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January, 1891.

THE
* OTTAWA NATURALIST *

VOLUME IV. No. 10.

The
TRANSACTIONS.

Of the
* Ottawa Field-Naturalists' Club *

(Organized March, 1879. Incorporated March, 1884.)

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NOTICE.—The Treasurer begs to call the attention of members to the advertisements.

EVENING LECTURES.

THE OPENING ADDRESS, DELIVERED DEC. 11, 1890.

The first meeting of the course of Thursday Evening Lectures, arranged to take place during the winter, was held in the Normal School on the above date, at the advertised time. Dr. J. A. MacCabe, the Principal of the Normal School, opened the meeting by delivering an Address of Welcome. He stated that owing to the fact that they were in the midst of the closing examinations it had been quite impossible for him to prepare the address he had proposed. He had two objects in view in granting the use of the Normal School Lecture room for these Free Popular Lectures, which he was certain could not but be of great value to the students attending the school and to the citizens of Ottawa. The first object was to show, as expressed in the title, that "Science" was given on the programme for his address "an aid to general education," the second was a very easy and pleasant one, namely, to extend to the members of the Ottawa Field-Naturalists' Club and their friends a very hearty welcome.

Speaking of the educational value of science he drew attention to the fact that no one was too old to learn—the time never came to anyone when he could say he had finished his education. A person's education was always progressing, and was influenced by every person or object with which he came into contact. Taking this into consideration, he said we all must appreciate that the great fountain and source of knowledge lies outside the class-room, and is not found in text books alone, but must be sought in the great world of Nature. Teachers are frequently told to study Nature's methods; he would go further and say: Study Nature herself.

Speaking of the good work which had been already done by the club, Dr. MacCabe foresaw great advantages from the present course of lectures, not only to the Normal School and the city of Ottawa, but to the whole district.

He concluded by wishing the club every success, and then introduced Dr. Ellis, the president of the club, who delivered the following:—

PRESIDENT'S INAUGURAL ADDRESS—1890.

LADIES AND GENTLEMEN,—In opening the lecture course of the Ottawa Field-Naturalists' Club for the present season, I feel that there are several things which call for a word of general remark before we enter upon the discussion of the several scientific subjects which, as you will see by reference to your programmes, the Soiree Committee have so liberally provided for our entertainment. And, first of all, I think this society has great cause for rejoicing, in the fact that we have had placed at our disposal, through the kindness of the authorities in charge of the Normal School building, and more particularly through the courtesy of Dr. MacCabe, the Principal, the large and commodious rooms of this institution in which to hold our lecture courses; a change, I am sure, that all will appreciate, not only those whose place it is to speak to you but those who may listen; for there is no denying the fact that much of the pleasure and profit derivable from any lecture course is dependent upon comfortable and attractive surroundings. On behalf of the Club, therefore, I would desire to tender our thanks, through Dr. MacCabe, for the privileges which have been hereby conferred upon our society, more especially since, through this courtesy on their part, we are enabled to extend very considerably the aims of this club, in that we are now in a position to tender a cordial invitation to the large classes of students who attend the Normal School to be present at all our lectures and soirees, a thing impracticable heretofore owing to the limited lecture room at our disposal. In this way, I say, the original purpose of the club's work, viz., that of Education, will be very greatly facilitated.

I must, in the second place, congratulate the club as a whole on its rapidly increasing membership, which now reaches nearly 300 persons, as well as upon the fact that many of our new members are persons of influence at points remote from Ottawa, and among whom are represented the several provinces from the Atlantic to the Pacific; a feature which, I take it, is largely due to the change in the policy of the club two years ago, when the scope of its work and transactions was extended. In this extended membership I see a very great element of strength, so much so that I feel, if we can keep up the

interest in the society at its headquarters by continuing to furnish such excellent programmes for our evening and afternoon lecture courses, this interest will gradually spread to the remotest limit, till presently we shall find the little society in Ottawa a gathering centre for information from all parts of the Dominion, concerning which aspect of the question I may have something further to say presently. Though I regret that owing to absence I was unable to be present at but two of your excursions, I am glad to know that throughout the season they were markedly successful, both in the numbers attending them and in the greatly increased interest manifested in the several scientific branches which were discussed. I think, therefore, on the whole, the club has great cause to be proud of the work already accomplished, and, judging from the progress of the last two years, it can safely be predicted that before the next decade, at the present rate of growth, this society will be the largest and most influential scientific body on the American continent. To some this may seem a far-fetched notion, but, I think, if we look at the composition of the club as it is to-day, with its long list of names, among which are those of many men distinguished for scientific attainments in every branch of Natural History, both at home and abroad, you will all agree with me that the realization of this ambition lies entirely within ourselves. And why should it not be realized? Why should not Ottawa, the centre of legislative and political influence, the most important city in many respects in the Dominion, the seat also of the largest purely scientific staff in the country, as well as of the Royal Society, with its several important institutions of learning, be also the headquarters of the largest and most important scientific society in Canada as well? I firmly believe, if we pursue the proper methods to this end and do not allow our zeal to flag, we shall see this aim accomplished. By enlarged membership we secure enlarged means, and with increased means greater facilities for publication and extended influence. I do not know of any society or scientific institution anywhere, either in this or the adjacent great country of the United States, which, for the small sum of one dollar a year, provides such an amount of valuable information, both in its lecture courses and in its publications, as the Ottawa Field-Naturalists' Club.

I trust I have said sufficient to indicate the future possibilities of this club, and to some of us the time appears to be drawing nigh when even a yet larger field of operations than any heretofore contemplated may be safely entered upon—that is to say, the establishment, not of an international but an inter-provincial science association, which, having its headquarters here in the Ottawa Field-Naturalists' Society, may, by means of its widely extended branches, gather together scientific information from every quarter, with many things of great value, which can be here arranged and placed on record. For, though the club has no museum of its own, the museum of the Geological Survey Department will always be only too glad to be the curator of valuable specimens in the several kingdoms of Natural History, and should be the natural receptacle for them. The present museum space is none too great, but some of us as members of the Geological Survey, and all of us as citizens of Ottawa, do not despair of the coming of the time when, upon some one of the beautiful spots in this city, there shall arise the magnificent proportions of a national museum within whose walls shall be gathered together and properly arranged the large and exceedingly valuable collections which are now found in the old building on Sussex street, a building which it is no sacrilege to say, is utterly unworthy of the treasures therein placed, exposed every day as it is to the risk of destruction by fire owing to the character of its surroundings. In this museum of the Geological Department are to be found specimens, not only illustrative of the geological formations and of the mineral wealth of the Dominion, but extensive collections in the branches of ethnology, botany, ornithology, entomology, conchology, etc., collections more extensive by far than the capacity of the building will even now accommodate, and many of which are, as a consequence, laid away in drawers and out-of-the-way places simply for the reason that there is no available space for their display. These collections, moreover, are increasing at a wonderfully rapid rate, as may easily be imagined, from the fact that of the large field staff that go forth every spring each one forwards annually whatever is found illustrative of the field which he is working, so that; of sheer necessity, the erection of a new museum, or the very considerable enlargement of the present one,

must be undertaken at no very distant date. In such an event, with a national museum erected, it is easy to see what a power for good scientific work such a scheme as that now proposed would be, in the contributions not only of wonderful and valuable materials to every branch of Natural History, but in the great collections of important scientific data that constantly accrue. Throughout all the provinces of this Dominion which I have visited, many persons interested in some one of the various branches of Natural History will be found. Botany, ornithology, entomology, etc., all have their students among persons whose tastes incline them to the study of the many objects of interest which are common to every one of Nature's fields. These observations are, however, checked or hindered by the fact that there are no local societies in most of these places where assistance in determining the specimens can be found, unless, indeed, at considerable expense; and also by a lack of opportunity for presenting the facts obtained, many of which are of very great importance to the scientific world, and by means of which the results can be made known to the host of persons interested in such pursuits. To all such workers the methods of the Ottawa Field-Naturalists' Club must commend themselves heartily, since in the work of this club there is an honest effort made to acquire as well as to impart information in nearly all the branches of Natural History. I can see, therefore, no reason why this society, having already shaken off the local trammels which once bound it according to the terms of its original constitution, should not go on still further and enlarge the scope of its operations to an indefinite extent by incorporating in its ranks the best talent found in our High Schools and other educational centres throughout the length and breadth of our country, as well as all those whose tastes incline them to the study of the natural sciences.

To this it may be objected by some that local societies are already in existence in the several provinces, and therefore there is no field left for extending the scope of our own society in this direction. It is true that such societies exist in cities like Halifax, St. John, Quebec, Toronto, Ottawa and Winnipeg, but of many, and in fact most of these, the work is of a different character to that contemplated by the

Field-Naturalists' Club. Some of these societies deal with literary and historical subjects only, others confine their observations largely to but one branch of Natural History; while of others, again, owing to the very doubtful policy of leaving the management in the hands of men who, from business engagements or advancing years, do not possess the necessary animus to keep the societies' aims prominently to the front, or, in fact, to keep the society itself alive in its fullest sense, it is to be feared they have fallen rapidly into the background and are not conspicuous for the amount of scientific work done. In none of these, probably, or at least in very few, is there any attempt at obtaining a membership outside of the city in which the society is located; and it is in this particular respect, if in no other, that this society has already secured a prominent place in the fact, that our membership even now embraces persons from Nova Scotia to British Columbia.

At the last meeting of the Royal Society of Canada a scheme was suggested for the acquisition and arrangement of various scientific data, such, for instance, as the arrival and departure of our birds, the first flowering of plants, the putting forth of the leaves on the various kinds of forest trees, and other kindred subjects, work which has been done locally by the members of this society ever since its organization. By many of us, however, I think it will be admitted that, while the Royal Society, from its elevated position as the leading literary and scientific society of Canada, stands in a particularly favorable position in regard to its smaller, and I think we may allow the expression, sister societies in literature, science and art, to lend the support of its great influence to all those which, as working organizations, must ever be the great gatherers and collaborateurs as regards the material from which scientific conclusions may be derived, the work itself must and can only be done by persons laboring actively in the out-door realms of Nature, and in actual contact with the things which surround us, whether in the hard and puzzling problems of geology, in the pleasant and instructive study of botany, or the delightful study of our birds, insects and shells, or in some of the more minute forms of animal and plant life. The materials thus obtained by these working societies, like the Field-Naturalists' Club, and the quantity of these should, in a short time, reach large proportions, can then be discussed, and the conclusions

arrived at arranged and presented at the winter sessions, after which the final results can be presented to the Royal Society of Canada in a series of papers which would form a most valuable contribution to our store of scientific knowledge, and which would be, by this society, put on record, and in case of doubtful points, could there be further discussed and the points in dispute carefully considered and settled. The question, then, of extending our membership in the way just indicated is one which I feel should be earnestly and speedily considered, and I am convinced that such a course will be conducive to the highest possible gain to our club as a whole and to the furtherance of scientific investigation throughout the Dominion.

I have had considerable difficulty in arriving at any conclusion as to what would be most profitable to present to the Club's consideration to-night in this opening address; for I think it will be unnecessary to designate the few remarks I may have to make by the title of lecture. You will see by reference to the programme of our winter courses, both for the evening and afternoon lectures, that there is an unusually good variety of material, embracing the Animal, Vegetable and Mineral Kingdoms. Among the latter we shall, I trust, have the pleasure of learning about the mode of occurrence, peculiarities and distribution of that important substance, mineral phosphate, concerning which Mr. Lanson Wills has kindly promised to give us some information, while in the department of Canadian gems we may also expect a treat in the contemplation of really beautiful things; for although Canada cannot as yet produce the diamond, the ruby or the emerald, she can furnish exquisite gems for personal ornament or for interior decoration, as you will be enabled to testify after seeing the exhibit which will, doubtless, be made on that occasion. The mode of occurrence and characteristics of that very peculiar mineral asbestos, are also to be described. In the department of Natural History you will hear our ever-welcome friend, Mr. Lett, who will tell us of the habits and peculiarities of the beaver, an animal now unfortunately rapidly becoming extinct in Eastern Canada owing to the fact that it is hunted very often without regard to proper observance of close seasons; while botany, in the more familiar form to many of garden decoration, will be discussed by one of the staff of the Central Experimental Farm. In

the afternoon lectures, which are supposed to be of a somewhat more elementary nature, botany will also take a somewhat prominent place, while the chemistry of food, a somewhat new branch in connection with the work of this club, but one of very great practical importance, will also be ably discussed. It may, therefore, be safely predicted that both the evening and afternoon courses of lectures for the coming winter will equal in every respect any which the management of this society has ever yet been able to provide, and will amply repay any who may be able to attend them for the amount of time and effort therein involved.

I must not omit in this connection to call the attention of the members to a new departure in the matter of sub-excursions for the coming winter. In former years these sub-excursions, as you all know, were supposed to terminate in October or with the coming on of cold weather, but this year, owing to the courtesy of the Director and staff of the Geological Survey Department, it has been arranged that these excursions will be continued on the alternate Saturday afternoons of each month during the winter to the museum on Sussex street, and some one of the branches of Natural History as there displayed will be discussed and illustrated by one of the officers in charge. Several of these gentlemen have already expressed their readiness to explain the leading features in the several collections, and it may be safely stated that the hour or two there spent will not be wasted.

While I do not propose to-night to go into any elaborate discussion on the comparative merits of any of the sciences, I think it is only fair to point out, in a working society like this, some of the great benefits that may be derived from the study of some one of the various branches of Natural History, more particularly since it has always been the aim of this club to keep prominently before the general public the higher education along these lines. And just here it is fitting to remark that it would seem that our present location in the buildings of the Normal School is one particularly adapted to forward our aims in this direction. Here we have annually a large number of students from many portions of the country, young men and women, who may be supposed to represent the more progressive elements in either sex, and who have arrived at that stage of life when, as instructors of youth, they are supposed to have a very fair idea of what constitutes the best and most useful

part of a liberal education, and to know the best means of imparting the same to those with whom they are brought in contact. To all such, both of those who are here to attend the winter session, and those who are present during the earlier part of the year, we can say most confidently that an attendance at the regular lectures of the winter courses, or at the regular outings of the summer and autumn, which may be said to extend from the 1st May to the 1st of November, will be time most profitably spent, and be productive, in most cases, of far better and higher results to those engaged in the work of teaching than the same time devoted to the study of some prosy text book. In this way, too, by opening some hitherto unexplored pathway among Nature's choicest treasures, and by awakening in the mind some new and hitherto unexpressed desire for a further and broader acquaintance with some of the more varied forms of matter, such a plan will, it is safe to say, tend to kindle the higher and nobler part of our natures and enhance our capacities for enjoyment tenfold. True it is that all dispositions do not regard the study of the natural sciences with the same feeling of delight. To some there is, unfortunately, no enjoyment in the contemplation of the beauty presented in the unfolding rose, or in the flight of the delicately tinted butterfly. To some, also, the study of the fossils embedded in the rock, or the contemplation of the wonders seen on every hand, does not raise the mind to the consideration of the grandeur and condescension of that Master designer of the universe that has fashioned all things with such wondrous art, and created for man's enjoyment such wondrously beautiful things. But in so far as the teaching portion of our community is concerned, I believe there is no way by which those so engaged can exercise so beneficent an influence on those entrusted to their care as by frequent short excursions over the neighboring fields; by unfolding to them the beauties of structure displayed in every opening flower, by showing the wonderful convolutions of the many dainty shells which, though more rare than the flower, can also be easily obtained, the increased necessity for closer search, serving often but to enhance the pleasure of the discovery. What, for instance, can be more interesting than to study the habits of some of our most common insects, to watch the various evolutions of our common ants, to note the gorgeous colors and graceful flight of som

of our moths and beetles? All these things appeal most strongly to the sense of the beautiful which will be found implanted in the breast of by far the greater number of our youth, and which in many cases requires but the smallest encouragement to spring up and develop into what may make of its happy possessor a painter, a sculptor, a naturalist, who may be conspicuous among his fellow men for the power of depicting whatever is great and beautiful in the domain of his chosen art. How many an Audubon, Cuvier, Darwin, or Linnaeus, may we have in our very midst, to whom the divine spark which is necessary to kindle into flame the slumbering forces of these youthful minds may be imparted by a chance word of encouragement or of sympathy, and to whom a chance excursion into the domain of Natural History may prove the starting point upon a career which will bring renown, not only upon himself personally, but upon our country as well? If, indeed, no such prominence is reached, the habits of observation thus engendered will prove to be such that the powers of mind will be strengthened very materially, for, whatever pursuit in life may be adopted, it will be found, without a doubt, that the study of Nature in some one of her many forms will tend to make life easier and happier, and will cultivate and refine our ideas; and not only this, but this study will tend directly to impart breadth and solidity to all our conceptions, to lift us out of the narrow rut into which one is far too prone to be drawn; to extend the scope of our possibilities, and to make gladder the whole pathway of life. When one thinks of the privileges enjoyed by the instructors of our youth at the present day, in the acquisition of knowledge concerning Nature in all her forms, not only through the medium of the lecture room, but through the agency of text-books, which have increased so rapidly and obtained such an excellence that one finds it almost an impossibility to keep in line with them, we can but hope that those to whom are entrusted the moulding of the minds of our nation will carry out their work on the broadest and noblest plan, and make full use of all the best and choicest methods at their disposal. The study of all these things carries us at once into the broad domain of science, and a knowledge of the anatomy of the beetle, or of the habits and life history of one of our most ordinary insects, things which can be picked up anywhere by hundreds, are as

pregnant with importance, in so far as we know, as the most abstruse problems of the astronomer or the physicist, who endeavors to ascertain the composition and life-history of the remotest of our planets, or with the studies of the geologist who strives to decipher and to map out the life history of our own planet. In fact, the former often presents problems of the greatest practical scientific importance, since by the study of the common living things around us, and by the determination of their habits and modes of existence, the greatest benefits to the human race accrue.

The practical application of science in some one of its many forms is at the present day so universal that we have long since ceased to consider it as entering into the doings of our everyday life. Yet, when we allow ourselves to glance for a moment at the various processes going on around us, we are brought at once face to face with the fact that, even in the simplest and most ordinary avocations, its influence is everywhere visible. The word science is derived from the Latin word *scio*, meaning to *know*. There is, therefore, no mystery about the word itself in its general or ordinary acceptation, and it simply may be used as another term for knowledge in its highest and truest form. Science has been defined as, knowledge, certain and evident in itself, and the basis of all science as, the immutability of the laws of Nature and of events. The varieties of scientific knowledge are almost endless. Thus we have the science even of Mathematics, which deals with abstract truths, of Jurisprudence, of Logic, Chemistry, Astronomy, Geology, Rhetoric, Grammar, and a hundred others, including the more abstruse sciences of Metaphysics and Theology. Some of these may be regarded as speculative sciences; others deal with the material alone, and whatever theories arise are supposed to be founded entirely upon the facts which are ascertained during the processes of investigation. In this latter class may be placed those which deal with the phenomena of Nature, with which we more particularly have to do.

With many the idea appears to prevail that science is a thing of comparatively recent date, and in their egotism these suppose that the citizens of the nineteenth century should almost be permitted to claim for themselves a monopoly of the honors arising from the unravelling of Nature's secrets. While, without a doubt, the growth of knowledge

in all its branches has, within the present century, proceeded at an exceedingly rapid rate, we must not as a consequence infer that our ancestors of a thousand, or even of five thousand years ago, were destitute of inventive genius, the faculty of reason, or the ability to put their common sense to a profitable use, or that their craniums were not furnished with as good a quality of brain matter as those of the present day. The magnificent ruins of fifty, or even possibly a hundred centuries ago, since no real date can be assigned to many of these monuments of a long extinct people, which are found both in the new and old worlds, show at least that the sciences of architecture, of sculpture, and of the highest of the mechanical arts, must have reached a very advanced state of perfection even at that early time; while among the very earliest remains of our race, viz., those who dwelt in caves and were contemporaries of monstrous beasts which have long since become extinct, such as the mastodon or the cave bear, when the ice of the glacial period was even yet descending from our mountain sides, we find that the genius of sculpture, and to a certain extent the knowledge of it existed, though probably without having reached any very great degree of excellence. The magnificent sculptured forms and architectural wonders of Egypt are familiar to you all, and show that in this country, one of the great centres of the human race, knowledge of these arts had also become very highly developed, according to the most recent and reliable investigations at least 6,000 years ago; while on our own continent, in the curious remains left by the mound-builders and the cliff-dwellers, races so far removed that their origins have never yet been satisfactorily explained, but which evidently have preceded the present races by an unknown and lengthy period of time, many of the lines of decorative work have also been cultivated to a very considerable degree. In fact, the present race is very often confronted with the accuracy of the statement that "there is nothing new under the sun," and it may probably be accepted as a sober truth that, making all due allowance for cultivation, the human nature and the intellect of the present day, differs very little, and that not in kind, from that which prevailed among the earliest settlers of the globe. It may even be said that, with many of the so-called startling discoveries of modern

science, it is known of some at least that these are but the re-discoveries of arts which perished with the records of a former people.

It has been already suggested that science in some of its forms enters very largely into our most ordinary pursuits. As an illustration of the complexity of the subject, and the mutual interdependence of one science upon another, let us glance for a moment at even so apparently simple a thing as the making of our daily bread. Here we should probably, first of all, obtain a knowledge of the conditions of climate which are most favorable to the growth of cereals; and this opens to us at once the great domain of the sciences of climatology and meteorology. The conditions of soil, again, also a question of great importance, brings us to the study of chemistry, physics and geology, while the sowing, harvesting and grinding of our grain introduces us into the wonderful field of applied mechanics, the skill of whose students is so largely devoted to the invention and perfecting of the best and most labor-saving appliances by which these operations can be most satisfactorily effected.

In the second stage of the industry, chemistry again comes into play in the laboratory of our kitchens and in the production of the best materials for producing the finest varieties of bread from the prepared grain, and in this connection also several sister sciences are invoked in the invention and building of our ranges and other appliances for the cooking of the materials after they are ready for that process. If we follow up our illustration to its legitimate conclusion we shall have to go back still farther and bring in the aid of several other important assistants. Thus we must have the science of geology to determine the presence of the coal-beds from which we derive the necessary fuel to supply our ranges. Then we have the sciences of palæontology and palæo-botany to determine the age of the coal plants which accompany these coal beds, and the science of mining engineering, by which the coal, and even the iron ores from which our implements and ranges are manufactured, can be extracted and brought into useful shape, in which process, also, we have the aid of the sister science of metallurgy, and so we might pursue our illustration almost indefinitely and show that in every department of our life's work there is an exceedingly close relationship everywhere existing between the various branches of scientific knowledge.

While, therefore, the study of the sciences should be of the greatest practical value to all, there are certain forms of thought or study which are by many supposed to be possessed of more elevating tendencies as regards the development of the mind than others. Yet it seems scarcely fair to make any such invidious distinction in the value of scientific knowledge itself, but if any such peculiar tendency is apparent among the mass of mankind in general, to attribute such peculiarity rather to the particular bias of the individual himself, since it is a well recognized fact that the tendency of the human mind in different individuals is exceedingly diverse, so that to some the study of the most intricate problems pertaining to the sciences of pure mathematics or metaphysics is capable of affording the highest type of mental delectation, while to others such studies are conducive only of weariness and even of disgust itself.

It is evident, I trust, from what has already been said, that there is nothing in the study of the natural sciences which is not of a character to elevate both the physical and moral condition of mankind, and yet, in regard to some of these, there is a certain feeling of hostility displayed which occasionally finds expression, but which is due apparently rather to a lack of conception of the principles involved in their study than to any other cause; so hard is it even among those who are generally considered as enjoying the advantages of a liberal education to cut entirely free from the old leaven of mediæval superstition, belief in which very often proves stronger than the exercise of the strongest common sense. As an illustration I may merely mention the fact that, not many years ago, one of the most popular lecturers of this city, at that time, assured me that he had read everything which he thought had a bearing upon the subject of the creation of the world and on the doctrine of evolution, and yet retained the impression that all the phenomena which have taken place since the period of chaos down to the beginning of the seventh day, could be easily included within the space of six literal days of twenty-four hours each, from which we may realize in what exceedingly narrow grooves some minds, excellent in other respects, are cast. We may be disposed to regard this as a somewhat exceptional case, and wonder how any one, possessed of even a moderate share of common sense, can prefer to cling to the exploded and

antiquated ideas of the middle ages rather than to allow his belief to be influenced by the light afforded through modern research ; yet the fact is still evident that the old views concerning some of the now well proved and generally accepted truths of science to some extent yet prevail. To the earnest student of Nature, however, there is nothing more certain than that broader and truer views of the harmony and fitness of all things pertaining to the material world will be presented as knowledge of these things increases, and that a grander and more correct conception will be afforded of the great Author by whom all things have been brought into existence and by whom they are harmoniously controlled.

There is yet one aspect of the scientific question which to us, as students of Nature in all her forms, need have no direct practical interest; but which, owing to certain circumstances, has assumed such a phase at the present day as to merit a word of explanation. To many of us the expression, "conflict of religion and science," is familiar enough, but to some at least I fancy the phrase is, to a very large extent, nearly meaningless. The aims of scientific investigation are, or should be, the acquisition of truth itself concerning the phenomena of Nature, and its conclusions are based upon the examination of the material things around us. The aims of religion are also associated with the ascertainment of truth in its highest form, but these have an entirely different bearing, and are not confined to the material, but rather deal with the immaterial or immortal portion of mankind. In certain points these two lines of investigation tend to converge, and in such cases, owing to imperfect interpretation on one side or the other, or possibly on both, there is an apparent clash of opinion.

It is plain, however, that science, that is, natural science, was not intended as a hand-book to each religion, except, possibly by induction and in its broadest sense ; and it is equally plain that there is no reason why religion should be so twisted out of her natural sphere as to cause any direct interference with the teachings of science, seeing that the two proceed in such entirely different lines.

Any apparent discrepancies which may exist in the interpretation of the two books which have been given us, viz., that of Revelation which we call the Bible, and that often styled the unwritten page

around us, the Book of Nature, and yet which, in truth, is a book written in plainest lines in every page, should, since they both have come from the same great source, be rather attributed to a lack of skill in those who attempt to read them ; since if we accept the statement that the Bible is the word of God, and the other statement, which is equally true, that there is an overruling force which controls the phenomena of Nature, in accordance with certain fixed and, in some cases at least, well known laws, the interpretation of such phenomena should, if correct, agree in their essentials even though viewed from different standpoints.

The term Agnostic, which now-a-days one frequently hears, has of late years assumed considerable prominence, and possibly more than it really deserves. The derivation of the word is from the Greek, and literally means one without knowledge. In its ordinary acceptation, however, it is held to signify one without definite knowledge of the Creator or God, or of the plan of creation. If we take the word in the broad and natural sense it has no meaning at all as applied to mankind, since every one is supposed to possess at least a certain amount of information, while no one is held to be perfect in every branch of knowledge.

If, on the other hand, we limit its meaning to those who have a lack of knowledge of the fundamental truths of theology, we, as Christians, must also, even from our own standpoint, to say nothing of that of the scientist, properly so called, acknowledge ourselves worthy the title in certain respects, since many of the accepted tenets of Christian belief are articles of faith only, and are not susceptible of actual demonstration. Though we may claim we have a clear conception of the plan of Creation according to the scheme laid down in Genesis, the exceeding terseness of the scheme as there presented is such that we know that it cannot be taken in its literal sense, and the theologian is indebted to the scientist for the presentation of more light upon a question which has produced much unnecessary, and often unseemly, controversy. When such uncertainty exists, therefore, it does not, to many, seem the wisest course that anyone should dogmatically assert any particular line of doctrine, and claim for himself infallibility in its interpretation, especially when the data given are confessedly so imperfect. It is, therefore, easily seen that this term *agnostic* is one exceed-

ingly hard to define clearly, and in the heat of controversy is very apt to be used so loosely that the results are frequently as damaging to one party as the other.

But it is not very clear to many why the word should be used at all in the sense as generally understood: With its broader meaning, doubtless, it would find scope in the realm of metaphysics, but as applied to the investigator after scientific truth, dealing only with material things, it should certainly have no place. As for any man's personal belief, that is an entirely different matter and one entirely beyond the range of scientific investigation.

The distinction between the terms *agnostic* and *atheist*, if these terms must be retained, while it should be sharply drawn, is apt to be confounded. An atheist, pure and simple, by which one understands a person without belief in God, or in any supreme overruling power, is a very rare being to encounter. Certainly they are very rarely found in the ranks of the earnest workers in the field of Natural Science. The greatest writers and students on these subjects do not hesitate when necessary to express their belief in the existence of a first great cause through which life was first introduced on the globe, and by whom all things are controlled—known, indeed, under different names, such as the Creator, the Infinite, Nature, the Power behind the veil, all of which terms in point of fact resolve themselves into the same meaning. From the fact, however, that scientific problems are supposed to be worked out by the aid of natural surroundings alone, and to be capable of actual demonstration, this portion of their belief is not brought prominently into notice, since there is no absolute occasion for its intrusion, but its influence is everywhere apparent in the lives of our most illustrious scientists.

For many hundreds of years the expression *Gnothi seauton*, know thyself, has been familiar to the human race. Generation after generation has been studying the problem this presented with somewhat indifferent success, and no one will to-day, I think, be so presumptuous as to say, that even in the study of the human frame, and of the phenomena which take place in the human body, have we yet arrived at the perfection of knowledge. How much more presumptuous, then, would it be to say that in any of the great fields of science, art

or theology, the expression *Gnothi seauton* has been fully worked out, or that we know but little beyond the merest rudiments of the boundless stores of knowledge which lie therein concealed. To many of us it will, therefore, seem much more fitting that the two great sister civilizations, science and religion, should go forward, hand in hand, intent on the ascertaining of truth itself and the amelioration of the condition of the human race, rather than through the errors of man's judgment or the imperfection of his knowledge, the least semblance of conflict should be apparent.

Theories there are without end in every department of life's work but theories are not always the essential things to which we should pin our faith. It does not follow that the school-boy, when he has reached man's estate, should continue to abide by the dictum of his early preceptor. Had Galileo been content to accept the doctrine of his so-called superiors that the world did not move, but that the heavenly bodies, by their revolutions around the earth, gave rise to the phenomena of day and night, and had the successors of Galileo been content to have followed the same blind path, it is very possible that the science of astronomy, and, in fact, human knowledge in general, would have made much slower progress than it has done since that date. The mere dictum of any man, or of any body of men, will not at the present day, and should not, carry more than its proper weight in the face of an array of indisputable facts to the contrary. The great thing to guard carefully against is the rash putting forth of unsubstantiated theories as theories only; and what is even worse, when such a theory has been advanced, is the deliberate distortion of facts to its support when its weakness becomes apparent or its falsity is clear. This unfortunate condition of things is occasionally found in all the sciences. Thus in the science of geology we have had the fierce warfare of the school of the Neptunists, who hold that all the phenomena of the earth's surface were produced by the agency of water, against that of the Plutonists, who invoked the agency of fire alone as the solver of all the difficulties in the creative problem. Later, we have had the men who contended for the great continental ice sheet extending over the entire northern half of our land, against the advocates of iceberg action and local glaciation only, and so on throughout the chapter. People looking on from

a safe distance often wonder how such diverse opinions can prevail on such subjects if the facts are the same in every case. The fault does not lie with the facts but in the peculiar bias of each individual's mind in regard to the interpretation of these facts. The principle sometimes laid down, that the conclusions of those who have preceded us, both in the domain of science and theology, must ever be regarded as infallible, has not only been opposed in large measure to the intellectual advancement of the race, but, if blindly persisted in, would tend to prove a very serious obstacle to any kind of improvement whatever.

True it is there are extremists on either side, and the great factors in the world's advancement, science and religion, should not be held in any way responsible for the foolish utterances of those ill-adjusted intellects which are constantly seeking opportunities to run a muck against any theory or individual that may chance to oppose the peculiar whim of the moment which they may desire to advocate. Truth is great and will prevail, and the differences between the two great schools will in the end be found to be more fancied than real.

The spectacle of the theologian bitterly assailing his co-worker in the cause of truth is not, to the general onlooker at least, a very edifying one. Disputes and misinterpretations will, doubtless, continue to arise, and owing to the imperfection of man's nature, and the lack of completeness of his knowledge, will furnish in the future, as in the past, abundant material for angry recrimination. Not until the final change comes to each of us will the mists be entirely dispelled, and then with clearer vision we shall see and understand all these mysteries, for then we shall see face to face.

At the conclusion of the President's address a vote of thanks was eloquently proposed by Sir James Grant, K.C.M.G., F.R.S.C. He spoke of the good work being done by the club, and particularly by the President and his colleagues in the Geological Survey. He had watched with great interest the rapid progress of scientific studies during the last 20 years, particularly in the Ottawa district and in response to the efforts of the Ottawa Field-Naturalists' Club. He suggested the appropriateness of the club erecting a monument to the late Elkanah Billings, a native of this city, who had done so much for the honour of the Dominion.

Prof. Macoun, in seconding the vote of thanks, spoke in high terms of the Inaugural Address and also of the Address of Welcome delivered by Dr. MacCabe. He showed the value of originality of thought, and deprecated students sticking to the letter of the text-book. Anyone who would succeed in life must study text-books closely at first, and then strike out boldly for himself. He was pleased to be able to agree so fully with what the Principal of the Normal School had said in his address.

The vote of thanks was unanimously carried.

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EDITORIAL NOTES.

SUB-EXCURSIONS TO THE GEOLOGICAL MUSEUM.

On Saturday, 10th January, there will be a sub-excursion to the Geological Museum, when the party will be addressed by Mr. H. M. Ami upon Palaeontology.

On Saturday, 24th, another of these excursions will be held and Mr. Willmott will deliver an address on some mineralogical subject.

PROGRAMME.

Members are requested to pin up the loose programme enclosed herewith in a conspicuous place, so that they may not forget the various lecture days as they come round.

THURSDAY EVENING LECTURES.

During the present month two lectures of great interest are to be delivered. Jan. 15th, Mr. W. P. Lett will read a paper upon the Beaver and the Report of the Zoological Branch will also be read.

For Jan. 29, there is a very full programme. The report of the Ornithological Branch will be read by Mr. W. A. D. Lees. Mr. A. J. Kingston will read a paper on the Chimney Swift, and Mr. Willmott of the Geological Survey Department will deliver a lecture upon Canadian Gems. This will be fully illustrated by an exhibit of native gems, cut and uncut.

MONDAY AFTERNOON LECTURES.

The inaugural lecture of the Monday afternoon series is to be delivered on January 12, when Miss Margaret A. Mills will speak on the Value of the study of Natural History. Knowing Miss Mills's ability to treat this subject, we can promise a most pleasant afternoon to all who avail themselves of this opportunity of hearing Miss Mills speak, and we trust that not only this but all the lectures in these free lecture courses may be largely attended. On the following Mandays in this month, lectures will be delivered upon Botanical subjects; on January 19th on "The Geographical Distribution of Plants," by Prof. J. Macoun, and on January 26th on "The Educational Value of Botanic Gardens," by Mr. J. Fletcher.



SUMMARY

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Canadian Mining Regulations.

NOTICE.

THE following is a summary of the Regulations with respect to the manner of recording claims for *Mineral Lands*, other than Coal Lands, and the conditions governing the purchase of the same.

Any person may explore vacant Dominion Lands not appropriated or reserved by Government for other purposes, and may search therein, either by surface or subterranean prospecting, for mineral deposits, with a view to obtaining a mining location for the same, but no mining location shall be granted until actual discovery has been made of the vein, lode or deposit of mineral or metal within the limits of the location of claim.

A location for mining, except for *Iron* or *Petroleum*, shall not be more than 1500 feet in length, nor more than 600 feet in breadth. A location for mining *Iron* or *Petroleum* shall not exceed 160 acres in area.

On discovering a mineral deposit any person may obtain a mining location, upon marking out his location on the ground, in accordance with the regulations in that behalf, and filing with the Agent of Dominion Lands for the district, within sixty days from discovery, an affidavit in form prescribed by Mining Regulations, and paying at the same time an office fee of five dollars, which will entitle the person so recording his claim to enter into possession of the location applied for.

At any time before the expiration of five years from the date of recording his claim, the claimant may, upon filing proof with the Local Agent that he has expended \$500.00 in actual mining operations on the claim, by paying to the Local Agent therefor \$5 per acre cash and a further sum of \$50 to cover the cost of survey, obtain a patent for said claim as provided in the said Mining Regulations.

Copies of the Regulations may be obtained upon application to the Department of the Interior.

A. M. BURGESS,

Deputy of the Minister of the Interior.

DEPARTMENT OF THE INTERIOR,
Ottawa, Canada, December 19th, 1887.

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