# PROCEEDINGS

OF THE

# Nova Scotian Institute of Science.

## SESSION OF 1901-1902.

### First Ordinary Meeting.

*Legislative Council Chamber, Halifax, 7th November, 1901.*

The President, Dr. A. H. MacKay, in the chair.

It was announced that Avard V. Pineo, Esq., barrister, Wolfville, and Professor Frank R. Haley, Acadia College, Wolfville, had been elected associate-members.

R. W. McLachlan, Esq., of the Numismatic and Antiquarian Society of Montreal, read a paper entitled: "A Talk on Roman Coins," illustrated by a number of specimens belonging to the lecturer.

A. H. Cooper Prichard, Esq., numismatist, exhibited and described a series of Roman coins belonging to the Provincial Museum of Nova Scotia, and drew attention to the desirability of increasing the coin collection of that institution.

The subject was further discussed by the President, and Messrs. R. R. McLeod and W. L. Payzant.

On motion of Mr. McKerron and Rev. R. Laing, a vote of thanks was presented to Mr. McLachlan.

## Annual Business Meeting.

*Legislative Council Chamber, Halifax, 9th December, 1901.*

The President, Dr. A. H. MacKay, in the chair.

### Presidential Address.—By A. H. MacKay, LL. D., &c.

*Gentlemen,*—Since our last annual meeting we have lost some of our members. It is a tribute to the constitution of things which every human organization has to pay.

#### OBITUARIES.

On the 5th of March, Dr. James Ratchford DeWolfe, who was a member from the first session of the Institute in 1863, and who bore his share in its administration as an officer, died in his 82nd year. He was the son of the Hon. T. A. S. DeWolfe, at one time a member of the Lord Falkland administration of the Province. He graduated from the University of Edinburgh, and came to Halifax in the year 1845. In 1857 he left a very lucrative practice to take charge as its first Superintendent of the Provincial Hospital for the Insane. Under his directing genius the institution took rank as one of the best administered of its class. While fulfilling all the duties of a leading citizen for so many years, he was always a staunch friend of the Institute of Science, in which he took an interest from its institution to his death. Not being able to be present at one of our meetings not very long ago in which the subject of ventilation of public buildings was being discussed, he supplemented the report of the discussion reported in the morning papers by a full and ably presented discussion of some points which he had demonstrated in his own experience, which he sent me for consideration, with special reference to the ventilation requirements of the Provincial Normal School. In him we have lost the last member on our list who joined the Institute during its first year.

Captain William Henry Smith, R. N. R., F. R. G. S., who was a member from the year 1889, died on the fifth of May, in the sixty-fourth year of his age. He was born in Kent, England, was educated at Canterbury and Greenwich, entered the Allan steamship service during the Crimean War, and was present at some of the engagements,

and afterwards successfully commanded the Allan steamers, *St. Geo ge*, *Hibernian*, *Circasian*, *Peruvian*, *Sardinian* and *Parisian*, and succeeded Captain Wylie as Commodore of the Allan fleet. He was appointed a lieutenant in the Royal Naval Reserve in 1867, and on leaving the steamship service was made Chairman of the Board of Examiners of Masters and Mates, Commissioner for enquiring into wrecks, and one of the nautical advisers to the Government of Canada. He compiled some valuable nautical distance tables, and was a valuable contributer to the press on nautical matters of public importance.

Rev. Moses Harvey, LL.D., F. R. G. S., F. R. S. C., who was a corresponding member of this Institute since 1890, died on the third of September, eighty-one years of age. He was born at Armagh, Ireland, educated at the Royal College, Belfast, and came to Newfoundland in 1852, and was for 26 years pastor of St. Andrew's Church in St. John's. In 1878 he retired from the ministry for the greater leisure of literary and scientific work, in which he became the most distinguished representative of that island. Apart from his published works, he contributed since 1869 a large number of articles and sketches on the resources of Newfoundland, to the leading newspapers and magazines of Britain, Canada, and the United States—sufficient to make many volumes. The best known of his published works are, "The Characteristics of the Present Age," "Thoughts on the Poetry and Literature of the Bible," "The Testimony of Nineveh to the Veracity of the Bible," "Lectures on the Harmony of Science and Revelation," "Lectures on Egypt and its Monuments," "Lectures Literary and Biographical," "Cormack's Journey Across Newfoundland," "Across Newfoundland with the Governor," "Newfoundland the Oldest British Colony," "Text Book of Newfoundland History," "Where Are We and Whither Tending," "Newfoundland as it is in 1894," "A Handbook and Tourist's Guide," "Newfoundland in the Jubilee Year." He also prepared the descriptive and statistical articles on Newfoundland in the "Encyclopedia Britannica" and in "Johnson's Universal Cyclopedia." He was the discoverer and first describer of that gigantic "devil-fish" which was called after him by Professor Verrill *Architeuthus Harveyi*.

WORK.

We have also lost the presence of Professor James Gordon MacGregor from our midst by his translation from the University of Dalhousie College to the Professorship of Natural Philosophy in the University of Edinburgh. He has been a member of this Institute from the year 1877, since which time he has served in all of the most important offices with a vigor which has transformed the institution in many respects. Not only did he furnish many valuable papers for our Transactions, but he prepared students who, during the last few years, added most important records of original scientific research to our list of valuable papers. And not only did he do these things, but he spent yearly a great deal of time in developing our foreign exchanges and laying the foundation of our present Provincial Scientific Library. Although not likely to be with us at our meetings, Professor MacGregor has put too much of himself into our Institute not to continue to be interested in its progress, and disposed to work with us still. The banquet tendered him on his departure for the "motherland" by this Institute, combined with the University of Dalhousie, was a public testimony to his services, and I am glad that the Council has added another small testimony in unanimously electing him to life membership, which we trust may be a very long membership.

At our regular meetings during the year quite a variety of subjects was discussed, the more valuable papers of which will soon appear in the volume of the Proceedings and Transactions. Mr. Poole described the new Calyx Drill; and exhibited specimens of the great cores of rock cut out by it, and at a subsequent meeting presented for examination a transverse section of *Stigmaria*, showing the cellular structure of its central vascular bundles with extraordinary distinctness. The excellence of the preservation of this structure makes its description a valuable one for the palæontologist. Mr. Prest utilized his expedition to the Labrador coast by giving us a vivid picture of his observations on Drift Ice as an Eroding and Transporting Geological Agent. Mr. Weatherbe demonstrated the latest explorations in the Torbrook Iron District. Mr. Fletcher discussed the nomenclature of our geological formations, taking in the New Glasgow Conglomerates this time—one of the most interesting of the series on the histor-

ical development of the geological exploration of the Province. Dr. Ami, who would add still further terms to this changing nomenclature, described the fossil tracks of an "Eo-Devonian" fish found in the fine-grained silicious sandstones of the Knoydart formation in Antigonish. Professor Haycock closed up the series of geological papers by a picturesque description of the geological history of the Gaspereaux Valley, and by the exhibition of fossils—probably Triassic—in glaciated fragments of rock in the Boulder Clay of King's County

Dr. Magee represented the science of chemistry in a graphic sketch of the rare earths and their importance in reference to the Periodic Law, a feat which was made easy by his research work in this department for some years. Professor Smith followed the science into its industrial applications in the rotation of leguminous crops, and the preservation and use of turnip tops. Mr. Bishop led into the field of zoology, exhibiting and describing the habits of the star-nosed mole and its young, and on another occasion showing his fine collection of Nova Scotian birds' eggs. Mr. Doane led us into the region of meteorology in his Notes on Rainfall, and I presented, as usual, my annual compilation of phenological observations made in the schools of the Province.

### PROVINCIAL MUSEUM.

During the year, the Provincial Museum, which although always the ward of the Government has always been considered to be the child of the Institute of Science, has been very extensively improved by the incessant and intelligent labor of its curator, Mr. Harry Piers. While it is being rapidly made more representative of the natural and industrial history of the Province by the introduction of new material, a great deal has been accomplished by the arrangement, accurate determination, and comprehensive but distinct labelling of the old material; so that now it is becoming not only of more value to those wishing to gain an idea of the productions of the country, but to the scientific student. The curator is not a man who merely attends during the hours the Museum is open to the public. He is always working, and when the doors are closed he works most. In no other way could the vast amount of work done during the past year have been accomplished.

The collections of coins in the Museum, many of which were neither specifically determined or generally classified, came under the

notice, last year, of Mr. A. H. Cooper Prichard, a numismatic expert for some time engaged in the Boston Museum of Fine Arts, and who prepared, under the direction of the Treasury Department of Jamaica, the coin collection exhibited at the Jamaica Exhibition of 1891. On returning to the Province this summer, after a study extending over some months, he at length completed his determinations of the various coins which are now properly and minutely catalogued. Mr. Prichard undertook this work as a labor of love, no doubt also interested in many of the curious mementoes of antiquity turning up. And it is fortunate for us, for I fear we could not well afford to pay the cost of Mr. Prichard's very thorough work. I am glad, however, to be able to intimate that the Council has just elected him to corresponding membership in the Institute as a token of our appreciation of his valuable services, and that he has graciously accepted the distinction.

### SCIENTIFIC LIBRARY.

On the flat above the Museum we have our new Provincial Scientific Library, also under the charge of Mr. Piers, who deals with it as a part of the Museum. This composite collection of publications, the great nucleus of which is the original library of this Institute, has already been reduced to order. The Government has added to it modern works of science, both elementary and advanced, such books as are absolutely necessary in such a library, to the value of $500; and we have reason to hope that this intelligent appreciation of the necessity of stimulating the scientific development of the thought and industries of the Province will continue to be shown by a Government which has done so much to make a start in a line deemed now so essential by every progressive country.

### PROVINCIAL PROGRESS.

While at headquarters the growth of our scientific equipment is satisfactory, the developmeut of the Scientific spirit appears also to be accelerating throughout the Province. Under the stimulating influence of Professor Haycock a branch or affiliated organization has been instituted at Wolfville, which is thus making a bid for the second place as a scientific centre in the Province. While the access to the library of the Institute and to publication in our Proceedings and Transactions will be of some value to the local institution, it will also tend to

develop scientific workers eventually for the central institution and thus benefit both.

In Halifax the organization of the Halifax Botanical Club last summer, under the presidency of Mr. Waddell, is another and similar sign of the times.

Throughout the province several of our county academies or high schools have now better laboratories for proper science teaching than had our best colleges not many years ago; and some of the teachers are more competent than many of the good old college professors. But the Government has not allowed the country to lead in this line of our education; for laboratories have just been completed for the Provincial Normal School which are not equalled by those of any institution in the Atlantic Provinces of Canada. We should soon begin to see signs of useful results from these practical beginnings. With laboratory extension in the high schools we are now commencing to foster manual training in the common schools; so that it is hoped our future students may have not only their minds, but their hands directed in the school room to the personal and public advantages of intelligent industrial labor, as well as to the at present overcrowded, less important, less honorable, once-called learned professions.

But while the great majority of people can understand the advantage of the scientific study of the principles immediately underlying the occupations which constitute the industrial force of the country, they are not far-sighted enough to see why we should cultivate the sciences generally—the sciences which at present appear to be unproductive. Pardon a concluding word on this point.

I think of science as the application of common sense to the discovery of the facts or truth of things around us, and the arrangement of this knowledge in some system which enables us to hold them in mind in their true relations. Science, therefore, in so far as it approaches truth and completeness in agriculture, enables us to do what will give us the best crops at the least expense; in mining to do what will lead us most directly to the valuable ore and enable us to raise it at the least expense; metallurgy, to reduce the metal from the ore most economically; in medicine, to touch the hidden cause of disease and remove it; in manufacture, to improve the product or to reduce the expense of production; in transportation, to save another minute of time or another cent per ton of freight; and so on through the

whole range of human industry. That is the kind of science in which the whole intelligent world believes in without dissent. It is the ancient Egyptian cult of utility as opposed to the ancient Grecian cult of truth for truth's sake.

I would say a word, not against the Egyptian philosophy which with the world I approve; but in favor of the Grecian ideal, not simply on account of the higher order of character and of pleasure created by it, but on account of its ultimate utility in making the development of the industrial sciences possible.

The constitution of things is so very unlike our elementary conceptions of the world even after we are some years in investigating it, that the most pious theologian as well as the neglected street Arab, without a single exception, becomes a sceptic with respect to his infantile philosophy. The fairies have taken wing and disappeared for ever, and Santa Claus with his marvelous powers over space and time and the universal laws of physics which chain puny men and boys to the ground and the dull prose of fact, drops out of the gorgeous cloud of poetry and shrivels up at last to a benevolent old man also chained to the ground.

Now, many people continue to learn more after the infantile stage has been passed; but much of what they learned had been discovered and pointed out to the world by a few others. And when all that has been discovered is known, we shall feel that the world is wider and fuller than ever we thought it before. We cannot resist the conviction that there is a great deal more to be known than we thought when we knew less. And the new things are so unlike what we were expecting from what we had previously learned, that we were looking for something else when we tripped upon the new.

Now the man who is roaming through the universe searching for truth wherever it may appear, just because he enjoys such an exercise, will some day fall upon some new thing, it may be gold, coal, or a cocoa-nut, which those digging in the potato field for the hundredth time can never get, no matter how they may long for it. Truths picked up in the simple search for truth, arranged and recorded so that they are always henceforward accessible when their complements are found, may for years, even centuries be unproductive. The discovery of just one point more may complete the solution of an old industrial problem, or reveal a new power over nature.

MALARIA OBJECT LESSON.

As an illustration, let me follow out my example of last year, the history of the cause and prevention of malaria. No single man made this discovery. Laveran in 1880 discovered the minute *Haemamoeba* in the malarial human blood corpuscles. But five years more of work by others merely proved the truth of Laveran's discovery. Nothing was done for the business men, the soldiers, the missionaries, going into malarial regions of the world, nothing was done for the millions of natives having their life sapped by the mysterious affliction. They were suffocating themselves at night by keeping out the cool healthful night air, while they allowed the sneaking *Anopheles* to snipe them without serious protest. In the meantime Danelewsky found that the birds had their blood corpuscles affected in many cases by a somewhat similar organism which he called a *Proteosoma*. The bloods of all animals were now being searched, even the blood of lizards and snakes, but the malaria still went on from 1885 up to 1895. A tremendous amount of truth about a great number of animals was being discovered, but nothing productive. Major Ross got at length to work, but still there was nothing productive. Noticing Danelewsky's discovery of the *Proteosoma* in the blood of birds, he caused mosquitoes hatched safe and sound from eggs to feed upon birds, the Blue Jay bearing his share of it, which had the *Proteosoma* in its blood. The mosquitoes became infected. These mosquitoes infected sound birds. Now in 1898, the mosquito was falling under deeper suspicion. The mosquitoes would not be affected by sucking the malarial blood from a sick human patient, however. Nobody ever thought that one species of mosquito was likely to be more dangerous than another. Why should they? But the experiments went on with all the different species which could be found, for was it not already proven that *Culex* could infect the Blue Jay with *Proteosoma*—a bird malaria. At last species of the genius *Anopheles* were found to be capable of being infected by sucking malarial human blood. Next in 1899 it was rapidly proven by Ross and the leading scientists of other countries, that persons might sleep in the most malarial district open to the night air if the mosquito netting guarding the room remained intact; and if a person were in a mountain sanitarium and be but bitten by an infected *Anopheles* he would be soon down with the malaria.

Now came the day of glory for the fly-catcher who with his net used to frequent the town pump, a harmless man supposed to have a bee in his bonnet as well as a mosquito in his net. But from over all the world except Nova Scotia and some other provinces, these fly-catchers reported the species native to the country, so that the malarial regions of the world were soon proven to be coterminous with the range of certain species. The unproductive knowledge which had been growing for twenty years and more, now suddenly became productive with a fruition of life and health and wealth to the world.

But the end of the work of these for-so-many-years unproductive toilers with the microscope and the insignificant flies did not yet cease. A species of Culex, harmless from a malarial point of view, has been proven only this year to have been the unsuspected, but sneaking and most gigantic murder of tropical America. As Danelewsky's discovery could not have been made without Laveran's, and as Ross' discovery could not have been made without Danelewsky's, so Sternberg and Reed's could not have been made without Ross'.

YELLOW FEVER OBJECT LESSON.

Before Laveran, in 1880, demonstrated the presence of the jelly-speck parasite in malarial blood, the blood of the victim of the terrible Yellow Fever plague was being examined; but the microscope was able to show nothing which could be proved to be the cause of the disease. From the range of the fever and its retreat before cold weather, some species of musquito were suspected, and were experimented with; but the result for over twenty years was still negative. Dr. Carlos Finlay, in Havana, from 1881 to 1893, had no less than eighty-eight human subjects bitten by mosquitoes which had fed a few days previously on Yellow Fever patients from the second to the sixth day of the disease. But the results were so doubtful as to be negative, for only one case developed into a slight attack, while thirteen were attacks of acclimatization fever, generally at too long and irregular intervals to be deemed due to the inoculation. We now know why Finlay came within an ace of the discovery, but was still so far from it. There was a peculiarity in the facts which he never suspected, for it was not suggested by the cognate previous discoveries. Nature does not work in accordance with our preconceptions. It has its own habits, which we must discover, and we may guess a thousand times

before we hit the truth. Dr. Daniel Ruiz, in the presence of Dr. Sternberg, who is now Surgeon-General of the United States Army, in the year 1887 injected blood from the vein of a Yellow Fever patient into a healthy individual to prove whether the germ was in the blood; but even that experiment was negative—the germs in the eighth day being destroyed in the course of the disease. Still, it did not appear to be an infection carried in the air, for non-immune nurses and others were very often not attacked. And the results of the malarial demonstrations of 1899 stirred up the Havana Commission anew under the general direction of Sternberg and the local management of Dr. Reed and his staff.

Last year Dr. Jesse W. Lazear and Dr. James Carroll, two members of the Commission, allowed themselves to be bitten by mosquitoes fed on a case in its early stage. Dr. Carroll was promptly taken down within the incubation period of five days, and Dr. Lazear, who was at first bitten by the mosquito within ten days of its feeding, was not affected. But on the 12th of September last year, about a month after the first experiment, he allowed a mosquito to fill itself from his hand—one which had been fed on a patient about a fortnight before, presumably. Within five days, on the 18th of September, he took ill, and on the 25th was dead. Nine other individuals voluntarily allowed themselves to be experimented upon. In those cases when the mosquito had bitten within eight days of their feeding there was no result. The cases of infection occurred when the mosquitoes had bitten more than twelve days after the feeding on the Yellow Fever patient. Thus dawned the light of the facts on the Commission. *Culex fasciatus* when fed on the blood of a Yellow Fever patient during the *first few days* of the disease did not become capable of infecting a human subject until *after twelve days*, or more if the weather was not very warm.

Now arose the question: Is this the only manner in which this plague is spread? When infected ships have to remain in quarantine, and all clothes and fabrics have to be burned or steamed, when patrols with shot guns surround quarantined towns to prevent people flying to other places, when the tremendous expense of quarantine, delay and destructive disinfection is being endured, is it of any use when the mosquito is allowed to fly past the shot gun of the sentry, and past the cauldron of the disinfector, while the insignificant gnat is not even

challenged? To settle this question, the Commission formed an extensive camp in Cuba, not very far from Havana, called after their first martyr for the cause of science—which is the cause of humanity—Camp Lazear. Special buildings were put up for various purposes, and the strictest regulations were enforced, with every action tested and recorded.

On the 30th of last November, three men who never had Yellow Fever agreed to go into one of the little cottages, which was furnished with doors and windows perfectly protected from mosquitoes by a fine wire netting or gauze, every night to sleep, for twenty nights. During the day they remained in their own quarantined tent near by. In this cottage, which was kept up to tropical heat, were the clothes and bedding taken, soiled, from beds of Yellow Fever patients. These clothes they packed away in the morning and opened out at night, and slept in. On the 19th of December they came out all right, and after quarantine for five days were allowed to go at large, while another set, consisisting of two volunteers, tried the experiment for the next twenty days, and still another set for the next twenty days, from January 11th last to the 31st. These volunteers excelled in their attempts to take Yellow Fever from soiled clothing within their net-protected cottage. Boxes of filthy clothing, stained with blood and vomit from the Yellow Fever hospitals, were opened up within the room, sometimes causing such a stench that they had to retire temporarily when opening the boxes. Here they slept for twenty nights, in the very clothing of those who had died from the fever. But no fever was taken during these sixty days by these five noble volunteers. This would appear to demonstrate that the mode of quarantining should be adjusted to the specific nature of each kind of disease. What may be necessary for small-pox may be altogether unnecessary for other diseases. Millions of dollars have been spent on quararanting Yellow Fever which had little more virtue than the incantations of the old red Indian medicine-men; while the real cause was practically allowed to be limited by nature, as it was in the days of the medicine-men.

But in the camp at Lazear, in another cottage, other experiments were being conducted by heroes as great as war or missionary zeal ever produced. A cottage was divided in two by a mosquito-proof netting—each half alike. Volunteers sleep in each. But in the one

apartment a few mosquitoes which, twenty days ago, fed on a new case of fever, were set free. In the other apartment was put clothing soiled by Yellow Fever patients. On the 21st of last December the volunteers entered upon their strange preparation for Christmas. On Christmas day, three days and twenty-three hours after being first bitten, John J. Moren took ill with the fever, of which in due time he recovered. Out of seven who attempted to be infected by mosquitoes, only one escaped. Of the seven who were attempted to be infected by the Yellow Fever filth in the other half, all escaped.

The result of all this was that the regulations for the treatment of Yellow Fever epidemics had to undergo a complete revolution, with the most satisfactory results. It is not found necessary to destroy all the mosquitoes of the species *Culax fasciatus*, which is the species so far found to be capable of infection. It serves the same purpose to prevent any mosquito from infection by touching a fever patient—a regulation which must be as agreeable to the patient as it is useful to the public.

### SHEEP-FLUKE OBJECT LESSON.

But the mosquito is not the only dangerous carrier of disease. Any fly may carry the germs of disease by simple contact. Some of them may carry special diseases within their bodies, as in the cases discussed. It took a long time before the cause of the spread of the Texas Cattle Fever was discovered to be by infected ticks. But as soon as the discovery was made, the control of the disease was assured.

Some of the histories of disease carriers are most complicated. And I hope you will pardon me for the reference to one as an illustration of the value which may eventually come from our exploring all the corners of our country for the insignificant animals and plants found on the earth or in the water,—such work as some members of such societies as ours are always doing. without any immediate industrial or significant results.

In Britain the sheep in some localities began to die in hundreds, and on post mortem examination their livers were found to be filled with a parasitic animal about three quarters of an inch long, somewhat flat and leaf-like. It is known as the Liver Fluke or the "Liver-rot." I shall briefly sketch its life history, which illustrates my point. One fluke produces about half a million of eggs which are expelled from the

liver through the bile duct into the intestines, whence they ultimately reach the ground. The eggs would all die if they did not fall upon the earth during cold weather, when at the end of two or three weeks they may be found as minute ciliated specks swimming in the water of pools or rain puddles. These all die in ten hours if they do not find a certain species of water snail, *Limnæa truncatula*. Those which find the snail stick to it, burrow into it, and soon become encysted in a small round cell. After some time it grows and changes into a minute somewhat worm-like shape, bores through the cyst wall and enters the liver of the snail. It is now called a Redia, and it produces a number of offspring with a large head and slender tail called Cercariæ which escape into the water of the pond. They finally swim to land and climb up grass blades where they become encysted. They die here in a short time unless a sheep comes along and swallows the Cercaria with the grass. From the stomach of the sheep it enters the liver by the bile duct, thus producing the disease from which the sheep dies. The same animal appears in many different forms. First the parasite embedded in the liver ; second, the ciliated microscopic pin-head swimming in the water ; third, the cyst in the muscle of the snail ; fourth, numerous Rediæ migrating to the liver of the snail ; fifth, numerous Cercariæ migrating from the liver of the snail into the water ; sixth, the swimming Cercariæ climbing the grass blades and becoming encysted, covered with a tough skin making them look like seed or scale stuck on the blade. Let the season be hot and dry at the critical stage and the Liver-rot becomes extinct for the season. In a few years if the climate is suitable they may become numerous again. But if the water in the sheep's pasturage should be kept clear of the said species of snail, no condition of climate could keep the plague in existence. The extirpation of the snail is no easy matter, and the Fluke is more destructive to sheep in Great Britain than the Boer war is to the sheep in Africa—at least a million per annum dying from this cause.

### MARINE BIOLOGICAL STATION.

We have been favored this year with the Marine Biological Station of Canada at Canso. There, several of the scientists of Central Canada were studying the inhabitants of our neighboring sea water, etc., a knowledge of which will very soon be essential in order to preserve some of our fisheries. The duties of my office have been so engross-

ing that although one of the directors, I was not able to visit the station before its close. It is to be regretted that we had no Nova Scotian student taking advantage of such a grand opportunity this season. I hope that if the station is with us next summer there may be some of us able to take advantage of the great opportunity to study effectively at least some small portion of the unknown flora and fauna of our land and water.

Whatever work we do can be recorded in our Transactions which even last year contained information deemed valuable to scientific men in other countries. Our exploration work although proceeding at a very slow rate, and although of no immediate productive value, is building up the root, the stem, the branches, and the leaves of a tree which in due time will flower and fruit, and its fruit will be for the healing of the nation. But we cannot produce the fruit directly. The course of nature is to begin with the root and branches without which there can never be any fruit.

From such considerations, I hope it can be understood, that the cult of buying the truth and selling it not, is not only good in itself as a source of the highest pleasure, but that it is also essential for the development of that utilitarian science which results immediately in bread and material power.

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 1900-1901 :

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| PUBLICATION OF TRANSACTIONS :— | | | |
| Vol. X., Part 2, (1899-1900) : | | | |
| Printing and binding | $126 54 | | |
| Engravings | 38 00 | | |
| | | $164 54 | |
| Vol. X , Part 3, (1900-1901) : | | | |
| Photograph for portrait (Jones) | $ 1 00 | | |
| Engraving | 3 38 | | |
| | | $ 4 88 | |
| | | | $168 92 |
| DISTRIBUTION OF TRANSACTIONS :— | | | |
| Vol. X., Part 2 : | | | |
| Wrappers, receipt forms, wrapping and twine | $ 11 75 | | |
| Addressing and supervising distribution | 15 00 | | |
| Postage, truckage, porter, freight, boxes, insurance, expressage | 18 19 | | |
| | | $ 44 94 | |
| *Carried forward* | | | $213 86 |

| | | |
|---|---|---|
| *Brought forward* | | $213 86 |
| LIBRARY EXPENSES: | | |
| Stamping all books and pamphlets in Library | $ 12 00 | |
| Services, Janitor Dalhousie College | 5 00 | |
| Expressage on books received | 1 72 | |
| Truckage, removal of books from Librarian's office to Provincial Science Library | 1 00 | |
| Insurance on Library | 23 10 | |
| | | $ 42 82 |
| Calling of meetings | | 22 16 |
| Advertising | | 8 00 |
| Postage (Secretary's and Librarian's) | | 7 47 |
| Post Office box | | 4 00 |
| Miscellaneous printing (including stationery) | | 4 25 |
| | | $302 56 |

The Report on the Library was read by MR. PIERS, and was received and adopted.

PROFESSOR E. HAYCOCK presented a report from the Wolfville branch of the Institute, which had been organized on May 28th, 1901, with the following officers; President, ERNEST HAYCOCK; Vice-President, A. V. PINEO, ESQ.; Secretary-Treasurer, PROF. EVERETT SAWYER. It was decided that all members of the parent society who are also members of the branch, should form the council. Associate members are admitted to the branch on approval, and for an annual fee of twenty-five cents to help cover local running expenses.

It was resolved that the thanks of the Institute be conveyed to the HON. ROBERT BOAK and HIS WORSHIP THE MAYOR for their courtesy in granting the Society the use of the Legislative and City Council Chambers as places of meeting, and to the SECRETARY OF THE SMITHSONIAN INSTITUTION for continuing to admit the Institute to the privileges of the Bureau of International Exchanges.

The following were elected officers for the ensuing year (1901-1902):

*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. R. S. C., Assoc. Roy. Sch. Mines.

*Treasurer.*—W. C. SILVER, ESQ.

*Corresponding Secretary.*—PROF. E. MACKAY, PH. D.

*Recording Secretary.*—HARRY PIERS, ESQ.

*Librarian.*—M. 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., H. H. READ, ESQ., M. D., WATSON L. BISHOP, ESQ., RODERICK MCCOLL, ESQ., C. E., H. W. JOHNSTON, ESQ., C. E.

*Auditors.*—WILLIAM MCKERRON, ESQ., G. W. T. IRVING, ESQ.

## Second Ordinary Meeting.

*Legislative Council Chamber, Halifax, 9th December, 1901.*

The President, Dr. MacKay, in the chair.

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

It was announced that J. B. McCarthy, Esq., B. Sc., teacher of science in the Halifax County Academy, had been elected an ordinary member.

It was also announced that the council had elected Prof. J. G. MacGregor, D. Sc., F. R. S., of Edinburgh University, a life member, and A. H. Cooper Prichard, Esq., of Boston, Mass., a corresponding member.

The President, Dr. A. H. MacKay, exhibited a condensed form of *Botrychium ternatum* found by Mrs. R. R. McLeod at Blomidon, N. S. There sterile fronds of different ages encircled the stipe of the fertile frond. The variety was provisionally named *Agnetis*, in honour of the disooverer.

The President reported progress in consideration of the resolution of 13th May, 1901, relative to the establishment of Branch Societies.

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## Third Ordinary Meeting.

*Legislative Council Chamber, Halifax, 13th January, 1902.*

The President, Dr. MacKay, in the chair.

A paper by R. W. Ells, Esq., Ll. D., F. G. S. A., entitled, "The Progress of Geological Investigation in Nova Scotia," was read by the President. (See Transactions, p. 433.)

The subject was discussed by Messrs. H. S. Poole, R. H. Brown, and Hon. S. Holmes.

The President exhibited a set of mounted plants collected in Labrador from June to August, 1901, by Walter H. Prest, Esq., M. E. (See Transactions, p. 507.)

## Fourth Ordinary Meeting.

*Legislative Council Chamber, Halifax, 10th February, 1902.*

The President in the chair.

It was announced that Hector H. MacKay Esq., M. D., of New Glasgow, N. S., had been elected an associate member.

H. S. Poole, Esq., read a paper by Dr. H. M. Ami, entitled, "The Upper Cambrian Age of the Dictyonema Slates of Angus Brook, New Canaan, and Kentville, N. S." (See Transactions, p. 447.)

Mr. Poole presented a paper entitled, "Notes on Dr. Ami's Paper on Dictyonema Slates." (See Transactions, p. 451.)

Mr. Poole then exhibited and made remarks upon supposed worm-trails in slate from the syncline at Green Bank, Point Pleasant, Halifax. (See Transactions, p. 453.)

The subject was discussed by Dr. Murphy, Mr. Bishop, and the President.

Mr. Poole took the chair while the President read a paper by Miss A. Louise Jaggar, of Redlands, California, entitled: "Notes on the Flora of Digby County, N. S." Appended was a list of the phanerogamous flora of the county, observed by her, which was recommended to be compiled into a general Provincial Flora.

The Recording Secretary read a paper by Thomas C. Hebb, Esq., M. A., of Dalhousie College, "On a Determination of the Freezing-point Depression Constant for Electrolytes." (See Transactions, p. 409.)

The subject was discussed by Prof. Dixon.

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## Fifth Ordinary Meeting.

*City Council Chamber, Halifax, 10th March, 1902.*

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 May meeting of the Society. The communication was referred to the council for action.

A paper by WALTER H. PREST, ESQ., M. E., entitled, "Supplementary Notes on Drift Ice as an Eroding and Transporting Agent," was read by MR. POOLE. (See Transactions, p. 455.)

Specimens of sand and gravel from drift ice on the coast of Labrador near Cape Smoky, collected by Mr. Prest, were exhibited, and described by DR. A. H. MACKAY.

The subject was discussed by Dr. Murphy.

A paper by PROF. JOHN DAVIDSON, PHIL. D., of the University of New Brunswick, entitled, "Agricultural Credit," was read by MR. MCKAY. (See Transactions, p. 458.)

The paper was discussed by MESSRS. MCKERRON, POOLE, and BISHOP.

The following papers were read by title :—

(1). On the Standardization of Hydrochloric Acid with Borax.—By R. S. BOEHNER, ESQ., B. SC., Dalhousie College.

(2). On the Determination of the Freezing-point Depressions of Dilute Solutions of Electrolytes.—By THOMAS C. HEBB, ESQ., M. A., Dalhousie College. (See Transactions, p. 422.)

HARRY PIERS,
*Recording Secretary.*

## Sketch of the Life of Andrew Downs, Founder of the First Zoological Garden in America.—By Harry Piers.

*(See frontispiece.)*

Andrew Downs was born in the town of New Brunswick, New Jersey, U. S. A., on 27th September, 1811. His father, Robert, left Scotland, of which he was a native, with the intention of taking a position in Quebec, Canada. Some of his possessions having been landed at Halifax, N. S., he came here, but afterwards left for New Jersey, where he remained for some years. There he married Elizabeth, daughter of John and Catherine Plum, who was, I understand, of German descent. With recollections in his mind of the city by the sea, Robert returned to Halifax in 1825, bringing with him his family, including his son Andrew, then a lad of about fourteen.

Andrew was for sometime engaged in the plumbing business with his father, and later, on his own account. His tastes, however, were entirely of another kind, and he gradually gave more and more of his time to the study of nature, the preserving of birds and other animals and the propagation of the same, and to this work he finally devoted all his energies.

I would like to emphasize the fact that to him belongs the honour of founding the first zoological garden in America. This he started at Halifax in 1847, sixteen years before the Central Park collection at New York was opened to the public. The Philadelphia garden did not open till July, 1874, although the society was incorporated a number of years before; while the "zoo" at Cincinnati opened in 1875, that at St. Louis in 1877, and the Lincoln Park Garden, Chicago, in 1881.

Mr. Downs commenced with a piece of land of five acres, but by 1863 he had enlarged his premises to one hundred acres ("Walton Cottage"), near Dutch Village, North-West Arm, Halifax County, embracing wood and field, stream and pond, hill and valley. This

place soon became a most popular resort for the curious and for those students and lovers of nature and good fellowship who found keen pleasure in the proprietor's company, and many anecdotes are connected with the naturalist's life in this lovely spot. The Prince of Wales, now King Edward, paid a visit to the place when in Halifax in 1860, as did nearly every notable person who came this way, including Prince Jerome Bonaparte, King Victor Emmanuel's daughter, Lord and Lady Falkland, Capt. Sir Richard Grant, and many others.

In 1864 Downs visited Europe, being complimented by a free passage across the Atlantic in one of Her Majesty's war vessels, the "Mersey," Capt. Caldwell. On this occasion he carried with him several living specimens, two cases of mounted birds and a stuffed moose, which he presented to the London zoological garden. In Europe he received courtesies from many scientific men.

On his return to Halifax his zoological garden was much improved, and the following extract from an article by his friend Charles Hallock, author of "The Fishing Tourist," and founder and proprietor of "Forest and Stream," graphically describes the place in these, its best days* :—

"I recall his premises as if it were but yesterday. From a rustic gate in the enclosing hedge a gravelled road wound under interlacing trees to a Gothic cottage over-hung with woodbines and honeysuckles, and surmounted at all points with antlers of elk and moose. This was at once the residence of the proprietor and the outpost of the realm. Beside the porch were bird houses perched on poles, whose chattering tenants hovered round, entering and departing at will. Pigeons of all sorts tumbled and circled overhead, and strange noises were emitted from a neighboring copse. Here and there were rude boxes of cocoons of many varieties, kept for experiments. Not far from the door a pair of whale's ribs and some huge vertebræ lay upon the lawn.

"Entering the house by the main hall-door ajar, we find it alive with the more delicate species of songsters. The parlors and reception

* "The First American Zoo," by Charles Hallock; *Nature*, New York, Vol. 1, No. 10 (Jan. 4, 189 ), pp. 130-131. The reader is also referred to another article by Mr. Hallock, "Andrew Downs, F. R. S. [error for C. M. Z S.], Naturalist," in *Forest and Stream*, New York, Vol. 53, No. 10 (Sept. 2, 1899), p. 184, with portrait, p. 182. In both of these papers he strongly appeals for public recognition of Downs as the founder of the first zoological garden in America.

rooms constitute a museum of natural history and art, perfect in classification and detail of arrangement,—paintings, engravings, water colors, herbaria, busts and miniature sculptures. And what a view from the verandah and bay windows! The 'North-west Arm' stretching away toward the ocean, with its bays, inlets, wooded hills, island and far-reaching points of land that are blue and only half-distinct in the hazy atmosphere of a summer day. Yonder is the devoted naturalist in his shirt sleeves feeding his poultry. He is fairly surrounded by multitudes of the feathered and four-footed tribes. Shaggy skye terriers of different colors, which have the freedom of the yard, greet our approach by rubbing their dusty paws on our boots; tumbler pigeons throw summersets in the air and plump down at our feet; pouters and fantails strut and flutter among the throngs. Chinese and Egyptian geese with huge, bulbous bills, squawk discordant notes; cranes stalk majestically; monkeys grimace and marmosets chatter in a cage close by, and a big Brazilian monkey gives a sly tug at our coat tail through the wires of his cage. There are bantams and game fowls, ducks, geese and pheasants, all of rare breeds, and for each he has a peculiar call and a handful of seeds or grain, or bread or biscuit, suited to its peculiar taste. All about the immediate vicinity are cages, coops, perches and shelter-houses, some closed on their inmates and others open for free ingress and egress. A little beyond this part of the premises, at the edge of a lawn, is a lake where China swans, odd-looking geese and ducks with uncouth topknots are playing under the douche of a fountain. Tall cranes stalk along the reedy margin, herons on one leg stand motionless among the lilypads, wood ducks skulk beneath the overhanging bushes, and wild wood birds dart in and out of the trees which fringe the border. Farther on a cascade tumbles into the lake, and the rocky basin at its foot provides cooling refreshment for a large polar bear. The stream leads to a pond above, where a seal sports and comes to the beach at call. Here are beavers, mink and otters, all suitably secured in mesh-wire inclosures. Anon we cross a rustic bridge which spans a ravine, and thence traverse a shadowy path to a bower with a table inside made of the ponderous bone of a whale's tail. Near at hand is a flower garden laid out in artistic designs, and in a clump of trees just aside are nesting birds which receive the naturalist's daily attention. Next come

enlosures for Spanish, Mexican and Virginian deer, a large yard for moose, enclosing trees for browse, others for elk and caribou, and another for black bears. And so the visitor passes on through this hundred-acre domain, with its alternate woods and open intervals, to gaze successively at the long-billed bitterns, whooping cranes, gold, silver, English and Amherst pheasants, California and native quails, eagles, hawks, foxes, lynxes, prairie wolves, owls, fancy rabbits, Guinea pigs, China sheep, Angora goats, silver-bearded Polands, Hamburg fowls, Indian and Egyptian doves, ring doves, and so on.

"In another part of the grounds is an Oriental kiosk filled with every variety of stuffed birds, live snakes, lizards and turtles, and containing an extensive aquarium.

"What particularly strikes the observant visitor is the nicety with which the habits of the creatures are satisfied by the adaptation of environment; and it is easy to perceive, from such results accomplished, what is possible for our public gardens in the United States, with sufficient area and liberal money appropriations. Certainly no existing zoological collection is as thoroughly and suitably provided for as this of Downs' was twenty-five years ago, as I have just described it."

In January, 1865, Downs read his first paper before the N. S. Institute of Natural Science, on the land-birds of Nova Scotia, which was the result of forty years' observation of bird life in this province. This subject he continued in a paper read in May of the following year.

In the latter part of 1867 he was proposed for superintendent of the Central Park menagerie, New York, being recommended by Prof. Spencer F. Baird, of the Smithsonian Institution. In the following year he disposed of his animals and grounds and went to New York; but being, it it said, displeased by what he considered an over-abrupt and apparently cool reception from one of the commissioners, he did not accept the appointment and returned to Halifax at the end of about three months.

Soon afterwards he purchased a new property (subsequently S. A. White's and Capt. W. H. Smith's) adjoining his old place, built a house and started a new zoological garden. This he continued to improve for about three years, gathering around him birds and other animals, and continuing his taxidermic work, in which he excelled.

Subsequently he lived for years on Agricola Street, surrounded by living animals and specimens, where his house was well-known to naturalists. A couple of years before his death, he, with the vigor which characterized him, although venerable in years, built a museum annex to his house and placed therein his extremely fine collection of mounted native birds. The writer remembers with pleasure many pleasant hours spent there in conversation with the aged and kindly naturalist, surrounded by hundreds of reminiscent specimens.

He died after a brief illness at Halifax, on 26th August, 1892, wanting but one month of eighty-one years.

He was twice married, first to Mary Elizabeth Matthews of Halifax, who died in 1858, having had four daughters, two of whom survive; and secondly to Matilda E. Muhlig of Halifax, by whom he had one daughter who survives.

Ornithology was his chief study, and the store of knowledge he possessed of our birds was very large and always freely at the service of enquirers. He took particular delight in encouraging the study of nature in young people. He was distinctly a field naturalist rather than a student of books.

His taxidermic work was very fine and was evidence of much loving, faithful labour. The preliminary operations were accomplished with skilful rapidity, but the final manipulations were done with great care. I have seen him sit in conversation for hours, with a recently mounted specimen beside him, from time to time adjusting feathers, often one at a time, or slightly altering the pose here or there, until all satisfied his critical eye. He had the rare ability of giving his specimens the appearance of having actual flesh within them. For his taxidermic work he received many awards at exhibitions in England and elsewhere, including a bronze medal at London in 1851 and in 1862, a bronze medal at Dublin, 1865, and a silver medal at Paris, 1867. Sir Wyville Thomson, in a critical article on the natural history section of the Paris exhibition, writes ("Illustrated London News," 24th August, 1867):—"In the Nova Scotia Court there is a very beautiful collection of birds stuffed by . . Mr. Downs. These birds are nearly perfect in their way; perhaps there is a little too much sameness in the attitudes, but the form and the proportions of the body are perfectly preserved, and there is scarcely a feather out of place."

Mr. Downs claimed he had stuffed about eight hundred moose-heads and supplied King Victor Emmanuel with many thousand dollars' worth of animals and specimens. At one time this sovereign had in his acclimatization garden at Pisa a number of living moose and caribou supplied by the Nova Scotian naturalist. Specimens of his taxidermic work were supplied other European sovereigns, and large quantities went to the great museums and private collections on both sides of the Atlantic, and a number are incorporatsd in the collection of the Provincial Museum at Halifax. His own private collection of some fourteen cases, which he had at the time of his death, is still the property of his estate.

He was one of those connected with the foundation of the Nova Scotian Institute of Natural Science, although he did not take up his membership until December, 1863. He was also a corresponding member of the Zoological Society of London, having been elected early in 1862.

He published, unfortunately, but little. His papers, all in the "Transactions of the N. S. Institute of Natural Science," were :

On the Land Birds of Nova Scotia. Vol. i, pt. 3 (1864-5), pp. 38-51 (read Jan. 9, 1865) ; vol. i, pt. 4 (1865-6), pp. 130-136 (read May 3, 1866).

[An annotated list, giving a total of 91 nominal species, being the result of "forty years' experiences in bird life."]

Pied, or Labrador, Duck. Vol. vi, (Trans. for 1885-6), pp. 326-327 (read May 10, 1886).

[Notes on two specimens in Dalhousie College Museum, Halifax, and other notes regarding the occurrence of the species in Nova Scotia, &c.]

A Catalogue of the Birds of Nova Scotia. Vol. vii, (Trans. for 1887-8), pp. 142-178.

[An annotated list, giving 240 nominal species, the result of "sixty-six years of practical field work." Prepared in summer of 1888. The note to the title, "read May 14, 1888," should be struck out.]

At a meeting of the Royal Society of Canada in May, 1888, he presented a paper "On the Birds and Mammals of Nova Scotia," which was not, however, published.

He was a man of very quiet and retiring disposition, disseminating his stores of knowledge mostly verbally or through a large correspon-

dence with the foremost naturalists of his day. He had a high sense of honour and was of a genial, kindly disposition, and was much respected by all who knew him. It has been truly said of him by his friend, Charles Hallock, that "his modesty was always such that his name is hardly known outside of scientific circles, while his credentials he folded away in a napkin." He remembered once seeing Audubon, with whom he also corresponded, and was a friend and great admirer of Charles Waterton, the naturalist, at whose house, Walton Hall, in England, he had been a guest, and whose "Wanderings in South America" he greatly admired and frequently quoted. He also corresponded with Frank Buckland and most of the foremost zoologists of his time.

Jan. 26, 1903.

THE KINGS COUNTY BRANCH OF THE NOVA SCOTIAN INSTITUTE OF SCIENCE: OUTLINE OF PURPOSES AND AIMS OF THE SOCIETY.—BY PROFESSOR ERNEST HAYCOCK, *Acadia College, Wolfville.*

The Kings County Branch of the Nova Scotian Institute of Science was organized on May 29th, 1901. The society was formed primarily to meet the needs of such Kings County members of the Institute of Science as were unable to attend the meetings of the parent society at Halifax, and who believed that much personal encouragement and stimulus was to be derived from the meetings of such a society. Furthermore it was believed that there were many others, young and old, who might be brought within the sphere of its influence, and that the scientific spirit would be stimulated and knowledge disseminated by such an organization.

The highest work in science is investigation of the unknown. By such investigation new facts are brought to light and added to the existing sum of knowledge, to be handed down as the heritage of succeeding generations. The marvellous attainments of the nineteenth century, and the civilization of the present, as compared with that of the earlier centuries of the Christian era, are due to such an inheritance, and it is the duty as well as the pleasure of the present generation to add its mite to this epitome of progress. The purpose of the parent society is to foster this investigating spirit in its members, and to add the results of their labors to the body of the world's literature. This will be the chief object of the branch society also, and we believe that the papers presented at its meetings will show a definite and real accomplishment.

As a rule the investigator needs considerable preliminary training, and a comprehensive knowledge of what is already known about his subject, in order to work to advantage, and achieve results that will be new to the world. The promoters of this society hope to provide this preparation, as far as lies in their power, and since it consists of two parts—1st, training in power of observation, and 2nd, the acquisition of facts already known—the work of the society will likewise consist of two parts, the presentation and discussion of the

results of original investigation by its members, and the presentation and discussion of papers on contemporary discoveries in science, or on scientific subjects pertinent to our especial needs. The former will suggest methods and point the way to exploration of the unknown ; the latter will aid in furnishing the basis of knowledge necessary to fruitful investigation.

Although an arduous preparation is absolutely necessary for work of the above character in many branches of science, yet in many more departments of scientific study anyone with a love for truth and an honest interest in the world about him, whether he be young or old, whether he has or has not had a scientific training, may make contributions to the sum of human knowledge. These departments lie mainly within the domain of what are known as the Natural Sciences, and in them we hope to achieve our best results. The distinct aim of the society should be, in my judgment, to explore the natural history of Kings County, and in order to train workers for that purpose, to disseminate knowledge of the natural sciences in the widest possible way.

In designating this as the work of the society, we assign a field that lies all about us, that has scarcely been touched by the investigator, and in which the maximum results can be secured with the minimum amount of preparation. A few hours reading would put one in possession of all the facts that have as yet been recorded in regard to the geology of the county. A smaller number of hours would enable one to read the mineralogical record. I know of but one paper on the microscopic study of a Kings County rock, and this new science of petrography offers to one who is willing to make the necessary preparation, an outlook that is very fascinating. An admirable beginning in the zoology of the county has been made by Mr. Harold Tufts, who has published a list of 250 birds that occur within its borders. This list is without doubt still incomplete,, and further, every bird enumerated should be on exhibition either in a public county museum or in a private collection, in order that the correctness of the identifications might be verified at any time. Similar work in the land animals, the marine vertebrates and invertebrates, is waiting to be done, and the collection of all the known insects of the county and the study of their metamorphoses and habits, is a work not only of scientific interest, but likely to prove of untold value to the fruit growers

and agriculturists of the county. The botanical exploration of the county is still another equally attractive and important field for study. Since many of the diseases that injure the cultivated plants are lower forms of plant-life, investigation along this line is also likely to prove valuable from an economic standpoint. The geography of the county, its tidal phenomena, its meterology, are all subjects that will prove fruitful in result to the investigator. Our need will never be a lack of work but a lack of workers.

Advance along these lines can only be made by the slow and patient accumulation of material and facts, extending over years, but my hope is before long to see workers within the county in every department enumerated. Already beginnings have been made in several of them, and these beginnings are indicative of a real interest at present, and significant of great results in the future.

Thinking men are convinced that our progress, as a people and as a nation, is being and will be decided by the way in which we meet and settle the scientific question. If we foster the teaching of science in our schools, and the scientific spirit in our people, the adoption of scientific methods in the manifold industries of our country will follow as a natural consequence, and place us in the front ranks of the competing nations; but if we are content to go along in the systems of education and methods of industry followed by our fathers we must expect to take a rear place and see ourselves outstripped by peoples of a more progressive spirit.

I regard this fact, among others, that Kings County is the first in the province to form an affiliated society with the Nova Scotian Institute of Science at Halifax, the centre of the scientific life of the province, as an indication that this county is ready to accept the conditions of twentieth century progress, and proposes to take no second place among the county units in scientific and industrial achievement. Let us not measure our influence by our numbers, but grapple boldly with the difficulties that confront us, and strive to carry out the purpose for which we have united.