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THE STUDY OF NATURAL SCIENCE.

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Science
AN ADDRESS

BY

THE REV. A. DE SOLA, LL.D.,

AT THE CONVERSAZIONE HELD IN THE HALL OF THE

NATURAL HISTORY SOCIETY OF MONTREAL,

ON

WEDNESDAY, 9TH MARCH, 1870;

AND COMMEMORATIVE OF THE VISIT OF

HIS ROYAL HIGHNESS PRINCE ARTHUR,

TO THE INSTITUTION, ON THAT OCCASION.

Montreal:

PRINTED BY JOHN LOVELL, ST. NICHOLAS STREET.

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JEWS' COLLEGE
LONDON



THE
STUDY OF NATURAL SCIENCE.

May it please Your Royal Highness; Ladies and Gentlemen:

The Annual *Conversazione* of the Natural History Society—always a gala season for its members—becomes especially so this evening, when we are privileged to welcome to it, the honored son of our highly revered and dearly beloved Queen, on whom may God bestow many years of happiness and blessing. On so memorable an occasion in the history of this Society, there devolves on me a duty that could have been more worthily and ably discharged by another—the pleasant duty of extending to you, Ladies and Gentlemen, a very cordial welcome, on behalf of the Society, to the entertainment we are enabled to offer you. I beg to assure you that we experience a very high degree of gratification in believing that your presence on this and other occasions is intended to evince your sympathies with the objects of our Society. May we be permitted to hope that these sympathies will lead you to become, instead of mere annual visitors, permanent, earnest co-laborers with us. I at least propose, in a few remarks on some of the intellectual and utilitarian aspects of the study that engages us here, to show you that we have some warrant for the invitation we give you to labor with us in its great and glorious cause.

In its most extended sense, natural science means an investigation into the laws governing, and the elements composing, the whole of God's material works—the heavens above, and the earth beneath. The boundlessness of such a field of inquiry I could not, on this occasion, more forcibly, and I trust more appropriately, impress upon you, than by quoting to you the words of that excellent and lamented Prince, whose like, in respect to his extensive attainments in literature and science, and his judicious and successful efforts to promote them, Britain has never yet seen; who, in his life, afforded us a noble illustration of all that dignifies humanity, and in his death, left us a precious example how the time and talents God bestows on us may be most beneficially employed for the best interests of mankind. Need I say I refer to Albert the Good. These are his words, addressed to the "British Association," at Aberdeen, in 1859:—

"But in gaining new centres of light from which to direct our researches and new and powerful means of adding to its ever increasing treasures,

science approaches no nearer to the limits of its range, although travelling further and further from its original point of departure. For God's world is infinite; and the boundlessness of the universe whose confines appear ever to retreat before our finite minds, strikes us no less with awe when, prying into the starry crowd of Heaven, we find new worlds revealed to us by every increase in the power of the telescope, than when the microscope discloses to us in a drop of water or an atom of dust new worlds of life and animation, or the remains of such as have passed away."

A society such as ours has to regard natural science in its more limited sense. It is only from a few salient points that we can hope to penetrate a field which is not more distinguished by its boundlessness, than by its variety. But in its immense variety, we discover, the more we advance in the study, a prevailing uniformity that speaks of plan and system. And as the astronomer has shown that the slight deviations and perturbations of the spheres in their course are, equally with the regularity of their movements, the result of fixed laws, so the scientific naturalist holds it as one of his highest duties to discover and exhibit the principle governing not merely the uniformity of structure and habits of living nature, but also those deviations from it that at first sight seem so unaccountable and perplexing. If this be so, then all persons of all degrees, stations and occupations should aid, in some way or the other, a Natural History Society. For the scientific naturalist wants facts and the result of observations; and he frequently wants those facts which may appear trivial and unimportant, but which he is able by his powers of generalization to show, when connected with other facts already obtained, possess a very great value in correcting what is vague, contradictory or erroneous in his former deductions. And the contributor of these facts need not be a scientific one. Everyone with ordinary powers of observation may make important additions to the store of scientific knowledge. Some of the most valuable contributions to natural history have been made by unscientific travellers, who simply but faithfully described what they saw and collected. But we need not go to foreign countries to pursue our investigations. There is quite room enough for them in this Canada of ours. For, not to speak of the specially interesting field we have for geological and mineralogical research, there is ample scope for observation and inquiry into the structure and vital actions of even our lowest plants and animals, not by any means thoroughly investigated; and it may be safely promised the diligent collectors among our insects and marine tribes, that their labors will not always remain unrewarded by the discovery of some species hitherto unknown, and thus valuable contributions made to an important department of natural history—the geographical distribution of animals.

The duty of acquiring and imparting knowledge from observation, though a very evident one, inasmuch as it advantages society as well as the individual, is yet one very generally neglected. We have heard of

the pedagogue in a small village who having joined a crowd anxiously engaged in watching an eclipse of the sun, and who, having been asked in deference to his superior learning what was the cause of this extraordinary appearance, replied, "It is only a phenomenon." The truth seems too evident to repeat that if, when we behold anything extraordinary in nature, we check our instinctive curiosity by saying to ourselves, "It is only a phenomenon," we shall not be one step nearer any rational knowledge of the appearance than if we had never observed it. "How many singular phenomena," exclaims the zealous naturalist, in accents of bitter regret,—“how many rare and precious fossils have been lost to the world seen by blind eyes. How many gas lamps might have trembled at sounds, before a Lecomte observed under what conditions the ball-room lights responded to the tones of a violoncello.”

But the study of Natural History is not merely valuable as a means of cultivating the powers of observation, but of educating all the faculties of the mind. Advancing as it does from the study of the simple to the analysis of the complex, it must necessarily bring into play all those mental powers that men are called upon to exercise in all the engagements of life. "The process by which truth is attained," says Mill, "reasoning and observation, have been carried to their greatest known perfection in the physical sciences." Natural History being concerned rather with the knowledge of things than of words, can lay claim to an exactness which is not the least of its merits. Another of its advantages is that it supplies us with the great ideas of natural law and harmonious adjustment. Finally, it bestows on us a general quickness of perception; for the habits of observation it necessitates, give to the intellect a superior aptitude for understanding and enjoying the thing observed.

Were this the occasion to dwell on the utilitarian aspects of the study, we might refer to the countless blessings it has bestowed on man in the shape of all those things essential to his wants and comforts; we might point to an improved Agriculture and Horticulture; to the protection of crops from the devastations of insects; to the multiplication of the ores, the coal, the useful and precious stones and metals. We might point to the wondrous triumphs of science applied to the arts; the labor-saving processes which enable all to possess so cheaply the comforts and elegancies of life, formerly attainable only by the very few. Especially might we point to these in the mother country; but they are not entirely absent in this Dominion, even with a sparse population of comparatively scant leisure and opportunities. For where erst stood the primeval forest in which roamed only savage man and wild beast, now rise large cities, important centres of commerce, pleasant villages and smiling hamlets. Where formerly prevailed unbroken stillness and solitude now is heard the busy hum of industry, the cheerful sound of civilized man's labor in his work-shops and in his factories, with his labor-saving implements and machines and engines and the countless devices for multiplying force and velocity, all originating in science and directed by science, the

friend of art and guide of industry. Where the Indian canoe slowly bore its untutored occupant in his short journeys on the bosom of our noble streams, now rides the majestic steamboat carrying its hundreds of passengers, hundreds of miles even through a night's sleep, on their errands of business, pleasure and duty. Where on the banks of these streams could only be seen a few rude wigwams approached by the narrow bridle path or painful trail, now stand thousands of commodious houses and palatial mansions, every where connected with broad and easy roads or finished railways, along which rushes the mighty locomotive, so fearful in its energy and power, with its freight of human beings and all that ministers to their wants in distant settlements; speeding on its way through tunneled hill and mountain; over the marvellous tubular and suspension bridges that hang over gorges of dizzy depths; following the telegraph wire along which the lightning conveys with its proper rapidity man's messages, wishes and behests; over the canals that science has substituted for rivers not navigable; along rich cornfields and beautiful gardens, replete with lovely flowers and luscious fruits, and perfumed exotics, all multiplied and improved by scientific culture. Such are some of the results which science, applied to the arts, has obtained for us in Canada; and there is not one of her sons or daughters who may not yet aid in further developing these blessed results.

But it is no mere material, grovelling, earthly science, that we laud and advocate in this institution—but a science whose eye alternates between earth and heaven—below, seeking the advancement and good of humanity; above, finding communion with the Great Creator and Architect of all; acquiring the fuller knowledge of wisdom and design and adaptation and harmony everywhere displayed,

“ To see in part
That all, as in some piece of art,
Is toil, co-operant to an end,”

and that end, the elevation and felicity of man. Yes, the benevolence, the wisdom, and the omnipotence of Him who formed all and maintains all, are made more and more manifest to us as we advance, step after step, in the study of natural science. We hear the voice of God on the mighty waters, when He thundereth, and when He flasheth the flames of fire that shiver the mighty cedars. We raise our eyes and we see His infinite and unapproachable wisdom displayed in the delicate adjustments and felicitous arrangements of the varied forces that astronomy reveals. We see it in the mechanical and physical properties of the atmosphere; in the effects of light and heat in developing and fostering all the varied beautiful, animal and vegetable life; in the production of cooling winds and fructifying showers. We read this testimony in the towering rocks and giant trees, as in the grains of sand and petals of the flower; in the nerves and veins and arteries which permeate this wondrous frame of ours, as in the vessels that convey the sap from the root to the leaf in the

vegetable world; in short, in all the countless adaptations and modifications every where visible, every where needed. And when we pass from the known to the unknown, from the revealed to the unrevealed, from the study of the stupendous and inimitable organisms, it is given us to understand, to the contemplation of the mysterious powers and qualities and forces in Nature which seem almost for ever destined to baffle man's puny efforts to resolve them, we cannot fail to carry away a sentiment of the most profound humility, a deep-seated conviction of the utter weakness and insignificance of our powers. Yes, from the study of nature, from this house in which it is specially cultivated, we should, and we must, carry into the active occupations of our lives, in our daily intercourse with our fellow beings, an earnest desire to imitate, as far as we may, the attributes of the Creator as revealed to us by nature, to elect the most comprehensive of these attributes, benevolence, as the main-spring of all our thoughts and actions, so that we may look upon all men, no matter what their origin, colour or creed, as equally the objects of the one Creator's care, and the one Creator's love, and so that we may learn to practise that toleration for each other's most cherished opinions, political or religious, that shall for ever banish from amongst us the bitter wrangling of dogmatism and the rancour of sectarian strife; which shall secure among us the rule of that harmony every where prevalent in nature, and every where taught by her,—the harmony that shall prove

“ The chain of love
Combining all below and all above.”



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From the "Montreal Daily News" of Thursday, March 10, 1870.

CONVERSAZIONE OF THE NATURAL HISTORY SOCIETY.

The eighth annual Conversazione of this Society took place in their rooms last night, and was attended by a large and brilliant assembly composed of the elite of the city. The Lecture Room, Library and Hall were most tastefully decorated, for which Mr. McCord deserves great credit. There was a good display of philosophical instruments and apparatus in the Lecture Room, while the Library, which was thrown open and connected with the Lecture Room, was brilliant with lamps, and glittering with a large number of microscopes of the newest and most improved descriptions. The inspection of microscopical objects was highly interesting, and was superintended by the members of the Microscopic Club.

At about a quarter past, eight His Royal Highness entered the Lecture Hall preceded by the Chairman, Rev. Dr. De Sola, and immediately followed by Principal Dawson, Lieutenant Picard, Drs. Smallwood, Hunt, and Edwards, and Messrs. Ferrier, Leeming, Billings, Barnston, and Whiteaves, the band of the Rifle Brigade playing the National Anthem. On ascending the dais, the following address was presented to the Prince by Dr. De Sola, on behalf of the Society :

To His Royal Highness Prince Arthur Patrick William Albert, Knight of the Most Ancient and Most Noble Order of the Thistle, Knight of the Most Illustrious Order of St. Patrick, &c., &c. :

May it please your Royal Highness,—We, the officers and members of the Natural History Society of Montreal, beg leave to approach your Royal Highness with our most respectful salutations, and to tender you a very cordial welcome on this occasion, when we are honoured with your presence amongst us.

We beg to assure your Royal Highness of the reverence and regard in which we hold the exalted virtues and beneficent rule of Her Most Gracious Majesty the Queen.

Our Society has existed as a corporate body for thirty-eight years, during which time it has ever had for its chief object, the advancement of the study of Natural History in this city and throughout Canada. It has erected this building, in which we have collected and arranged a Museum, which is attaining a magnitude that will bear favorable comparison with ordinary public Museums in England, and is especially valuable for its exhibition of local specimens. It has also erected the nucleus of a useful library of reference on scientific subjects. It has sought to promote original investigation and to foster a taste for the

study of nature, by its lectures, its papers statedly read, and by its organ, "The Canadian Naturalist," which spreads the best attainable information on the natural productions of Canada, not merely among students in the Dominion, but throughout the scientific world where it is favorably known.

We believe that the aims and labours of such an Association as ours will enlist the fullest approval of your Royal Highness, as they did that of your honored and lamented father, whose name is revered wherever science is cultivated as one of its most earnest friends and efficient promoters.

(Signed,)

A. DE SOLA, LL.D.

J. F. WHITEAVES, F.G.S.

REPLY.

*o the Officers and Members of the Natural History Society of Montreal,
Mr. Chairman and Gentlemen:—*

It is to me a source of great satisfaction to receive this address of welcome at the hands of a Corporation so learned and distinguished, many of whose members have battled bravely in the cause of science.

Their achievements in the fields of geology and organic chemistry are well known not only to Canadians but to the scientific world at large; and their meritorious literary contributions in other branches of science afford clear indications of the ability of various members.

The establishment of this excellent museum, so full of objects of deep interest, reflects great credit upon this Society.

Most praiseworthy are the efforts of the members to popularize the natural sciences, and most sincerely do I offer to them my congratulations on the success that has attended their undertaking.

[Signed,]

ARTHUR.

On conclusion of the Prince's reply, Dr. De Sola addressed the audience in words of welcome and on the inducements to the study of Natural Science. His remarks were warmly applauded. After a piece performed by the Band, Principal Dawson followed in an interesting speech upon science and scientific institutions generally, but for want of space we are unable to give it at length. For the same reason we are obliged to omit a synopsis of Dr. J. Baker Edward's lecture on applied science.

Immediately after the lecture, the Prince, accompanied by I r. De Sola and Mr. J. F. Whiteaves, proceeded to inspect the collection of objects. and appeared especially interested with the cases of birds and cabinets of insects.

His Royal Highness left at a late hour, and expressed himself highly gratified with the proceedings, and surprised at the extent and value of the collection.

The Band of the Rifle Brigade performed various selections during the evening.



