

## OPENING ADDRESS.

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BY PROFESSOR J. G. MACGREGOR, PRESIDENT.

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### MEMBERS OF THE INSTITUTE OF NATURAL SCIENCE :

I TAKE this, the earliest opportunity which has presented itself, of thanking you for the honour you have shown me, in electing me to the Presidency of the Institute. To be asked to preside over the work of a number of earnest men, however few, must always be a source of gratification. The invitation to preside over your work at the present time is especially so, because of the critical point which the activity of the Institute seems to have reached. We have recently had the misfortune to lose some of our most active members, and so far as we can see there are few young men who are ready to take their places. For this reason the Presidency of the Institute at present should involve much more onerous duties than ever before, and I undertake to discharge them, only because I know that, though there are few active scientific workers left among us, those few are willing and ready to exert themselves to the utmost.

I have looked recently somewhat fully into our history, and find that, since its first meeting in 1863, this Institute has published about 304 papers, dealing for the most part with the Natural History and Geology of the Province of Nova Scotia, and averaging about 9 pages each. It is interesting to know how these papers have been distributed in time, and I have therefore plotted two curves, shewing, one, how the number of papers, and the other, how the number of pages, in our Trans-

actions, has varied with the years. These you see before you; and they shew that our Institute has had its ups and downs. Judging by numbers of papers, you see that the time of our greatest activity was the first few years of our existence, that since 1867 we have kept oscillating about an average of about 11 papers a year, never getting far above that number and never falling far below it, that the year of greatest intellectual dearth was 1875, and that, during the last few years we have been below the average. If we remember that in the first few years we published regularly papers on our local meteorology, and that now all such returns are made to the Meteorological Bureau and published by the Legislature, it would appear that for the last 20 years we have kept at a pretty uniform level, and that at present we are but little below it. The other curve, the curve of pages, has an interest of its own. It shews much greater variations than the curve of papers, the Transactions having been much bulkier in some years than in others. In 1866, 1869, 1873, 1876, and 1878, our members scattered the silver of speech with lavish hand, but since 1878 we seem to have realized that though speech may be silver silence is gold; and it is a somewhat remarkable fact that, though since 1868 the number of papers has not in any year varied very much from the average, the average length of papers between 1868 and 1879 was nearly twice as great as between 1879 and the present time. Of course the falling off is by no means an indication of lethargy. It is possibly due to a growing power of perceiving rubbish, and a consequent growing determination to eliminate it.

On the whole the record which these curves show is not satisfactory. The activity of the Society ought to have been gradually increasing; instead of that, it has been gradually diminishing, until now we find ourselves not only making no progress, but even falling somewhat below the records of former years. And this just means as I said at the outset, that the older workers in our Institute are passing away, and that few young men are coming forward to take their places.

If we ask why this is, it must be noted that in the early history of a country, it is a comparatively easy matter to make additions

to the knowledge of its local Natural History and Geology, the two departments in which the work of the Institute for the most part lies. The knowledge of the geographical distribution of its plants and animals, for example, makes at first very rapid strides, but progresses more slowly as time goes on. The discovery of new species becomes more and more rare and the recognition of new species as new involves ever increasing research. So, also, the main features of the geological character of a new country are apparent even to an observer who is provided with no large stock of geological lore, whereas when the surface problems are solved and more intricate questions come to be investigated, their solution is found to require thorough knowledge and deep research. We cast no slur upon the early workers in the Natural Science of this Province when we say that much of their work was of a character that required no very thorough scientific training. Nor do we glorify ourselves when we assert that in these latter days the problems that confront us are, in general, of a higher and more difficult order than those which naturally first presented themselves for solution.

Unfortunately, scientific education in Nova Scotia has not kept pace with scientific investigation; and now, when progress in our local scientific knowledge demands more thorough training than in former years, we find ourselves with no body of young men whom our Schools and Colleges have provided with the necessary training, and with but few who have had the energy to train themselves. We lack even the constituency which most scientific societies find in the Colleges themselves. If we look through the records of such societies, we find that usually a large proportion of their memoirs are contributed by College Professors, men who are appointed not only to teach but to extend the bounds of the departments of science which they profess, and who for that purpose are enabled to devote their whole attention to comparatively small departments. Our Colleges are so small and so poorly equipped that in general their Professors require to teach, and therefore to spend their time in studying, several subjects instead of one. And it is consequently almost impossible for them, however able they may be, to lend a hand in work

such as our Institute was founded to foster. When our Colleges, either by acquiring large endowments or by combining their small endowments, become able to allow their scientific Professors to devote themselves to special departments of Science, we may expect the golden age of the Institute of Natural Science to begin. Meantime we must look elsewhere for the most of our recruits.

There is one source from which we may hope that before long a considerable number of recruits may be drawn, and that is from the teachers of the schools and academies of the Province. From our point of view it is most hopeful that the necessity of introducing Science-teaching into the schools is being more and more clearly perceived by our teachers, and that they are making great efforts to acquire the knowledge that is necessary for its introduction. The Summer School of Science, which leading men among them have established, will not only assist them in preparation for their educational duties, but must in some cases produce an interest in scientific work which will lead to still greater results. The many will of course fit themselves merely to teach, but the few will fit themselves to investigate. And the public-spirited men who devote their vacations to assisting their colleagues to prepare for the more thorough discharge of their academic duties, may have the satisfaction before long of finding that some of the seed they have sown is springing up and bearing fruit worthy of being preserved in the Transactions of our Institute.

There seems, therefore, to be ground for hope that, by the aid of Teachers in our Colleges and Schools, and of laymen with leisure and taste for scientific work,—some of whom have been our main supporters in the past,—we may be able at present to maintain, and in future to increase, the activity of our Institute. Where there is interesting work to be done, we may have confidence that workers will not fail.

And that leads me to attempt to make a synopsis of the work which the Institute has to do, to ask how far we have been doing it, and to make some suggestions as to the best mode of doing those portions of it which seem hitherto to have been left undone.

Our work may be said roughly to be three-fold—(1) Investigating; (2) Stimulating the love of investigation; and (3) Providing the means of investigating.

The first and purely scientific part of our work is the extension of our knowledge of Natural Science, more particularly of the Natural Science of our own Province, by original investigation. To a great extent this must be the outcome of the knowledge and tastes and resources of individual members of the Institute, each member following the bent of his own inclination and doing the work which falls to his hand, while the Society aids by providing sympathetic criticism. This is the work which the Institute has hitherto for the most part done, with what result our Transactions bear witness. It is not permitted unto us to glory, but we may nevertheless say that a large amount of this individual work has been done. And while our publications contain much that on looking back we would wish had never seen the light, they contain still more in which the most rigorous critic can take delight, and feel a justifiable pride.

There are a great many important scientific problems, however, which cannot be solved by the isolated work of individuals, but require the concerted action of a great many observers, not necessarily highly skilled observers, but intelligent men, working under the guidance of one who is able to direct them as to what they should observe, and to record and systematise their observations. This collective form of work has been attempted only to a very limited extent by the Institute, owing probably to the difficulty of securing the necessary observers. But if this difficulty could be overcome,—and now that our teachers are obtaining a knowledge of the elements of science, it would seem to be more easily overcome than heretofore,—we might very largely increase the “output” of our Society. I may mention as a subject requiring for its proper elucidation the combined observations of many observers, the occurrence of luminous meteors. Any person with such knowledge of the constellations as may be obtained from a fairly good star-atlas could describe the apparent path of a meteor in the heavens, and the comparison of the apparent paths as seen by different observers would shew what the actual

path had been. Now, had we, scattered over the Province, a large body of correspondents who would send us descriptions of the appearance, positions, directions, &c., of such meteors as they might see, we might add greatly to our knowledge of this interesting subject. In the department of meteorology good work might be done by correspondents who would send us extracts from the log-books of ships, descriptive of unusual meteorological phenomena. Had we funds to supply such correspondents with simple instruments we might get valuable data with regard to magnetic and tidal phenomena. But as the funds are wanting the collective investigation of phenomena requiring them is beyond our powers.

In the departments of Natural Science there would seem to be many subjects in which collective investigation is both necessary and possible. I would suggest merely observations of the times of the flowering of plants, the migration of birds, the movements of fish, the first appearance of insects, a systematic record of which would seem to be comparatively easy to obtain and would certainly throw much light both on the life history of the plants and animals themselves and on the variation of our climate.

It would seem to be eminently desirable, not only that our Institute should itself undertake the superintendence of some forms of collective work of this kind, but also that it should induce other Canadian Societies to co-operate with it, and perhaps prevail upon the Royal Society of Canada to collect and systematise the results which the local Societies might be able to supply year after year.

Besides purely scientific work, a Society such as ours, which exists in a community as yet but slightly developed in the direction of scientific education, ought to do something towards stimulating outsiders to an interest in scientific work; and not only ought to do so, in fact must do so, if it is to have a successful career. The stimulating in the non-scientific a desire to become scientific can be done only by making some or all of our meetings more popular and more attractive than the ordinary meeting of a Scientific Society usually is. Outsiders are accustomed to think of us as a lot of old fossils engaged in riding

hobby horses in the form of insects and plants, and birds and rocks, and bringing occasionally to light facts of more or less utility. Because of the utility of our work we receive a little monetary assistance; but countenance and encouragement and the opportunity of making proselytes, such as attendance at our meetings would provide, are but rarely given us. And that is as much our misfortune as our fault. For the discussion of a scientific paper in general is conducted, and must in many cases be conducted, in a language whose technical terms render it unintelligible to all but the initiated. It would appear therefore, that our ordinary meetings, which must be devoted to the hearing and discussing of new and somewhat recondite things, cannot readily be rendered wholly popular. And accordingly it has been proposed that we should devote some evenings to popular lectures or to conversaciones, or that we should organize excursions of a scientific kind. Doubtless, popular lectures and excursions have their merits and should not be neglected; but we would probably get at the few outsiders who have observational tastes more readily, if we could render the ordinary meeting of the Institute sufficiently attractive to make them regular attendants. And it is in this direction that the Institute has lately been moving. It may not be generally known that we are endeavouring now to make our ordinary monthly meetings more popular than they have hitherto been by the introduction of what may be called popular prefaces to the various scientific papers that may be read and discussed. We invite the readers of papers in fact to prepare introductions which will enable even their non-scientific hearers to understand the work of which the papers are to give an account, and to describe the contents of the papers in as untechnical language as possible. Men differ very much of course in their power of complying with this invitation. But in many cases the result has been quite successful, and audiences which contained but few persons who possessed any previous knowledge of the subject under consideration, have appeared to follow and enjoy the whole discussion. I think that the most of us feel that our efforts in this direction have been sufficiently successful to warrant our continuing them,

and persons who have scientific inclinations but no extensive knowledge, may therefore henceforth attend our meetings with the assurance that the time devoted to them will not be thrown away.

The third department of our work consists in providing for investigators to as great an extent as possible the means of investigation. And this we are doing with greater or less success in a variety of ways.

First, it is above all things necessary that investigators should know all that has been already discovered in connection with the Natural Science of the Province; and this involves the publication, from time to time, of such papers read before the Institute, as may be considered to contain new and well established results. Hence for the last quarter of a century our "Proceedings and Transactions" have been published year by year. It is often difficult to determine whether or not the results contained in any paper are really new and really well established, and doubtless occasionally papers are published whose contents do not possess these characteristics. But on the whole our Transactions will be found to be a record of continuous advances made in the knowledge of the Natural Science of Nova Scotia; and it is a source of legitimate gratification to us to find that scientific men and scientific societies all over the world welcome our publications gladly, and are ready to send us in exchange for them, publications, I will not say of much greater value, but certainly of much greater magnitude and of much greater cost.

Secondly, it is necessary that investigators should have access to collections of specimens of the various species of plants, animals, minerals, etc., which have so far been discovered in Nova Scotia, together with similar specimens found in other countries, for purposes of comparison. And it is therefore the duty of the Institute to see that the Province possesses a well filled and well arranged museum. Fortunately, however, this part of our work has been to a large extent taken out of our hands by an intelligent Legislature which itself has provided the public with a museum, and has put an experienced scientific man at its head; and our work in this department, therefore, consists in giving him



such assistance as we can in adding to his collections. If the fact that we do make efforts in this direction gives us the right to make suggestions, we might suggest that since the Legislature has provided the collections and a curator to look after them, it should complete its work by providing a local habitation in which they might be advantageously exhibited. The room at present set apart for this purpose is so small that a study of the specimens which it contains is attended by great difficulty, while the arrangement of typical collections for the use of students of the elements of Natural Science is well nigh impossible; and thus the very object with which the collections have been made is to a large extent rendered unattainable by the lack of suitable accommodation. Apart from this defect, however, it is a matter of great consequence to our Society that the Legislature has taken off its hands the work of forming a Museum. For it is, I believe, the experience of local scientific societies in Great Britain, that the expenses connected with the maintenance of Museums are in general too heavy for them, and that too often they are crushed by the weight of the material which they collect.

Thirdly, it is necessary that investigators should have means of informing themselves of the progress which Natural Science is making in other countries, and it thus becomes the duty of the Institute to collect a Library of scientific publications giving accounts of what is being done in Natural Science all over the world. Could such publications be obtained only by purchase, it would be quite impossible for the Institute with its limited income to form any adequate collection of the kind referred to. But fortunately a large portion of them can be obtained at slight expense so long as we exhibit a reasonable activity ourselves and continue to publish Transactions of scientific value. For, as stated above, foreign Societies will in that case be ready and willing to send us their publications in exchange for ours. The value of such publications, not only to the scientific investigator but also to the practical man engaged in pursuits whose methods improve with the increase of our knowledge of Natural Science, such as mining, agriculture, fishing, manufactures, etc., cannot be over-estimated; and from this point of view alone it is important

that our Transactions should be kept at least up to their present volume and value.

For many reasons the publications which have accumulated during the last seventy-five years have neither been so numerous as they might have been, nor so well preserved as they should have been; and, for want of proper cases and rooms, they have been lying in a state in which it was impossible to use them. Lately, however, the Institute has been engaged in reducing them to order, and has bound up all the volumes which were found to be complete. It is our intention now to get as many as possible of the incomplete works rendered complete, and to add largely to our list of exchanges; so that if we are able to maintain the publication of our own Transactions, we shall very soon acquire a valuable Library of the Transactions of other Societies.

There are many works, however, in which records of progress in Natural Science are contained, which cannot be obtained in this way, but must be purchased; and in cases in which such works are too expensive to be purchased by individual investigators, and are required for purposes of investigation, it would seem to be the duty of the Institute to obtain them. Here our poverty makes judicious selection necessary. But it may be hoped that as our Library increases and is found to be of practical utility, funds available for this purpose may be found also.

And lastly, it is desirable, if not necessary, that in many cases the Institute should provide for investigators instruments which are too costly to be purchased by individuals themselves. Our funds have always been too small to enable us to make any extensive provision of this kind. We have recently, however, purchased an excellent microscope for the use of our members,—such an instrument as individual members could not be expected to purchase for themselves,—and good work has already been done by means of it. There are many instruments of this kind that the Institute ought to possess, and that doubtless will be acquired as time goes on and funds increase.

Such, then, is a rough sketch of the work which, as I conceive it, the Institute has to do; and it will be seen that while in some departments we have been active and successful, in others

we have not done so much. Even now, it may not be possible for us to put much energy into all. But, it is well, nevertheless, that we should compare what we are doing with what a Society such as ours ought to be doing. For such comparison must result in a desire to do more and better work.

While referring to the many things which we have left undone in the past, I must urge in our behalf that, few though we have been, we would have done much more, and few though we still are, we could look forward with greater expectations, were it not for the smallness of our income. But we are hampered on all sides for want of funds. We ought to have a commodious meeting place with our books on the walls and our working materials easy of access. As it is we have no room we can call our own, but are indebted to one Government official for the use of his office once a month and to another for allowing us standing room for our book cases in a corridor. We ought to have a paid librarian and secretary to take charge of books and instruments and conduct our correspondence, whereas these onerous duties are discharged by volunteers. We ought to be able to stock our Library with books of reference and costly publications of all kinds, whereas the purchase of a new book is a great event in our history. We ought to be able to furnish our members with expensive instruments, whereas, so far, we have been able to purchase but one. Had we the funds at command there are many ways, to which I have not even referred, in which they might be advantageously expended. I may mention the making of grants to assist in defraying the expenses of experimental investigations of great public utility, as for example, the introduction into our Nova Scotian climate of foreign plants useful for manufacturing purposes, and the offering of prizes for memoirs of practical value, as for example, on the raw materials for manufactures which our Province supplies. Such modes of stimulating research have been tried with much success in other countries, and could we adopt them, would doubtless be found equally successful here. Perhaps our Institute has been too backward in the past in making its wants and wishes known. And it may therefore be well that we should let it be known

that no man who is looking about him for a public-spirited mode of investing capital can do better than establish for us a Library Fund or a Prize Fund.

I fear I have already kept you too long from the main work of this evening. Let me therefore in conclusion simply express the hope that the Session which we are now beginning may be one of great productivity and of unusual progress.