

PROCEEDINGS
OF THE
Nova Scotian Institute of Science.

SESSION OF 1899-1900.

ANNUAL BUSINESS MEETING.

Legislative Council Chamber, Halifax, 20th November, 1899.

The PRESIDENT, ALEXANDER MCKAY, Esq., in the chair.

The PRESIDENT addressed the Institute, as follows :—

GENTLEMEN,—A review of the last year's work of this Institute may well be very brief. Meetings were held at the usual times, except in February, on account of a severe storm. Twelve papers were read and discussed, and another was read by title. These cover a wide range of subjects : Social science, geology, sanitary science, mineralogy, medicine, chemistry and botany, zoology and physics.

Prof. Davidson, of the University of New Brunswick, opens up a field new to the Institute by a valuable paper "On Statistics and Expenditure in Canada." In this and related studies there are splendid opportunities for unlimited research and the display of the highest order of talents. A paper by Prof. Russell on "School Room Air" will be of much interest and value to teachers. The tests recommended are inexpensive, and such as can be generally used. Teachers who have once made these tests will ever afterwards be more alive to the almost criminal carelessness of those who allow children to occupy badly-ventilated school rooms. Dr. A. P. Reid also deserves the

thanks of the Institute for calling attention to the spread of consumption by contagion and its prevention by means of properly constructed sanatoria, of which he exhibited a model. In the phenological observations of the school children, collected by Dr. MacKay, and in the experiments in physics and chemistry conducted by Messrs. Barnes and Lindsay—promising young students of Dalhousie College—we see hopeful signs of a reviving interest for science in Nova Scotia. Mr. Piers has favored us with “No. 5 of Notes on Nova Scotia Zoology.” Dr. Mackay, who is our only authority on the Diatomaceæ of Nova Scotia, has awakened a fresh interest in one of his favorite studies by another paper reporting progress, and by exhibiting excellent microscopic slides of our principal diatoms.

Upon the whole, then, the work of the year has been of very considerable interest and of some scientific importance.

We have added to our numbers two ordinary members, one corresponding member and three associate members. We record with sorrow the death in September of one of our oldest and most faithful members, Mr. J. J. Fox. He was born in Salisbury, England, in 1818. He studied medicine, but preferred a seafaring life, and spent many years full of adventure in Egypt, Greece, the West Indies and South America. In 1852 he was appointed by the Imperial Government comptroller of customs and navigation laws at Magdalen Islands.

A faithful performance of duties soon led to advancement, and for many years he was familiarly known as “governor.” He was characterized by modesty, bravery and humanity. For valuable services to shipwrecked mariners he was presented by the President of the United States with a magnificent gold watch valued at \$1,000. His intimate knowledge of the fisheries made him a most valuable witness before the Halifax fishery commission in 1877. After retiring from the civil service he lived in Halifax, joined the Institute, and seldom missed a meeting.

To-day brings us sad tidings of the death yesterday of Sir William Dawson, the most distinguished member of our Institute and the most eminent scientific man in Canada. He was born in Picton in 1820. At a very early age he began his studies in natural history, thereby cultivating his powers of observation, and thus laying the foundation for his remarkable achievements in geology subsequently. His success in this respect is a good argument in favor of the early introduction into our course of study of science teaching.

Mr. Dawson graduated from Edinburgh University at the age of 26. For four years he studied geology, travelling part of the time with Sir Charles Lyell, the greatest geologist of the world. At the age of thirty he was superintendent of schools for Nova Scotia, and did much to lay the foundation of our present educational system. In 1855 he was appointed Principal of McGill University, a position which he held until 1893, until he and the University had become famous the world over.

He was capable of a prodigious amount of hard work. In his favorite science he kept in the foremost rank, but he found it difficult to avail himself of the light thrown upon natural phenomena by the theory of evolution of which he was a most uncompromising opponent.

His extraordinary industry is shown by the large number of books and scientific articles which he wrote. Some of them were of very great value and are still used as text books.

His eminent services to science were acknowledged by his appointment as first President of the Royal Society of Canada in 1882, his election in the same year as President of the American Geological Association, and of the British Association in 1886. He received honorary degrees from various universities, and was knighted in 1884.

At the close of my address last year I referred to the fact that science was much neglected or very badly taught in our schools. As a remedy I suggested (a) that the colleges prescribe science as a subject for matriculation, (b) that for the academic license more scholarship, especially in practical science, and a long course of the best professional training be made imperative, (c) that higher qualifications in science be required for B licenses, and (d) that a large part of the provincial examination in science for grade A consist of laboratory work.

The progress of science teaching in other countries during the last year has all been in confirmation of the soundness of these principles. No doubt the time is near when we also must adopt them. When that day comes, and not until then, science will make satisfactory progress in all our educational institutions.

But it is perhaps more especially the province of this Institute to awaken the public to an interest in general science and to stimulate and assist individuals in particular fields of research.

In reference to this aim I may be allowed to make some additional suggestions :

1. We should have a scientific library easily accessible to scientific workers in every part of the Province. At present we have nothing of the kind. A collection of partially catalogued, somewhat inaccessible reports of scientific societies cannot be said to be such a scientific library as the majority of workers need, however useful it may be to those engaged in original research.

We require not less than 5,000 volumes of the latest books by the ablest men of science ; 10,000 would be better. In addition to this there should be complete sets of all the scientific periodicals in English, French and German.

Such a collection of standard science textbooks, supplemented by government reports on agriculture, forestry, fisheries, etc., and the reports of scientific societies, and managed by a competent librarian, would be of incalculable benefit. I have no hesitation in saying that I believe it is the duty of our government in its encouragement of technical instruction to establish such a library. If there existed an intelligent appreciation of its value the cost would not long be a hindrance, for the number of books required would not be large, and probably many of them would be received as donations.

But why should the government provide a science library any more than a law library or a historical library ? Because science in some form or other lies at the foundation of success in all the industries of the country, so that the government would be justified and supported in making an expenditure which would result in such general benefit. Facilities for scientific research would lead to discoveries which would pay the cost a thousand fold. Pasteur's discoveries were worth untold millions to France.

Although Nova Scotia is not large, populous or rich, yet her natural resources are so great and varied as to warrant the government in following the examples of other countries in respect to technical education; and the establishment of a good science library would be but the first and most natural step in that direction.

Recently I wanted to consult twenty or thirty scientific works and periodicals. In the three largest public or quasi-public libraries of Halifax I was able to find but one of them. No wonder that our ablest young men are lost to the Province when we deny them the opportunities for research which they readily obtain elsewhere.

Here let me call your attention to the most valuable and self-sacrificing labors of Dr. MacGregor and Mr. Maynard Bowman in connection with the library of this Institute. A few years ago, when they began work upon it, it consisted of a small number of unclassified reports from societies in various parts of the world. It now includes a large number of serial publications by scientific societies and other institutions, and numbers about 1,500 bound volumes with about as many more unbound. These have been placed in a room temporarily provided by Dalhousie College, and so arranged that any one desirous of consulting any volume would be able to find it without the assistance of the librarian.

The work of bringing order out of the confusion that existed at first, the cataloguing and labelling of so many books, searching and sending abroad for missing numbers, was an immense labor, which if performed by a paid expert would have cost several hundred, not less, perhaps, than two thousand dollars.

But in addition to all this, the addresses of other societies had to be searched and copies of our Transactions sent abroad to about 700 societies in all, by which means the number of valuable publications received each year was more than doubled. Surely when these two gentlemen have done so much, we may expect our provincial government to supplement their efforts by the addition to this library each year of a few hundred treatises. Then would it not be better that the library thus enlarged should be taken over by the government, properly housed and managed, and made free to the public?

Nor must I forget to say that the thanks of this Institute are due to the Governors of Dalhousie College for the use of a room at a time when our library became so large that it could no longer be kept in the place which it formerly occupied.

2. A properly conducted museum would do much to popularize science in our midst. A collection of dusty, unlabelled, badly arranged specimens does not amount to much and scarcely justifies the expense. Such a museum is the deadest of all dead things.

To be practically useful a museum requires a large, well-lighted, readily accessible room. It should primarily contain typical specimens of the most important natural bodies, arranged according to their chemical or organic affinities, so that the student may learn from them at a glance something of their relationship and the laws of nature

Especial attention should be given to the products of this Province. They should be scientifically marshalled and their industrial applications carefully and suggestively illustrated. Raw products in every stage of their manufacturing processes should be exhibited.

The museum should be in charge of a man of the broadest scientific culture, a man of business capacity, and a thorough teacher.

A museum thus equipped would do more for science than any college or any other agency. Every visitor from the country would return to his home with his curiosity awakened, and often with scientific problems or difficulties solved, with a new inspiration for further advances.

Such an institution would have organic connection with every high school and college in the province, exchanging specimens and thus enriching the local school museums, diffusing scientific information, and stimulating scientific activity.

How often throughout the last sixteen years have our teachers lamented the want of opportunity in this respect? During their holidays they would have made large collections of interesting objects which they would study in classes formed at the museum. Long since every school in the city, after the example of the German schools, would have been supplied with a respectable collection of labelled specimens for the instruction of their pupils, and the amount of scientific knowledge and interest would have been increased tenfold.

For the sake of economy and efficiency the museum and the science library should be in the same building and in charge of the curator of the museum.

Book and specimen are complementary and should be drawn as close together as possible. "First of all, their aims are identical, for they have the one end in view, the culture of the people; secondly, they appeal to the same mental faculties with which all men are endowed in a greater or less degree, and thirdly, to a very great extent one of them, the museum, to carry out its proper functions to a great measure, is dependent on the other. It leans upon it, as it were; it looks to it to minister to the museum visitors that information which the most comprehensive catalogue and labels in the world would fail to supply."*

If all the specimens were labelled giving references to the books in which they were best described, placed on a shelf near at hand, the

* C. W. Wallis, Curator Birmingham Art Galleries and Museum.

student's ability to do better work and the extent to which both library and museum could be utilized would be greatly increased. The tendency in England, Ontario and the United States is towards combining libraries and museums in the same building.

In conclusion, when the colleges come to see that good work in science in the high school gives, to say the least, as valuable mental discipline as classics, and vastly more of useful knowledge ; when the education department provides adequate professional training for the higher teachers, and subjects them to tests in the laboratory which will demonstrate their fitness for teaching science, and when the government will supply us with a well-equipped museum and science library in one building, then but not before we will make satisfactory progress in science.

The thanks of the Institute were presented to MR. MCKAY for his services as President.

The TREASURER'S report was presented, and having been audited and found correct, was received and adopted. The following is an analytical statement of the expenditure for 1898-99 :—

PUBLICATION OF TRANSACTIONS:—

Vol. IX, Part 4 (1897-98):

Printing and binding	\$171 40	
Less received for authors' separates and two copies sold	8 00	
	<u> </u>	\$163 40

Vol. IX, Parts 1-4. Preparation of Index 2 00

Vol. X, Part 1 :

Printing.....	\$ 8 00	
Photographs for Portrait	1 00	
Engravings	14 13	
Expressage	75	
	<u> </u>	23 88

Vol. X, Part 2, 3 or 4 :

Photograph for Portrait.....	25	
	<u> </u>	\$189 53

DISTRIBUTION OF TRANSACTIONS :—

Vol. IX, Part 4 :

Wrappers, receipts, wrapping, twine.....	\$14 50	
Addressing	15 00	
Postage, truckage, freight, expressage, insurance.....	15 39	
	<u> </u>	44 89

Carried for ward.....\$234 42

Brought forward \$234 42

LIBRARY EXPENSES :—

Insurance (including stock of Transactions)....	\$16 88	
Janitor, Dalhousie College, for services	5 00	
Asst.-Librarian, Dalhousie College, for services	10 00	
Librarian, clerical expenses.....	25 00	
Fittings	12 77	
Arranging Library, preparing card catalogue, etc.....	75 00	
Truckage.....	3 80	
Binding.....	95 65	
Freight and postage on back numbers of Transactions sent in exchange.....	4 01	
Petty expenses.....	2 55	
	<hr/>	250 66
Calling of meetings.....		28 00
Advertising.....		6 00
Postage (Secretaries and Librarian).....		11 85
P. O. Box.....		4 00
Miscellaneous printing (including stationery)		2 50
Type-writing.....		50
		<hr/>
		\$537 93

The Report on the Library was presented by the Librarian and Corresponding Secretary.

During the year the Transactions had been sent for the first time to the following :—

- *Königl. Landesarchiv, Agram, Austria-Hungary.
- Elektrotechnischer Verein, Berlin, Germany.
- Real Academia de Ciencias Naturales y Artes, Barcelona, Spain.
- Naturæ Novitates, Berlin.
- *Musée du Congo, Brussels.
- Baltimore Astronomical Society, Baltimore, Md.
- *Maryland Geological Survey, Baltimore, Md.
- Library, Harvard University, Cambridge, Mass.
- New Hampshire State Library, Concord, N. H.
- *Natural History Association of Miramichi, Chatham, N. B.
- *K. Vetenskaps- och Vitterhet-samhället, Göteborg, Sweden.
- Real Academia de Ciencias Medicas, Fisicas y Naturales; Habana, Cuba.
- Periodico di Matematica, Leghorn, Italy.

Lincolnshire Science Society, Lincoln, G. B.
 Public Library, Museum and National Gallery, Melbourne.
 *Canadian Mining Institute, Montreal.
 Club Alpin de Crimée, Odessa, Russia.
 Rivista di Patologia Vegetale, Portici, Italy.
 Pasadena Academy of Science, Pasadena, Cal.
 *Philadelphia Commercial Museum, Philadelphia, Pa.
 Rochdale Literary and Scientific Society, Rochdale, G. B.
 *Augustana College, Rock Island, Ill.
 "Minerva," Strassburg, Germany.
 *Institut de Botanique, R. Université des Etudes, Sienne, Italy.
 State Laboratory of Natural History, Urbana, Ill.
 Concilium Bibliographicum, Zurich-Neumünster, Switzerland.
 American Microscopical Journal, Washington, D. C.

Publications have been received for the first time from the institutions indicated by an asterisk in the above list, and from the following:

Observatorio de Manila, Manila.
 Education Department, Wellington, New Zealand.
 Public Museum, Wanganui, New Zealand.
 Birmingham and Midland Institute, Birmingham.
 "La Science Sociale," Paris.
 Treasury Department, Washington, D. C.
 South Staffordshire Institute of Iron and Steel Works Managers,
 Dudley, G. B.
 Radcliffe Observatory, Oxford, G. B.
 K. Ungarische Geographische Gesellschaft, Vienna.
 Société Anversoise pour la Protection des Animaux, Antwerp.
 Society of Civil Engineers, Boston.
 Halifax Scientific Society, Halifax, Eng.
 Université Imperiale de Moscou, Russia.
 Carnegie Museum, Pittsburg, U. S. A.
 K. Botanische Gesellschaft, Regensburg.
 Kansas State Agricultural College, Manhattan, Ka.
 Public Library, New York.
 Société Linnéenne de Lyon, Lyons, France.
 Academie des Sciences, Belles Lettres et Arts, Lyons, France.
 Royal Society of Victoria, Melbourne.
 Academy of Science, Washington, D. C.

New England Zoological Club, Cambridge, Mass.
Public Library, Museum and Art Gallery, Adelaide, So. Australia.
Engineering Association of New South Wales, Sydney.
Associazione Mathesis, Leghorn, Italy.
Wisconsin Geological and Natural History Survey, Madison, Wis.
Société Nationale des Antiquaires de France, Paris.
Lloyd Mycological Museum, Cincinnati.

The Transactions were now being sent annually to 779 institutions of various kinds, and exchanges had been received from 447.

The distribution of the Transactions to Corresponding Societies and other institutions in all parts of the world had again, through the courtesy of the Secretary of the Smithsonian Institution, Washington, been effected at small expense, through the Institution's Bureau of International Exchanges. The total expense of distribution had been \$44.89, which included printing of wrappers and receipt forms, wrapping and addressing as well as postage (on Canadian packages), and freight.

At the date of the last report 113 volumes were in the binder's hands. Subsequently 89 volumes were added to these; and these 202 volumes are now on the shelves. The total cost of binding them was \$170.65, but as \$75.00 was provided for last year, only the balance of \$95.65 appears in this year's account. The books bound were mostly English, but some foreign publications which were in demand by members were included. The number of bound volumes in the Library is now 1,482; and there must be a somewhat larger number of unbound volumes, though we have never made a count of the unbound volumes.

The recommendation made last year that a paid assistant should be provided to get the library into a condition in which it would be of greater use to the members, was carried out during the past year, the services of Miss N. K. MacKay, who had previously been Asst.-Librarian of Dalhousie College, having been secured for some weeks during the summer.

The following work was accordingly carried out:—

(1) The arranging of books on the shelves and the labelling of shelves referred to in last report, had been completed. It is thus possible for members to find any books they may desire without difficulty, even in the absence of the Librarian.

(2) All unbound volumes, in parts, were examined and tied up, note being made of their defects. This had previously been done in the case

of most of the English books. It has now been done for the whole library.

(3) Memoranda were made out for transmission to corresponding societies, of the parts lacking in our sets of their publications.

(4) A card catalogue of the whole library was prepared according to the method in use in the Library of the Academy of Arts and Science of Philadelphia. The catalogue in the case of serial publications specifies of course only the volumes of the various series which are on the shelves, without giving any clue to their contents. In the case of publications which, though issued by one institution, do not form a numbered series, each volume or report is separately catalogued. The catalogue consists of about 1200 cards.

While the whole of the work, carried out in an admirable manner by Miss MacKay, forms a necessary preliminary to the issue of a printed catalogue for the use of our members, we are not yet ready to issue such a catalogue, at least to issue one which would be permanently useful. For many of the unbound volumes in the library are defective, and it would be well to get these defects supplied as far as may be possible before printing. The Corresponding Secretary hopes during the present year to transmit the memoranda of defects referred to above to the various corresponding institutions, and to make some progress in getting the defects supplied.

The report was adopted, and the thanks of the Institute tendered to Mr. Bowman and Dr. MacGregor for their work in connection with the library.

On motion of DR. MACKAY, it was resolved that the Council be directed to prepare a resolution appreciative of the scientific career of the late Sir William Dawson and regretting his recent death.

It was resolved that the Council be instructed to approach the Government for the purpose of ascertaining if it would be possible for the latter to provide space, in the new Government building, for the accommodation of the Institute's library.

The thanks of the Institute were presented to the HON. ROBERT BOAK, President of the Legislative Council, for granting the use of the Council Chamber, and to the SECRETARY OF THE SMITHSONIAN INSTITUTION for his courtesy in continuing to admit the Institute to the privileges of the Bureau of International Exchanges.

The following were elected officers for the ensuing year (1899-1900):

President.—A. H. MACKAY, ESQ., LL. D., F. R. S. C., *ex officio* F. R., M. S.

Vice-Presidents.—F. W. W. DOANE, ESQ., C. E., and HENRY S. POOLE, ESQ., F. G. S.

Treasurer.—WILLIAM C. SILVER, ESQ.

Corresponding Secretary.—PROF. J. G. MACGREGOR, D. SC.

Recording Secretary.—HARRY PIERS, ESQ.

Librarian.—MAYNARD BOWMAN, ESQ., B. A.

Councillors without Office.—ALEXANDER MCKAY, ESQ. ; EDWIN GILPIN, JR., ESQ., LL. D., F. R. S. C. ; MARTIN MURPHY, ESQ., D. SC. ; WILLIAM MCKERRON, ESQ. ; PROF. EBENEZER MACKAY, PH. D. ; WATSON L. BISHOP, ESQ. ; RODERICK MCCOLL, ESQ., C. E.

Auditors.—HERBERT E. GATES, ESQ., and G. W. T. IRVING, ESQ.

FIRST ORDINARY MEETING.

Legislative Council Chamber, Halifax, 20th November, 1899.

The PRESIDENT, DR. MACKAY, in the chair.

The meeting was held after the adjournment of the Annual Business Meeting.

DR. H. M. AMI communicated a paper "On the Subdivisions of the Carboniferous System in Eastern Canada," but owing to the lateness of the hour the reading of the paper was deferred.

SECOND ORDINARY MEETING.

Legislative Council Chamber, Halifax, 11th December, 1899.

The PRESIDENT in the chair.

The council reported that ERNEST HAYCOCK, ESQ., Instructor in Chemistry, Mineralogy and Geology, Acadia College, Wolfville, N. S., had been elected an Associate member.

The following resolution was adopted :—"This Institute has learned with the greatest regret of the death of its distinguished Corresponding Member, SIR J. W. DAWSON, and desire to place on record its profound sense of the eminence of the services rendered by him to the cause both of Science and of Education, during a long life, which was happily as fully characterized by successful results, as by unremitting efforts towards the attainment of a noble ideal.

“The Institute desires to convey to LADY DAWSON and her family, an expression of the deep sympathy with which its members have heard of the sad bereavement she and her family have experienced.”

A paper by HENRY M. AMI, Esq., D. Sc., of the Geological Survey of Canada, “On the Sub-divisions of the Carboniferous System in Eastern Canada,” was read by DR. E. GILPIN who gave an introductory statement of a popular character. (See Transactions, p. 162).

The subject was discussed by DR. GILPIN, MR. J. FORBES and others.

The president, DR. A. H. MACKAY, said he was glad to have DR. AMI's views presented to the Institute. He spent a fortnight with Mr. Fletcher in running over the stream-exposed sections of the southern flanks of the Cobequids; and became deeply interested in some of the problems discussed in the paper. The extremely careful work done of late years had thrown new light on the problems attempted to be solved by the older geologists from their original but more limited observations. Mr. Fletcher has reason to feel gratified that Dr. Ami and Dr. Dawson admit that his maps of the region in question “show clearly the true and natural order of sequence of the formations;” so that the reference to “types that are everywhere held to be of carboniferous age” must indicate a revision of the older geological nomenclature of some regions. Sir William Dawson, a most eminent palæontologist as well as geologist, after studying the fossil plants and animals of Riversdale, MacKay Head, and Harrington River, placed them in the Millstone Grit formation as intimately related to those of the Coal Measures. Dr. Ami now correlates them with the Lancaster fern ledges (hitherto known as Devonian) of New Brunswick; but he would place them all in his new Eo-carboniferous. Of the twenty-one fossil species enumerated by Dr. Ami, fifteen were Dawson's own species. *Psilophyton glabrum* belonged to a genus hitherto generally considered to be characteristic of the Devonian. *Leaia Leidyi* (perhaps identical with *Leaia tricarinata*) was found in rocks called Devonian by many geologists. *Belinurus grandævus* and *Estheria Dawsoni* represented genera usually considered common both to the Devonian and the Carboniferous, with specific names given to specimens obtained from the rocks in dispute. Dr. Ami's new species *Sauropus Dawsoni* was stated to be only “apparently from rocks of this age.” Mr. Fletcher would appear to oppose the assumption that the rocks underlying the New Glasgow conglomerate-

are equivalent to the coal measures of Stellarton, according to his views given in the Report of the Geological Survey for 1886, which he did not appear to have since changed.

These differences of opinion demonstrated that new information was being acquired, and was in the course of being assimilated by the geologists. But whether taking the upper slice from off our old slenderly developed Devonian and attaching it with its unconformity to the base of our corpulent Carboniferous is the true rectification of the old nomenclature, remained, perhaps yet to be indubitably determined. If the true order of superposition of rocks can be ascertained at any point from the observation of their actual bedding, the palæontologist must modify his hypotheses based on defective biological horizons observed elsewhere, so as to harmonize with the facts of the stratigraphist. It was the stratigraphist in the first place who determined the biological horizons for the palæontologist. But the palæontologist with his biological horizon becomes the supreme arbitrator where the stratigraphist is not sure of his base, or of the order of superposition.

PROF. J. G. MACGREGOR, communicated a paper, "On Laws of Dilution for Aqueous Solutions of Electrolytes."

THIRD ORDINARY MEETING.

Legislative Council Chamber, Halifax 15th January, 1900.

The PRESIDENT in the chair.

A communication was read from the EIGHTH INTERNATIONAL CONGRESS OF NAVIGATION, inviting the Institute to appoint a delegate to attend the meeting of the Congress to be held at Paris in July next. The matter was referred to the Council for action.

JAMES BARNES, Esq., B. A., Dalhousie College, presented two papers:—

1. "On the Relation of the Viscosity of Mixtures of Solutions of Certain Salts to their State of Ionization." (See Transactions, p. 113).
2. "On the Calculation of the Conductivity of Aqueous Solutions containing Hydrochloric and Sulphuric Acids." (See Transactions, p. 129.)

A vote of thanks was presented to MR. BARNES for his communications.

FOURTH ORDINARY MEETING.

City Council Chamber, Halifax, 12th February, 1900.

The PRESIDENT in the chair.

A paper entitled : "Nova Scotian Minerals collected for the Paris Exhibition," was presented by EDWIN GILPIN, JR., ESQ., LL. D., F. R. S. C., Inspector of Mines. DR. GILPIN answered a number of inquiries made by those present, relative to the minerals of the Province. (See Transactions, p. 248.)

A communication by HENRY S. POOLE, ESQ., F. G. S., entitled "Notes on the Periodical Appearance of Ants in a Chimney, and on an Unusual Site for a Humble-Bee's Nest," was read by the RECORDING SECRETARY in the absence of the author, as follows :

"For many years, possibly fifteen, a flight of ants has annually tumbled down a chimney in the office of the Acadia Coal Co., at Stellarton, N. S., generally on August 24th, sometimes a day or two later, and occasionally a few ants again appear as late as the middle of September. Fires are used in the chimney each winter. A tinned roof has been put on the office since the ants first were seen, and the top of the chimney has been thoroughly repaired by masons without finding a nest. The habitat selected seems unusual, and so far has not led to the similar adoption by colonies of other chimneys in the same building.

"In a grove of young fir trees, about eight feet from the ground, I noticed one autumn a large robin's nest in unusually good repair. On pulling down the tree-top the nest was found to be full, with a dome shaped cone. It was occupied by humble-bees and a small comb with larvæ in it. Such a situation for a humble-bees' nest, I am told, has been seen before, but apparently it is unusual."

 FIFTH ORDINARY MEETING.

City Council Chamber, Halifax, 12th March, 1900.

The PRESIDENT in the chair.

It was announced that CHARLES PICKFORD, ESQ., had been elected a Corresponding Member.

A paper by C. M. PASEA, ESQ., of Dalhousie College, "On a relation between the Ionization Coefficients of Electrolytes, and its application as an Interpolation Formula," was presented by DR. J. G. MACGREGOR.

JAMES BARNES, Esq., B. A., Dalhousie College, read a paper "On the Depression of the Freezing-point by Mixtures of Electrolytes." (See Transactions, p. 139.)

The paper was discussed by Drs. MacGREGOR and MacKAY, and a vote of thanks was presented to the author.

DR. A. H. MacKAY, exhibited, with comments, material taken from the bottom of the Atlantic at four different points, by the Cable S. S. *Minia* in charge of Captain De Carteret, by whom the specimens were presented.

1. From lat. $40^{\circ} 47' N.$, long. $38^{\circ} 45' W.$, at a depth of 2544 fathoms, in June, 1899:—

a. A fragment of a dark igneous rock about $13 \times 8 \times 5 \text{ cm}$, not very unlike some massive, dark green traps of Nova Scotia. The Cable was hooked at the same time, but broke and slipped over the stone which was abraded in two separate places. The exact determination of the rock, as well as the other specimens, had to be postponed to a future opportunity after which the results of their special examinations would be communicated.

b. A fragment of gneiss or granite with dark, fine-grained mica, about a centimeter cube, in

c. Mud, which on an average of three samples gave 72 per cent insoluble in nitric acid, leaving 28 per cent for carbonate of lime in foraminiferal shells, and any other soluble matter which might be present. The species of foraminifera present were left for future enumeration. The mud was, therefore, about three-quarters* derived from decomposed rock, and contained specks of mica flakes among the minute sand grains also found in it.

2. From lat. $49^{\circ} 30' N.$, lon. $49^{\circ} 36' W.$, at a depth of 2594 fathoms, were taken on the 3rd July, 1894:—

a. A fragment of rock about $8 \times 4 \times 3 \text{ cm}$. It was a very compact, fine-grained, dark (with a band of light grey) chocolate quartzose felsite in appearance, breaking with a conchoidal fracture, a portion of one side looking as even as if it were ground plane. The light grey band on the opposite side suggested discoloration by weathering, and the conchoidal fracture in this portion was much rougher in its surface texture.

b. A fragment of a water-worn, whitish, cryptocrystalline quartzite pebble about 3 cm in its three dimensions.

c. Mud with small pebbles, containing what suggested the remains of a cœlenterate animal with slender stem, cylindrical body a few

centimeters long, with slender tentacular processes. This material was originally bottled in alcohol which had nearly all evaporated before examination, and the organism was not intact. The mud contained siliceous grains with occasional sponge spicules, &c.

3. From a depth of 30 fathoms, about 15 miles E. N. E. (magnetic) from Flat Point, Sydney, C. B.

a. Thin brachiopod shells, the largest about 28x22^{mm}.

b. What suggested arborescent Polyzoan Zœcia, about 1^{dm} high, the cylindrical spray of branches having a diameter of about 15^{mm}.

c. A sheet of the eggs of a gastropod.

4. From between

lat. 43° 52' N., lon. 58° 53' W. in 500 fathoms,

lat. 43° 53½' N., lon. 58° 59½' W. in 858 fathoms,

and lat. 43° 56' N., lon. 59° 3' W. in 170 fathoms.

A coral, of the form of *caryophylia*, rising from a thin encrustation partly surrounding a pitch-covered cylinder (Cable) about 3^{cm} in diameter, with a stem about 1^{cm} at the base, gradually expanding until at a height of 4^{cm} it formed an elliptical cup-shaped corallite about 3.5^{cm} and 4.5^{cm} in diameter, filled with numerous septae of unequal height, in one series.

SIXTH ORDINARY MEETING.

Legislative Council Chamber, Halifax, 9th April, 1900.

The PRESIDENT in the chair.

The RECORDING SECRETARY read a communication from the Royal Society of Canada, inviting the Institute to appoint a delegate to attend the nineteenth general meeting of the Society to be held at Ottawa on the 29th of May next. The communication was referred to the Council for action.

PROF. ERNEST HAYCOCK of Acadia College, Wolfville, N. S., read a paper entitled: "Records of Post-Triassic Changes in Kings County, N. S." (See Transactions, p. 287.)

The subject was discussed by DR. GILPIN and MR. MCKAY, and a vote of thanks was presented to the author.

The PRESIDENT, A. H. MACKAY, Esq., LL. D., read a paper on "A Fresh-Water Sponge from Sable Island." To this species Dr. MacKay proposed to give the name *Heteromeyenia Macouni*. The subject was illustrated by microscopic preparations. (See Transactions, p. 319).

SEVENTH ORDINARY MEETING.

Legislative Council Chamber. Halifax, 14th May, 1900.

The PRESIDENT in the chair.

It was announced that the PRESIDENT, DR. MACKAY, had been appointed delegate to represent the Institute at the forthcoming meeting of the Royal Society of Canada.

It was reported that progress had been made in fitting up a room for the library of the Institute, etc., in the new government building, Hollis Street.

In the absence of the author, DR. MACGREGOR read a paper by PROF. JOHN DAVIDSON, of the University of New Brunswick, Fredericton, on "The Natural History of Money." (See Transactions, p. 179.)

The paper was discussed by COLONEL McSHANE, DR. H. H. READ, FRERERICK P. RONNAN, ESQ., and others, and a vote of thanks was presented to PROF. DAVIDSON for his communication.

A. H. MACKAY, ESQ., LL. D., F. R. S. C., read a paper entitled "Phenological Observations, Canada, 1899." (See Transactions, p. 303.)

A paper by T. C. HEBB, ESQ., B. A., Dalhousie College, "On the Variation of the Rigidity of Vulcanized India Rubber with Tension," was presented by DR. MACGREGOR. (See Transactions, p. 273.)

The following papers were read by title :—"Notes on a Cape Breton Mineral containing Tungsten, and on the effect of washing certain Cape Breton Coals,"—By HENRY S. POOLE, ESQ., F. G. S., Stellarton, N. S. (See Transactions, p. 248.)

"Geological Nomenclature in Nova Scotia,"—By HUGH FLETCHER, ESQ., Geological Survey of Canada. (See Transactions, p. 235.)

A collection of dried plants from the vicinity of Buffalo, U. S. A., made by REV. BROTHER JUNIAN PETER, St. Joseph's Commercial College, Detroit, and presented by him to the Institute, was shewn, and a vote of thanks was passed to BROTHER PETER for his gift.

The council was authorized to receive as having been read by title, any papers that might be offered too late for this meeting. [Under this resolution a paper subsequently submitted by PROF. J. G. MACGREGOR, "On a diagram of Freezing-point Depressions for Electrolytes," was accepted by the Council. (See Transactions, p. 211).]

HARRY PIERS,
Recording Secretary.