

# SCIENCE

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SIR WILLIAM DAWSON.

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In Sir William Dawson there has passed away the last survivor of that distinguished group of naturalists which in the earlier part of this century achieved for science in America such brilliant results and such widespread recognition—men whose range of knowledge was almost encyclopædic and many of whom made valuable contributions to science, in widely separated fields. The environment of the man of science has now changed and the older type of naturalist seems unfortunately about to disappear.

Sir John William Dawson was a native of Nova Scotia, a province which has produced more than its share of the Canadians who have risen to eminence in the various walks of life, having been born at Pictou on October 13, 1820. He died at Montreal on November 19, 1899, at the age of 79.

His father, James Dawson, was a native of Aberdeen Scotland, and came to Nova Scotia to fill a position in a leading business house in Pictou, and on the termination of his engagement began business there on his own account.

While still at school in Pictou at the age of 12 he developed a love for natural science, inherited from his father, and made large collections of fossil plants from the Nova Scotia coal measures, so well exposed about his native place. He speaks of himself at that time as being a "moderately diligent but not a specially brilliant



SIR WILLIAM DAWSON.

pupil." On leaving school he studied at Pictou College and subsequently at the University of Edinburgh. While at the former seat of learning, at the age of 16, he read before the local Natural History Society his first paper, having the somewhat ambitious title 'On the Structure and History of the Earth.' He returned to Nova Scotia in 1847 and two years later went to Halifax to give a course of lectures on Natural History subjects in connection with Dalhousie College, and organized classes for practical work in mineralogy and paleontology. These were attended by students, citizens and pupils of higher schools, a foreshadowing of university extension. In 1850, at the age of 30, having already attracted some attention by the publication of a number of papers, reports and lectures, he was appointed Superintendent of Education for Nova Scotia. From this time he became known in his native province as an indefatigable promoter of educational progress and a founder of educational institutions. His work in connection with this position obliged him to travel continually through all parts of the Province and on these journeys he accumulated that immense mass of information concerning the geology and mineral resources of Nova Scotia which are incorporated in his largest work—that entitled *Acadian Geology*.

† Sir Charles Lyell, in 1841, on his first visit to America, met Sir William and was by him conducted to many places of geological interest in Nova Scotia, and on his subsequent visit in 1852, they together continued their studies in Nova Scotian Geology. In a letter to Leonard Horner, dated September 12th of this year, Lyell writes :

"My companion, J. W. Dawson, is continually referring to the curious botanical points respecting calamites, endogenites and other coal plants, on which light is thrown by certain specimens collected by

him at Pictou. He told me that the root of the pond lily, *Nymphaea odorata* most resembled *Stigmara* in the regularity of its growth, and Dr. Robb showed me a dried specimen, a rhizoma, which being of a totally different family and therefore not strictly like, still suggests the probability of the *Stigmara* having grown in slush in like manner." And in another part of the same letter he, referring to the now celebrated Joggings Section on the coast of Nova Scotia, says : "Dawson and I set to work and measured foot by foot many hundred yards of the cliffs, where forests of erect trees and calamites most abound. It was hard work as the wind one day was stormy and we had to look sharp lest the rocking of living trees just ready to fall from the top of the undermined cliff should cause some of the old fossil ones to come down upon us by the run. But I never enjoyed the reading of a marvellous chapter of the big volume more. We missed a botanical aide-de-camp much when we came to the top and bottoms of calamites and all sorts of strange pranks which some of the compressed trees played."

About this time the governing body of McGill College, at Montreal, were looking about for some one fitted to assume the Principalship of the institution and to reorganize it.

The College, founded by Royal Charter in 1821, had made but slow progress in its earlier years and was at this time, through litigation and other causes, almost in a state of collapse. Sir William—then Mr. Dawson—was pointed out to the Governors of the College by Sir Edmund Head, then Governor-General, of Canada, as a man who if his services could be secured was eminently fitted to undertake the task of reconstructing the University. In the meantime, ignorant of all this, he was prosecuting a candidature for the chair of Natural History in his Alma Mater, the University

of Edinburgh, rendered vacant by the death of Professor Edward Forbes, and in which he was strongly supported by the leading geologists of the time. By a strange coincidence, just as he was about to leave Halifax for England, in connection with this candidature, intelligence arrived that the Edinburgh chair had been filled at an earlier date than his friends had anticipated, and at the same time a letter was received offering him the Principalship of McGill.

The services of Dr. Dawson were accordingly secured and in 1855 he assumed the Principalship of McGill College, stipulating at the same time that the chair of Natural History should be assigned to him. In his Inaugural Discourse he said: "At a time when literary and scientific pursuits are so widely ramified every one who aims to do anything well must have his special field of activity. Mine has been the study of nature, especially in these bygone aspects which it is the province of geology to investigate. My only other special qualification for my present position depends on the circumstance that the wants of my native province have induced me to devote much time to inquiries and pursuits relating to popular education. I come to you, therefore, as a naturalist and an educationist, trusting that I may be enabled in these capacities to render myself useful, and asking for my youth and present inexperience in the affairs of this Institution your kind indulgence, and for the work in which I shall be engaged your zealous co-operation."

The University as he found it had three faculties and but sixteen professors, a number of whom gave only a portion of their time to university work, while the buildings and equipment were wretched. When it is stated that the University has now one hundred and twenty professors and instructors of various grades, and an equip-

ment which is in all departments fairly good and in some of them unsurpassed, some idea may be gained of the progress which the institution made under Sir William Dawson's care and guidance.

As Professor of Natural Science, Sir William at this time delivered courses in Chemistry, Botany, Zoology and Geology. Natural Science became a very favorite study among the students, for he was an excellent lecturer, and his enthusiasm for these studies was communicated to all who heard him. As years went on the instruction in the first three of these subjects was undertaken by others, and a special chair of Geology and Paleontology was endowed by his old friend and co-worker, Sir William Logan; a chair which he held until his final retirement. His teaching work, however, formed but a small part of his daily labors. In addition to administering the affairs of the University he was first and foremost in every movement to further education in the province and no educational board was complete without him. He was the Honorary President of the Natural History Society and never missed a meeting or a field day, and also identified himself closely with many other societies in Montreal and spared neither time nor labor on their behalf.

Over and above all this he found time to carry out original work along several lines, achieving most valuable results—as well as to write many popular works on science more especially in its relation to religion. Original investigation he always considered to be one of the chief duties and pleasures of a man of science. Most of his work along these lines was done during his summer vacations, in fact he was led to accept the position of Principal in McGill, chiefly by the fact that the vacations gave him leisure and opportunity for work of this kind.

He was always very progressive in his ideas relative to the scope and development

of university teaching, and was continually urging the endowment of new chairs and the broadening of university work, so that all young men wishing to train themselves for the higher walks of life might in the university find their needs supplied. As an instance of this it may be mentioned that so far back as 1858 he succeeded in establishing a school of Civil Engineering, which after a severe struggle for five years succumbed to some unfriendly legislation, only however to be revived by him in 1871 and developed into the present Faculty of Applied Science of McGill University, with its numerous departments, its full staff of instructors and excellent equipment. Sir William, furthermore, never hesitated if funds were not forthcoming in sufficient amount for these purposes to subscribe large sums out of his own limited private means, and he was also the continual helper of needy students desiring to avail themselves of the university's teaching.

Sir William received the degree of M.A., from the University of Edinburgh, in 1856, and the degree of LL.D., from the same University in 1884. His attainments and the value of his contributions to science were widely recognized and he was elected an honorary or corresponding member of many learned societies on both sides of the Atlantic. He was made a Fellow of the Geological Society of London, in 1854 and of the Royal Society in 1862. He was the first President of the Royal Society of Canada and has occupied the same position in the Geological Society of America and in both the American and British Associations for the Advancement of Science. He was made a C. M. G., in 1883 and a Knight Bachelor in the following year.

After a long life of continuous labor, Sir William's health in 1892 became seriously impaired and it became necessary for him to lay aside his work for a time and go abroad. Failing to recover his strength,

however, he resigned his position as Principal in June, 1893, and retired from active work. During the later years of his life his strength gradually ebbed away and what little work he could undertake consisted in arranging his collections and working up some unfinished papers. Several of these were published in 1894 and 1895, but the years of quiet labor in his favorite pursuits to which he looked forward at this time were cut short by a series of sharp attacks culminating in partial paralysis, which forbade further effort. During the last few years from time to time his strength rallied somewhat and he attempted to resume his work. Only a few days before his death he penned a short essay on the Gold of Ophir. He passed away on the 19th of last month, very peacefully and without pain. We may say, in the words of Dr. Peterson, his successor in the Principalship of the University. "For such a painless passing out of life no note of sorrow need be struck. There is no sting in a death like his, the grave is not his conquerer. Rather has death been swallowed up in victory—the victory of a full and complete life, marked by earnest endeavour, untiring industry, continuous devotion and self-sacrifice, together with an abiding and ever-present sense of dependence on the will of Heaven. His work was done, to quote the great Puritan's noble line, 'as ever in his great Taskmaster's eye.'"

He leaves a widow and five children, of whom the eldest, Dr. George M. Dawson, the present Director of the Geological Survey of Canada, has inherited his father's taste for geological studies and has achieved wide distinction in the world of science.

Sir William's first original contribution to science was a paper read before the Wernerian Society of Edinburgh in 1841, on a species of field mouse found in Nova Scotia. From that time onward he was a

continuous contributor to scientific journals and to the publications of various learned societies. His papers were very numerous and covered a wide range of subjects in the domain of Natural History. The most important work of his earlier years was an extended study of the geology of the eastern Maritime Provinces of the Dominion of Canada. His results are embodied in his *Acadian Geology*, already mentioned, a volume of nearly 1,000 pages, accompanied by a colored geological map of Nova Scotia, which has passed through four editions. In writing to Sir William in 1868, Sir Charles Lyell says of this work, "I have been reading it steadily and with increased pleasure and profit. It is so full of original observation and sound theoretical views that it must, I think, make its way and will certainly be highly prized by the more advanced scientific readers." It is the most complete account which we have of the geology of Nova Scotia, New Brunswick and Prince Edward's Island, although since it appeared large portions of these provinces have been mapped in detail by the Geological Survey of Canada and Sir William's conclusions modified in some particulars. In carrying out this work Sir William paid especial attention to the Paleontology of the Carboniferous system and to the whole question of the nature and mode of accumulation of coal. He subsequently studied the paleontology of the Devonian and Upper Silurian Systems of Canada, discovering many new and important forms of plant life. In 1884 he began the study of the Cretaceous and Tertiary fossil plants of Western Canada and published the first of a series of papers on the successive floras from the Lower Cretaceous onwards, which appeared in the *Transactions of the Royal Society of Canada*. He also contributed a volume entitled *The Geological History of Plants* to Appleton's International Scientific Series. In 1863 he published his *Air Breathers* of

the Coal Period, in which were collected the results of many years' study in the fossil batrachians and the land animals of the coal measures of Nova Scotia. The earliest known remains of microsaoria were then discovered by him in the interior of decayed tree stumps in the coal measures of South Joggings. The results of his later studies on these creatures were embodied in a series of subsequent papers which appeared from time to time.

On taking up his residence in Montreal his attention was attracted to the remarkable development of the Pleistocene deposits exposed in the vicinity of the city and he undertook a detailed study of them, and especially of the remarkably rich fossil fauna which they contain. He also studied subsequently the Pleistocene deposits of the Lower St. Lawrence and instituted comparisons between them and the present fauna of the Gulf of St. Lawrence and of the Labrador coast. The results of these studies appeared in a series of papers as the work progressed and were finally embodied in a volume entitled *The Canadian Ice Age*, which was issued in 1893, as one of the publications of the Peter Redpath Museum of McGill University. This is one of the most important contributions to the paleontology of the pleistocene which has hitherto appeared.

Sir William's name is also associated with the renowned *Eozoon Canadense*, discovered by the Geological Survey of Canada in the Grenville limestones of the Canadian Laurentian and described by him in 1864 as a gigantic foraminifer. Concerning this remarkable object there has been a widespread controversy and a great divergence of opinion. Some of the most experienced observers in the lower forms of life, such as Carpenter, accepted it as of organic origin, while others considered it to be inorganic. And while the balance of opinion now possibly favors the latter view, its resemblance

microscopically to certain organic forms is certainly most remarkable. The literature of this subject, which includes many papers by Sir William, is quite voluminous, but the chief facts are summed up in his book entitled *The Dawn of Life*, which appeared in 1875.

Sir William was also a prolific writer of popular works on various geological topics. Among these may be mentioned his *Story of the Earth and Man*, his *Fossil Men and their Modern Representatives*, his *Meeting Place of Geology and History*, and his *Modern Science in Bible Lands*. These books, all written in a very entertaining style, had a wide circle of readers and many of them passed through several editions.

Other volumes from his pen, as well as many papers contributed to various religious publications, treated of the relation of science and religion. One of the earliest of these was entitled *Archæia*, and dealt with the relations of historical geology to the Mosaic account of the Creation. In others he considered the relation of the evolutionary hypothesis to religious thought. He was always, but especially in his earlier years, a strong opponent of the Theory of Evolution and vigorously combated it. Being above all things deeply religious and considering the evolutionary explanation of the origin of the universe to be contrary to the teachings of Scripture, he refused to accept it. This was, after all, but the weakness of a strong man. It did not, however, tend to enhance his reputation among men of science, who are commonly willing to let truth work out its own results, knowing that apparent contradictions are merely indications that the whole truth has not been discovered.

These works on the relation of science and religion met a popular need and were of great comfort to many a pious soul who feared that the whole framework of faith was being swept away by the advancement

of science. Their value, however, was not permanent and they are not the works by which Sir William Dawson will be remembered. His reputation is founded on the great contributions to our permanent stock of knowledge which he has made and which are embodied in his works on pure science, representing achievements of which any man might well be proud.

Sir William had a courteous, or rather a courtly manner, based on a genuine consideration for all. He was respected and beloved by all who knew him and especially endeared himself to all who studied under him. The preëminent note of his character was simplicity and singleness of purpose. His loss will be felt especially in the institution with which he was long connected, but his name has been perpetuated in connection with the geological department of his University by the establishment of a second chair in geology, to be known as the Dawson Chair, which has just been endowed in his memory by one of the great benefactors of the University, Sir William Macdonald.

FRANK D. ADAMS.

MCGILL UNIVERSITY,  
December 8, 1899.

*EXTENT OF INSTRUCTION IN ANTHROPOLOGY IN EUROPE AND THE UNITED STATES.*

REGULARLY authorized instruction in anthropology dates from the second half of the present century. Before passing the threshold of the next, it might be well to have the benefit of any inspiration which may be drawn from the progress of this new science as a branch of university discipline.

The time, the closing of a century, for such a review is, of itself, opportune. Even if it were not so, occasion would not be wanting in the independent movement in different countries looking toward the establishment of chairs and lectureships of anthro-