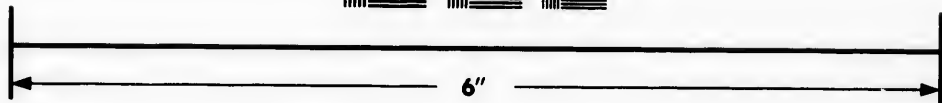
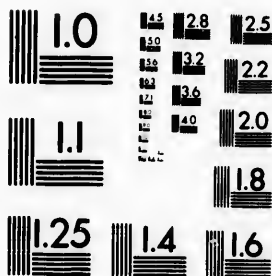


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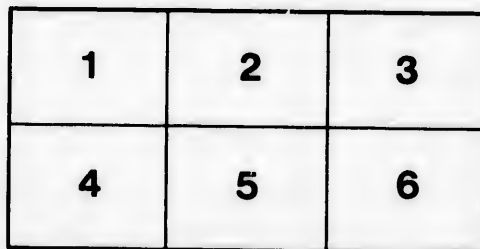
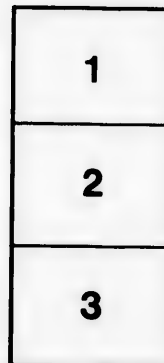
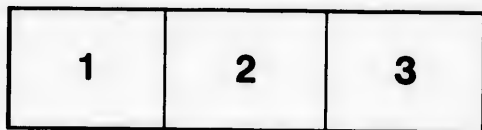
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Nova Scotian . . .  
Institute of Science.

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PRESIDENT'S ADDRESS,

1894.

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ADDRESS

TO THE

Nova Scotian Institute of Science,

READ AT THE

OPENING MEETING OF SESSION, 1894-95,

NOVEMBER 12th, 1894,

BY

GEORGE LAWSON, Ph.D., LL.D., F.R.S.C.,

PRESIDENT.

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NOVA SCOTIA PRINTING COMPANY.

1894.





## PRESIDENT'S ADDRESS

TO THE

### NOVA SCOTIAN INSTITUTE OF SCIENCE.

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GENTLEMEN,—

We have assembled this evening as Members of the NOVA SCOTIAN INSTITUTE OF SCIENCE, for the performance of two distinct duties,—first, to close the session of 1893-94, which we now speak of as past: and, secondly, to enter upon the operations of another year and lay plans for the future. We are thus required, Janus-like, to put on two faces, one looking backward, the other forward. The annual address must be to a large extent a looking backward, for it is expected we shall give some account of our stewardship. It is my place as president to deliver the address on this occasion, because a year ago you thought fit to appoint me to fill your most honorable office. I was conscious that you might well have made a better choice, for I felt that the president of a scientific body like this should be prepared to give time and energy for more arduous labor than that of sitting in a chair at the monthly meetings. I was not ignorant of the fact that the most active workers are apt to entertain an abnegative spirit in regard to such things, to shirk prominence and seek gratification in the quiet pursuit of knowledge rather than the attainment of personal distinction. While this spirit was to be respected, it did not afford a sufficient reason for my acceding to your request; but, on the other hand, I knew that the compliment which you wished to pay me after thirty years' membership of the Institute was sincere, and was actuated by the kindest feelings. When, moreover, I

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was assured of substantial help from the resident vice-president and secretaries, it seemed that no other course was left me but to accept the position, to thank you all for the honor you had conferred upon me, and proceed to do what I could in discharge of the duties so undertaken.

And now that my term of office is completed, I ask your attention to a brief review of the operations of the year. This will enable us the better to realize our position in the present, and to forecast the work that remains for the future. So fortified, we may make a fresh start.

It is pleasing to be able to record that this year our membership has not been reduced either by death or resignation. Our list has been increased by the admission of seven ordinary and two corresponding members.

During the session, seven ordinary monthly meetings for the reading of scientific papers were held. At these meetings twenty papers were read; their subjects presented considerable variety. The session commenced, in accordance with our laws, with the annual meeting of members of 8th November, when Dr. Martin Murphy, the retiring President, read an address, in which he reviewed the work of the bye-gone year. On the same evening an ordinary public meeting was constituted. The first paper read was by Prof. MacGregor, of Dalhousie College, on the isothermal and adiabatic expansion of gases; its object was to show how certain important laws of the expansion of gases, extensively employed in the study of heat engines, and usually demonstrated by the aid of the calculus, may be demonstrated by the use of elementary mathematical methods. The demonstration of these laws was thus brought within the comprehension of engineers who had not had the advantage of extensive mathematical training.

At the December meeting, Dr. Somers called attention to the native forms of juniper, giving details of his observation

of the variations in habit of these plants, and exhibiting living specimens showing more particularly the upright arborescent or tree-forms of *Juniperus communis*, a species which, both in Europe and America, commonly appears on bare hills and sand-dunes as a depressed bush without any erect main stem. He also exhibited a stuffed specimen of *Lanius borealis*, and read notes on its butcher-bird habits, distribution, and local occurrence. Both of these subjects elicited information from members of observations they had made. The discussion that ensued in regard to the juniper-forms led to expression of the view that depressed and bush forms of *Conifere* are to be regarded in general, not as incipient trees in process of development or evolution, but rather as degenerate or dwarfed forms of species that now exist, or have formerly existed, normally as trees. We do not now have the proper forest-tree-form of *Juniperus communis* anywhere, but our native yew bush, *Taxus Canadensis*, while it occurs nowhere on *this* continent as a tree, is believed by many botanists to be conspecific with the English yew, the trunk of which attains great size as well as antiquity: it is the tree that furnished wood for bows to the English bowmen. Mr. Guildford R. Marshall, Principal of Richmond School, gave an account of the observation of earthworms on roofs, etc., as if they had fallen in a shower: the facts narrated suggested several possible explanations of the phenomenon, in connection with which details of the habits of these familiar but despised creatures were brought forward by members. At the same meeting, the President offered remarks on some features of the Kentucky Flora, pointing out the prominent differences in the vegetation of the Kentucky plains or low-lands from that of Nova Scotia, while the hill or mountain plants were, in certain cases, identical with our species, or presented equivalent forms. These remarks were founded on, and illustrated by, speci-

mens collected during the season by Mr. Kearney, of the Botanical Department of Columbia College, New York, where much good botanical work is being done.

At the January meeting (1894), Dr. Gilpin, Deputy Commissioner of Mines, gave a geological description of the Nietaux iron-ore-field, which has of late years acquired increased economic importance. The reading of this paper led to an interesting discussion on the general geological features of the district, which was familiar to Dr. A. P. Reid and other members present. Mr. Doane, our City Engineer, gave an account of the operation of the "Kennedy Scraper," so-called, and an explanation of the cause of a recent failure in its working when introduced into the city water pipes. The interesting history of this invention for automatically freeing water-pipes from rust-incrustation was detailed, the apparatus shown, its mode of working described, and its use in our city water works fully explained.

The February meeting was occupied with botanical subjects. Notes were given on the botanical and commercial history of Nova Scotian foxberries, an export trade in which has been developed to a surprising extent within the last few years, especially in Guysborough County. Mr. G. H. Cox, B. A., communicated a list of plants collected in and around the Town of Shelburne, on the Atlantic Coast of our Province, in the years from 1890 to 1893. The Institute had previously given space in its Transactions (vol. VI., pp. 209-300, and pp. 283-285) to two similar lists of the native plants of Truro, in Colechester County, by Dr. George G. Campbell, which are supplemented this year by a list of additional species collected in that locality by Mr. Percy J. Smith. Such lists as these, when prepared with care, form valuable material for the preparation of local floras, as well as for Provincial or more general works, and the opportunity should not be lost to call attention to the substantial service that may

be rendered to botanical science by the preparation of such lists for localities throughout the Province by those who have opportunities, by residence or otherwise, for local observation and collection.

The March meeting was taken up with astronomical, electrical and chemical subjects. Mr. Cameron, Principal of Yarmouth Academy, whose papers on astronomical observation, published in the periodical press at different times, have so greatly interested the general public, gave us his notes of observations on Venus. These notes may be regarded as a sequel to his previous papers on that planet, of which he has for some years made a special study, with regard more particularly to her visibility from the earth under the changing conditions of elongation from the sun, brilliancy, position, and state of our atmosphere. It seems desirable, therefore, to advert briefly to the general results reached by the author in each of his two previous papers.

In the first volume of the second series of our Transactions, Session 1892-93 (pp. 148-159), Mr. Cameron dealt with the enquiry: On how many (astronomical) days in the year may Venus be seen with the naked eye? The answer to this question involved a discussion of the motion and changes of the planet and of the geometrical conditions upon which her brilliancy depends. By constant watchfulness he succeeded in recording a valuable series of observations at Yarmouth, while notes of others made at Marseilles were obtained from M. Bruguiere, who had been engaged on the very same work for several years before. During 1890, when Venus began her season as evening star with the superior conjunction of February 13th, and ended with the inferior conjunction of December 4th (a period of 290 days), Mr. Cameron saw her with the naked eye as early as March 16th, and Mr. Bruguiere as late as November 29th, so that she was visible to the naked eye that season on 259 days out of the total

290. In his second paper (Trans. Inst., ser. 2, vol. 1, pp. 345-358), our author dealt with the visibility of the planet in *daylight* to the naked eye and with aid of the opera-glass, and effectually dispelled the common notion that Venus could be seen with the naked eye in daylight on very rare occasions only. From the long course of patient, I might say persistent, observations made, Mr. Cameron was enabled to determine that on the average, out of every 100 days there are 84 on which any star-gazer with a fairly good eye can see Venus in daylight, if the weather permits and if he knows where to look for her. The paper of the past session brings the bright planet before us in another role, its object being to detail observations of her performance of the two characters of *evening* and *morning* star "at the same time," and to explain the conditions which bring about this phenomenon. The paper will be found *in extenso* in the forthcoming part of Transactions, now passing through the press. One feature of these papers ought not to be omitted; they consist not of mere observations and results (although it will be seen that these are of great interest), but give details explaining clearly the facts necessary to be known by those who, without having the advantage of previous training in systematic observation, may wish to observe for themselves the phenomena so well described; these papers will thus serve as a guide to young observers, and may help to correct the fault which their author finds with the general public, who, nowadays, he thinks, are not much given to looking heavenward either by night or by day. We wait with expectancy for the next secret which Mr. Cameron is going to wrest from the fair star of his affection.

At the same meeting, Mr. F. J. A. McKittrick, B. Sc., communicated a paper on the measurement of resistance of electrolytes; it consisted chiefly of a report of research

work done in the Physical Laboratory of Dalhousie College under Prof. MacGregor, and may be regarded as an earnest of still more important work that is expected from Mr. McKittrick in the future, for he was this year nominated by the University Senate, and accepted by Her Majesty's Commissioners of the London Exhibition of 1851 as recipient of one of their Science Scholarships. This scholarship, of the annual value of one hundred and fifty pounds sterling, is tenable for two years on the condition that, during his tenure, the holder shall devote himself wholly to study and research, more especially in some branch of science, such as physics, mechanics or chemistry, the extension of which is especially important to our national industries. The Senate's nomination to the Royal Commissioners was accompanied by a copy of Mr. McKittrick's paper from the Institute Transactions to show the author's capacity for research work.

Mr. D. M. Bliss, electrician, Amherst, in a paper titled, "The coming development of artificial illumination," set forth a number of interesting facts and problems that are now engaging the attention of electrical engineers, and that are not only of scientific interest, but also prospectively of economic importance to civilized communities.

Mr. John Forbes, whose mechanical inventions in connection with iron manufactures have brought fame to our city, presented us with a review of some modern methods in manufacturing, with suggested analogies from a study of the evolution and nature of some of the processes employed. The reading of this paper led to an interesting discussion on the processes of manufacture of the different kinds and qualities of iron and steel, the observations of the speakers being well illustrated by a series of samples exhibited by Mr. Forbes, which showed the several progressive steps in the processes of manufacture.

Our April meeting was held in the Church of England Institute building; the attendance was unusually large, both of ladies and gentlemen, notwithstanding the disagreeable weather. The evening was entirely devoted to a paper by Dr. D. A. Campbell, titled "General considerations concerning Bacteria, with notes on the bacteriological analysis of water." Dr. Campbell had studied Bacteriology at Johns-Hopkins University, where unusually ample facilities are offered, and he has continued the investigation since his return to Halifax. In this paper he gave a clear exposition of the most important results of bacteriological enquiry up to the present time. He described the principal forms of bacteria, with respect to their characteristic features in form and size, the changes which they undergo, the parts they play in the economy of nature, as in putrefactive processes, in converting organic substances into suitable compounds for plant food, and in their relation to such diseases as anthrax in the lower animals, and diphtheria and cholera in the human race. The author described the general methods of bacteriological work, the modifying modes of culture by which vaccines are produced, and showed the several forms of apparatus and appliances used. The whole subject was admirably illustrated by preparations and live cultures shown under excellent microscopes. The water supplied to the City of Halifax had been examined, and was found to be remarkably free from deleterious bacteria; the author, however, offered suggestions as to keeping the lakes clear of decaying vegetable matter that might at any time menace the health of the city. The animated discussion that followed was a feature of the meeting. Dr. A. H. Mackay, who had also studied the subject, showed by calculation the prodigious rate at which bacteria multiply, and enforced upon the audience the object lesson of necessity for scrupulous cleanliness in the kitchen which the fleeting life-histories of the bacteria taught us. Dr.



Somers expressed his belief that the investigation of bacterial phenomena was of scientific interest, but he could not admit that the germ theory of disease had been established. Dr. A. P. Reid, on the other hand, regarded bacteriology as of vital importance to the medical profession, and to the people, and congratulated the Institute on being the means of presenting to the community an exposition and illustration of this subject that every one could appreciate; to-night, he said, for the first time in the history of medical science in Halifax, the living and moving bacillus of cholera had been shown.

The May meeting, being the last of the session, was overerowed with papers: eight were brought forward, several having lain over from previous meetings. Some had to be read by title only. The first was a notice of a new test for Antipyrine, by the President. Antipyrine is the therapeutical name and that commonly used, for the chemical compound properly called oxy-phenyl-dimethyl-pyrazole, or phenyl-dimethyl-pyrazolon: it belongs to the great class of aromatic compounds, of which Benzene  $\text{CH}_6$  is the type; but it differs from the benzene derivatives in containing a pentagonal in place of a hexagonal nucleus. The chemical constitution of the compound was explained by means of diagrams of the graphic formulæ of related compounds, and the several known tests were shown. The special test referred to for detecting, or confirming the detection, of this compound, is the re-action obtained by prolonged boiling with strong nitric acid, a brilliant solution somewhat like that of roseine, but with a purplish tinge, being produced.

Dr. Mackay, the Superintendent of Education, presented a valuable summary of observations for the season of 1893, of the dates of flowering of plants, and of the appearing of migratory birds. Dr. Somers exhibited and described a

sponge obtained by Mr. Andrew Sullivan, one of our fishermen, at the neighbouring fishing village of Herring Cove; it has not yet been identified with any described species. Mr. H. Piers gave valuable notes on Nova Scotian zoology. Dr. Henry Ami, of the Dominion Geological Survey, contributed an account of a collection of silurian fossils from Cape George, Antigonish County, with descriptions of three new species. Dr. R. V. Wells gave notes on sedimentary formations on the Bay of Fundy coast. Mr. W. H. Prest's observations on deep mining in Nova Scotia concludes our catalogue of papers read during the Session of 1893-94.

At the thirteenth meeting of the Royal Society of Canada, held in May, 1894, the Institute was represented by our Vice-President, Dr. A. H. Mackay, who presented a report of our operations during the year; this has been printed in the Royal Society's Minutes of Proceedings for 1894, pp. xxvii-xxviii.

Having thus briefly dealt with the work of the session just closed, I may be permitted as an old member to extend my remarks to the circumstances under which the Institute originated more than thirty years ago, although the time now available will not admit of more than a mere glance at its early history and progress.

This Institute was originally organized in the winter of 1862-63, the former being the year of the London International Exhibition. Long before that time the Mechanic's Institute formed a centre of scientific and literary life in the City of Halifax, but it had then ceased to exist, leaving its museum as a memento in the old building of Dalhousie College. About the time when the proposal to hold the London Exhibition of 1862 was announced, it was felt here that it would be of substantial advantage to the Province to make known its resources and products to the world, and this International Exhibition

seemed to offer a fitting opportunity for doing so. It was accordingly determined to collect and forward a suitable contribution of specimens to the exhibition. This was a new kind of work in Nova Scotia: the task proved an arduous one, although the government was liberal in providing the means for obtaining what money could purchase, and those who were engaged in carrying out the work felt especially the need of scientific help in placing the products of the country before the nations of Europe. Thus was suggested the great want of some permanent organization to foster the scientific spirit in Nova Scotia. A society had been recently formed for the reading of literary papers. Some of the more active members were now engrossed with the arrangements for the Nova Scotian exhibit in London, and the literary society readily gave place to an organization of a scientific kind under the name of the Nova Scotian Institute of Natural Science. The inaugural address was delivered by PHILIP CARTERET HILL, D. C. L., President, who died rather suddenly at Tunbridge Wells in September last, and to whose memory there is an appreciative notice in the last issued number of the King's College Record. As mayor of the city, provincial secretary and premier of the Province, and in other important positions, he took an active part in civic and Provincial affairs. He afterwards removed to England, and during his residence there had been engaged in religious and philanthropic work, occasionally also contributing to the literary journals. He is pleasantly remembered by many citizens of Halifax as a genial, benevolent, scholarly, Christian gentleman.

In his inaugural address, at the first meeting of the Institute, Dr. Hill pointed out that however great the ardor or untiring the efforts of individual laborers in science might be, their isolated labors would really tend

but little to enlarge the boundaries of human knowledge. Communication with each other, every laborer in the field casting his contribution into a common receptacle, whence all could freely draw, could alone give those results of individual effort their highest value. "It is then," he said, "to aid in this important work, and to afford a well constructed and organized channel for the contributions to the general stock of knowledge of those among ourselves who are interested in the fascinating fields embraced in the term 'natural science,' that the Nova Scotian Institute has been established. Should our hopes not be disappointed, we look forward to the time when our 'Transactions' shall be exchanged with older and more important institutions, and any new and well authenticated fact, having passed the ordeal of our own local organization, shall be transmitted to the great centres of science, and become the property of the whole world. \* \* The object of the Institution is to stimulate effort, and to aid and encourage the student by giving a recognized position and permanency to the results of his labors. If we succeed, in however limited a measure, in effecting this object, our intention in founding the association will be fulfilled, and our humble efforts for the promotion of science and the elevation of our native land will be abundantly rewarded." The Hon. Dr. Hill could hardly have expected then that these prophetic utterances would have been so fully realized as they were in his own lifetime, for, owing to the strenuous exertions of some of our members: chiefly I believe Dr. MacGregor and Mr. Maynard Bowman, there is now no country under the sun whose scientific societies (where such exist) do not have our Transactions on their library shelves as exchanges for their own. (The exchange list presented this evening shows that our annual distribution of Transactions to such

libraries throughout the world amounts to upwards of seven hundred copies.)\*

While sentiments such as those expressed in Dr. Hill's address were entertained by the organizing members who looked to the Institute they were creating as an association for the promotion of pure science, it was no doubt felt, on the other hand, by the business or more practical classes of the

\* Statement of the number of scientific and other institutions, including societies, universities, government scientific offices, libraries, etc., to which the Transactions of the Nova Scotian Institute of Science are sent, and from which exchanges have been received. This list exhibits the extensive distribution of the volumes, and shows how large an audience may be gained by those who contribute scientific papers to the Institute's publications:—

	NUMBER OF INSTITUTIONS	
	To which Trans- actions are sent :	From which exchanges are rec'd :
Great Britain.....	126	59
France.....	62	21
Germany.....	87	57
Russia.....	18	11
Austria-Hungary.....	23	10
Norway.....	12	11
Sweden.....	11	6
Belgium.....	14	4
Netherlands.....	9	4
Italy.....	34	18
Switzerland.....	15	8
Servia.....	1	0
Spain.....	2	0
Portugal.....	1	0
Denmark.....	5	2
India.....	8	2
China.....	2	0
Malta.....	1	0
Mauritius.....	1	0
Straits Settlements.....	0	1
Japan.....	2	1
South Africa.....	2	1
Australasia.....	34	20
Brazil.....	3	1
Chili.....	1	1
Argentina.....	1	1
British Guiana.....	1	1
Central America.....	2	2
Mexico.....	4	4
West Indies.....	4	1
United States.....	156	96
Newfoundland.....	1	0
Canada (exclusive of Nova Scotia).....	11	1
Nova Scotia.....	22	37
Totals.....	709	383

community, that the want of home information in regard to our industrial resources in general, and our mines and minerals particularly, was a great evil, restraining the progress of our industries,—for coal mining was going on apace, iron was being produced at Londonderry, gold had been discovered at Tangier, and was being picked up in other places along the Atlantic coast. Such memoirs on the new mineral industries as had been prepared, either by native scientists or professional miners, were then necessarily published beyond the Province. Thus, in a paper by Prof. How of King's College, read to the Institute on the 4th April, 1864, on iron ores, he remarked: "Many facts have been given in original papers by myself and others, published almost exclusively out of the Province, during the last few years, and are scattered through the pages of various periodicals; \* \* \* and I propose, now that an Institute of Science exists in the Province which has a prospect of permanence and an established system of publication of its Transactions, to offer for the consideration of its members, from time to time, such notes on the minerals of Nova Scotia as I hope will be acceptable and useful."

For thirty two years the work of the Institute has gone steadily on. The monthly meetings have been regularly held; the channel for publication of scientific papers has been maintained; the fasciculus of them under title of Transactions has been annually issued, and of late years we have been able to illustrate papers more freely.

Many who took part in the work during the early period of the Institute's history have passed away; their names will not be forgotten. The papers they have left behind in our Transactions will be consulted and quoted by the generations to come of students working in the several departments to which they relate. Others have come in from time to time to

take the places of those who dropped out of our ranks year by year, and, while we cannot boast of any great increase in our band of laborers, yet the Institute remains in an active state, annually turning out a certain amount of substantial work, and exercising, we trust, a healthy intellectual influence in the community. The proceedings at our monthly meetings may be of limited interest to the general public, but our door is always open to any who care to hear what progress is being made in matters of science in which our Province is interested. We are accumulating by exchange a reference library that will be of great service for future work, and we are only waiting for the necessary building accommodation to assist in filling up the collections of our Provincial Museum, so as to make them an adequate representation of the natural wealth of the Province, and afford to our own people and to visitors from abroad a view of our mineral, agricultural, forest, fisheries, shipping and manufacturing industries commensurate in some measure with their growing importance.

In conclusion, I would like to call attention in a prominent manner to the fact that we are no longer limited to the domain of *natural* science. With an abbreviation of name made some years ago to that of the Institute of Science, we extended our range so as to embrace all departments. Our membership has not in consequence increased in the proportion that might have been expected. Almost every kind of industrial work nowadays, except mere manual labor, requires, on the part of the worker, some acquaintance with scientific facts and principles, and, in certain cases, regular scientific training. With our advanced civilization and industrial development, surely there must be more persons in this Province devoting some portion of their time to scientific work than those whose names are inscribed on the membership roll of the Institute of Science. To all such we extend a hearty invitation to come and join us!

# NOVA SCOTIAN INSTITUTE OF SCIENCE.

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PATRON—HIS HONOR MALACHY BOWES DALY, LIEUT.-GOVERNOR.

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## OFFICERS AND COUNCIL FOR 1894-5.

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F. R. S. C.	WILLIAM McKERRON.
JOHN SOMERS, M. D.	W. A. BISHOP.
F. W. W. DOANE, C. E.	

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THE Institute of Science meets, during the Winter Session, on the second Monday of every month, at 8 P. M., for the reading of Scientific Papers. To these meetings the public are invited. Those desirous of becoming members, or of communicating Papers or notices of scientific discoveries, may address the Corresponding Secretary, PROF. MacGREGOR, *Dalhousie University, Halifax, N. S.*



LAW S  
OF THE  
NOVA SCOTIAN INSTITUTE OF SCIENCE.

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NAME AND OBJECT.

1. The name of the Society shall be "The Nova Scotian Institute of Science."
2. The object of the Institute shall be the promotion of scientific research.

MEMBERSHIP.

3. The Institute shall consist of Ordinary, Associate, and Corresponding Members.
4. All persons, whatever may be their place of residence, shall be eligible for Ordinary membership.
5. All persons who reside at a distance of more than ten miles from the City of Halifax shall be eligible for Associate membership. No persons who reside within that limit shall be Associate Members.
6. All persons who reside outside of Nova Scotia shall be eligible for Corresponding membership. No persons resident in Nova Scotia shall be Corresponding Members, except by special permission of the Council.

ADMISSION OF MEMBERS.

7. Every candidate for admission as a member shall be proposed and recommended by two or more members, who shall, at an ordinary meeting of the Institute, cause to be delivered to the Recording Secretary a paper signed by themselves, specifying the full name and the usual place of residence of such candidate. Candidates thus proposed shall be balloted for at the next meeting of the Council.
8. Every person chosen as a member shall have immediate notice of his election given him by the Corresponding Secretary, who shall also send him a copy of these Laws.
9. No member elect shall enjoy the privileges of membership until he shall have paid his first annual subscription, except by special permission of Council.

PRIVILEGES OF MEMBERS.

10. An ordinary member shall have the following privileges, viz.: (1) that of reading scientific papers at the ordinary meetings of the Institute, (subject to the regulations of §§ 52-54); (2) that of speaking and voting on all matters that may be brought for decision before all meetings of the Institute; (3) that of bearing any office in the Institute to which he may be elected; (4) that of receiving, gratis, (subject to the regulation of § 18) a copy of such parts of the Institute's Transactions as may be published subsequently to his admission; and (5) that of using the Institute's Library and Museum.
11. Associate and Corresponding Members shall have the following privileges, viz.: (1) that of reading and discussing scientific papers at the ordinary meetings of the Institute) subject to the

regulation of § 52-51); (2) that of receiving gratis, (subject to the regulation of § 18), one copy each of such parts of the Institute's Transactions as may be published subsequently to their admission; and (3) that of using the Institute's Library and Museum.

#### PAYMENTS BY MEMBERS.

12. Every Ordinary Member shall pay to the Recording Secretary either an annual subscription of Two Dollars, or one fee of Twenty Dollars in lieu of all such annual subscriptions.

13. Every Associate Member shall pay to the Recording Secretary either an annual subscription of One Dollar, or one fee of Ten Dollars, in lieu of all such annual subscriptions.

14. An Associate Member may at any time become an Ordinary Member by undertaking to pay the fees of an Ordinary Member, and, in the event of his having paid the life composition fee of an Associate Member, the payment of an additional fee of Ten Dollars shall exempt him from the payment of annual subscriptions.

15. Corresponding Members shall not be required to pay fees.

16. The annual subscriptions shall be payable in advance, and shall be due at the date of the Annual Business Meeting.

17. Members who fail to pay their annual subscriptions for two successive years, due application having been made to them by the Recording Secretary, shall be reported to the Council, and, if the Council see fit, they shall be declared from that period to be no longer members. Such members shall not be eligible for re-election whilst arrears due at the time of their removal remain unpaid.

18. No member who is in arrears in the payment of his annual subscription shall receive the Transactions gratis.

#### PATRON.

19. His Honor the Lieutenant-Governor of the Province of Nova Scotia, for the time being, shall be requested to become the Patron of the Institute.

#### OFFICERS AND COUNCIL.

20. The officers of the Institute shall be a President, two Vice-Presidents, a Treasurer, a Corresponding Secretary, a Recording Secretary, and a Curator of the Museum and Library.

21. The affairs of the Institute shall be managed by a Council composed of the officers of the Institute, together with seven members without office.

22. The officers and other members of Council shall be elected annually, at the Annual Business Meeting. The election shall be by ballot, unless the meeting by a unanimous vote choose some other mode.

23. A retiring member of Council shall be re-eligible; but no member shall hold the office of President for more than three years in succession.

24. Any casual vacancy occurring in the Council may be filled up by the Council.

25. The duties of the officers and other members of Council shall terminate at the conclusion of the Annual Business Meeting.

#### DUTIES OF THE OFFICERS AND COUNCIL.

##### *A.—The Presidents and Vice-Presidents.*

26. The President shall act as Chairman at all meetings of the Institute or of the Council at which he may be present, and shall discharge such other duties as are laid upon him by these Laws.

27. In the absence of the President, one of the Vice-Presidents shall discharge the functions of the President.

28. If at any meeting of the Institute or Council, neither the President nor either of the Vice-Presidents be present, some other ordinary member shall be elected chairman for the occasion.

29. The President, shall, if he sees fit, deliver at the Annual Business Meeting an address to the Institute, reviewing the progress of the Institute during the year, giving a short sketch of the life and scientific work of members deceased during the year, and treating such other topics as he may deem conducive to the welfare of the Institute and to the promotion of its objects. If the President do not desire to deliver such an address, the Corresponding Secretary shall present a report to the Institute on the same subjects.

*B.—The Treasurer.*

30. The Treasurer shall keep a proper account of the income and expenditure of the Institute. He shall submit his accounts with vouchers for payments made by him, to be audited once in each year, and shall produce the account books properly posted up, when required by the Council. He shall present to the Institute at the Annual Business Meeting a balance sheet and report signed by two auditors. The auditors may be elected at any meeting of the Institute.

31. No sum of money, amounting to five dollars or upwards, shall be paid except by order of the Council, signed by the President or Vice-President in the Chair, and registered by the Secretary.

*C.—Secretaries.*

32. It shall be the duty of the Recording Secretary to record the minutes of all meetings, both of the Institute and of the Council, to provide the President with all required excerpts from such minutes, and to issue all requisite notices to members for the convening of meetings or for other purposes. He shall also keep a list of the members with the subscriptions paid by them, and shall report to the Council from time to time the arrears of each member.

33. It shall be the duty of the Corresponding Secretary to conduct the correspondence of the Institute under the direction of the President and Council, and in the event of the President being unwilling to deliver the annual address, to prepare the report referred to in § 29. He shall keep a list of the publications received from other societies or from individuals, and of the persons or societies to whom copies of the Transactions have been sent.

*D.—The Curator of the Museum and Library.*

34. The Curator of the Museum and Library shall have the charge of all the books, manuscripts and scientific objects belonging to the Society. He shall keep a regular catalogue of the same, which shall be open to the inspection of all members. He shall keep an account of the issue and return of all books borrowed by members, and shall report to the Council any damage done to the same. He shall prepare an annual report on the state of the Museum and Library to be laid before the Annual Business Meeting of the Institute.

*E.—The Council.*

35. The Council shall, subject to the regulations for the time being of the Institute, have the sole control and management of the income, property, and affairs of the Institute.

36. The Council shall meet, at least once a month during the session of the Institute, ten days before the day of the ordinary meeting of the Institute.

37. Special meetings of the Council shall be held at such other times as the President, or in his absence one of the Vice-Presidents, may appoint, notice of such meetings having been previously sent to every member of Council.

38. The President, or in his absence one of the Vice-Presidents, shall summon a special meeting of Council at any time, upon a requisition to that effect from five members of Council, who in the event of his failure to do so within one week, shall have the right to summon such meeting themselves.

39. At meetings of the Council three members shall form a quorum, and in the case of an equality of votes the Chairman shall have a second or casting vote.

#### MEETINGS OF THE INSTITUTE.

40. The meetings of the Institute shall be of three kinds, viz.:

- (A.) Business Meetings, including Annual and Special Business Meetings.
- (B.) Ordinary Meetings.
- (C.) Field Meetings.

##### *A.—Business Meetings.*

41. The Annual Business Meeting shall be held on the second Wednesday of October at 8 o'clock, P. M.

42. The order of business at the Annual Meeting shall be as follows:

- (1.) Confirmation of Minutes of last Business Meeting.
- (2.) President's Address or Secretary's Report, and business arising therefrom,
- (3.) Treasurer's Report, and business arising therefrom.
- (4.) Curator's Report, and business arising therefrom.
- (5.) Other Business.
- (6.) Election of Officers.
- (7.) Election of other members of Council.

43. A Special Business Meeting may be convened by the President or Council whenever he or they may think fit.

44. The President shall, upon receiving a requisition signed by not less than seven ordinary members, convene a special meeting of the Institute within fourteen days from the receipt of the requisition. Such requisition must state the object for which the meeting is desired. If the President should fail to convene such meeting within the time specified above, the said seven ordinary members of the Institute shall have the right to convene a special meeting themselves.

45. The order of business at Special Business Meeting shall be as follows:

- (1.) Confirmation of minutes of last Business Meeting.
- (2.) Special Business.

46. At least seven days notice of any Business Meeting, specifying the place, the day and the hour of meeting, and in the case of special business, the general nature of such business, shall be given by circular to every ordinary member resident in Nova Scotia.

47. At every Business Meeting seven ordinary members shall form a quorum. If at any such meeting a quorum be not present

within half an hour after the time appointed for holding the meeting, the meeting shall be thereby adjourned to a date to be fixed by the Council.

48. Every ordinary member shall at a Business Meeting be entitled to one vote. In the case of an equality of votes the Chairman shall be entitled to a second or casting vote, except in the case of the election of an officer of the Institute.

*B.—Ordinary Meetings.*

49. An Ordinary Meeting of the Institute shall be held on the second Monday of each month during the session of the Institute, *i. e.*, from the date of the annual Business Meeting to the second Tuesday in May.

50. The order of business at an Ordinary Meeting shall be as follows:

- (1.) Confirmation of the minutes of the last Ordinary Meeting.
- (2.) Announcement of the election of new members.
- (3.) Announcement of donations to the Institute.
- (4.) Reading and discussion of papers and exhibition of scientific specimens or instruments.
- (5.) Special business.

51. At an Ordinary meeting three members shall constitute a quorum.

52. Every person who may desire to bring a communication before the Institute shall give notice thereof in writing to the Recording Secretary, stating the nature of the communication. In all cases the Council shall decide whether any paper shall or shall not be read.

53. No paper which has previously been published shall be permitted to be read before the Institute.

54. All papers or communications which have been read before the Institute, and which the Council desire to publish in the Transactions of the year, shall become the property of the Institute, except in cases in which special arrangements have been made with the author.

55. Special business, the discussion of which is likely to require but a short time, may be brought by the Council before an ordinary meeting. Notice thereof must be given by circular to all ordinary members who reside in Nova Scotia. During the discussion of special business at least seven ordinary members must be present and the regulation of § 48 shall hold.

*C.—Field Meetings.*

56. Field meetings or excursions shall be held at such times and places and under such regulations as the Council may from time to time determine.

PUBLICATIONS.

57. The Institute shall from time to time publish its transactions and proceedings. For this purpose the Council shall select from among the papers and reports read, the addresses delivered and the discussions held before the Institute, some to be printed in full; they shall cause abstracts to be made of others as they may see fit; and they shall superintend the printing and publishing of the same.

58. No report of any written or oral communication made to, or proceeding had by the Society at any meeting, shall be published except under the authority or by the permission of the Council.

59. Authors of papers printed in full shall be entitled to receive fifty separate copies free of expense.

THE LIBRARY.

60. The Library shall be open to the public for consultation at such times as the Council may from time to time determine.

61. All ordinary members shall have the right to take books from the Library.

62. Books may be sent out of the City to members by special permission of the Council.

63. No member shall detain a book more than four weeks from the time of his taking it from the Library, without re-entry, or more than one week after notification by the Librarian that the same is required.

ALTERATION OF LAWS.

64. The Laws of the Institute may be changed at any Business Meeting, provided that notice of such change have been sent, and intimation of the time and place of such meeting made, to all Ordinary Members resident in Nova Scotia, at least fourteen days from the date for which such meeting is called. For this purpose a majority of two-thirds of the members present shall be necessary.

65. Proposals to change the Laws must be submitted to the Council, and the Council shall in general decide whether or not the notice required by § 64 shall be issued. But on receipt of a requisition signed by at least seven Ordinary Members stating their desire to propose a specified change in the Laws, the Council shall issue the necessary notice; and should they fail to do so the said seven members shall have the right to issue such notice themselves.

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