

THURSDAY, JUNE 1, 1876

SCIENTIFIC WORTHIES

VIII.—CHARLES WYVILLE THOMSON

CHARLES WYVILLE THOMSON was born at Bonsyde, a small property in Linlithgowshire, which had been long in his family, on the 5th of March, 1830. All his early associations were with Edinburgh; his father was a surgeon in the East India Company's service, and spent most of his life abroad; but his grandfather was a distinguished Edinburgh clergyman, and his great-grandfather was "Principall Clerke of Chancellary" at the time of the rebellion of 1745.

Wyville Thomson got most of his schooling at Merchiston Castle Academy, at that time under the excellent management of Mr. Charles Chalmers, brother of the famous divine. He left school and began the medical course in Edinburgh University in the year 1845. After studying for three years he fell into somewhat delicate health from overwork, and while still scarcely more than a lad, in 1850, to gain a year's rest, he accepted the lectureship on botany in King's College, Aberdeen. In the following year he was appointed lecturer on the same subject at Marischal College and University, which University conferred on him the degree of LL.D. He at this time was an indefatigable worker among the lower forms of animal life, and published several papers on the Polyzoa and Sertularian zoophytes of Scotland. Even at this time some of his philosophical speculations as to the development of certain Medusoid forms attracted notice, though they appear to have been considered too daring by Johnston, of Berwick-on-Tweed, and Edward Forbes. What would these worthies say, if they were living now, about the study of Ontogenesis as it at present exists amongst us?

Towards the close of 1853 a vacancy arose in the Professorship of Natural History (Botany and Zoology) in the Queen's College, Cork, owing to the resignation of the Rev. W. Hincks, F.L.S., and on August 26 Wyville Thomson received the appointment. He had, however, hardly settled down to the duties of this professorship, when a vacancy occurred in the Professorship of Mineralogy and Geology in the Queen's College, Belfast, by the resignation of Fred. M'Coy, who had been elected to one of the professorships in the New University of Melbourne. Wyville Thomson applied to be transferred to the Belfast chair, and was appointed thereto in September 1854.

The next five years were years of busy work for him. In addition to courses of lectures on Geology and Mineralogy, he laid the foundation and built up a good deal of the superstructure of the present excellent Museum of the Queen's College, Belfast. In addition to many papers on zoological subjects, published by him at this date, we may mention one on a genus of Trilobites, read before the London Geological Society, and on a new fossil Cirriped, published in the "Annals of Natural History."

The study of fossil forms without a good knowledge of existing forms is in itself most useless, and a palæontologist of this sort is after all little more than a cataloguer;

such was not Wyville Thomson. At this time, one fascinating group of the Echinoderms (the Lily Stars) attracted his attention, and while investigating the immense assemblage of extinct forms belonging thereto, he determined to know all that could be known about the life history of the few living forms. True, the illustrious Vaughan Thompson had some thirty years previously discovered and described a British Pentacrinus, and had determined that it was but the young stage of our common though beautiful rosy feather-star; but a great deal remained to be done ere the history of even this form was complete, and it was not until the close of 1862 that Wyville Thomson's researches were sufficiently advanced to enable him to lay them before the Royal Society. They have since been published in the volume of the Philosophical Transactions for 1865, and it is not too much to say that this memoir will ever be a witness of the author's acute and accurate powers of research. The illustrations are all from exquisitely finished sketches by the author, and show a most enviable power of drawing, an art almost indispensable to the naturalist. These investigations into the pentacrinoid stages of *Comatula* were but part of a series of observations on the genus *Pentacrinus* itself, and Wyville Thomson amassed a lot of material with the object of writing a memoir on the group.

About 1864 the son of the illustrious Michael Sars, Professor of Zoology in the University of Christiania, was one of the Acting Commissioners of Fisheries for Norway, and as such was engaged in a series of scientific investigations as to the fisheries on the Lofoten Islands, situated on the north-west coast of Norway. One day, dredging in water about 700 feet deep, for the purpose of determining the condition of the sea-bed, he obtained a number of specimens of a strange Crinoid, which at once struck him as being not unlike the pentacrinoid stage of *Comatula Sarsii*, with which he was familiar.

Here it is but right to mention that almost up to this date, men of science seemed to have made up their minds that life did not and could not exist below a certain depth of the sea. There were, according to Edward Forbes, fixed zones of depth. 1st, the littoral zone, between low and high water-marks; 2nd, the Laminarian zone, from low water to a depth of fifteen fathoms; 3rd, the Coralline zone, from the fifteen-fathom line to a depth of fifty fathoms; and 4th, the zone of deep-sea corals extending from the edge of the Coralline zone to an unknown lower limit. "In this region, as we descend deeper and deeper, its inhabitants become more and more modified and fewer and fewer, indicating our approach towards an abyss where life is either extinguished or exhibits but a few sparks to mark its lingering presence." Though the very general idea entertained by naturalists was that the depths of the sea were destitute of life, yet from time to time remarkable specimens were without doubt brought up from very great depths, and these occurrences, some of which were known to Forbes, had the evident effect of making him, during the later period of his life, write cautiously on the subject. The reader who would care to know all that is known as to the records of the existence of life up to 1865, will find a full account thereof in Wyville Thomson's "Depths of the Sea."

G. O. Sars lost no time in announcing to his father his interesting discovery, and, acting on Prof. Sars's advice, he

went on dredging at depths of from 700 to 800 feet, finding an abundance of animal life. In the meanwhile the elder Sars, knowing that Wyville Thomson was working on the subject, sent him word of his son's discovery, of the significance of which he was still in doubt, and invited him to Christiania to see the specimen. He went, and on going over the matter together they came to the conclusion that the new Lily Star seemed to be closely related to a genus called *Bourgueticrinus*, a well-known fossil, and was consequently a degraded form of the family Apicrinidae. This was a startling discovery; it seemed now almost certain that there had been found not only a living representative of a long lost group, but a form that might be regarded as having lived on from the great Chalk epoch even into ours. In the train of thought thus excited, we think we see the material for speculation, then a fixed determination to prove—is this speculation true? then the trial trip in the *Lightning*, the more extended survey in the *Porcupine*, and lastly, all the brilliant results of the most remarkable voyage of discovery ever made, in the *Challenger*. It is not right to anticipate, and in pursuing our sketch we must not forget to mention that in 1860 Dr. Dickie, who was then a colleague of Wyville Thomson's as Professor of Natural History in the Queen's College, Belfast, was appointed to the Chair of Botany at Aberdeen, and at first temporarily and afterwards permanently, Wyville Thomson lectured on zoology and botany, becoming thus in very deed Professor of Natural History in the Queen's College, Belfast.

Prof. Wyville Thomson was, however, something besides a mere enthusiastic biologist; he was not merely content with rapidly increasing the zoological treasures of the Queen's College Museum; he did more. By interesting himself not only in what concerned the working of the College, but even in the welfare of the town in which it was located, he soon gathered round him a host of intelligent and warm-hearted friends. In social life it was but an accident that would reveal the Biologist, and one witnessed only the general culture and the artistic taste of a well-bred man. On one occasion of great moment in the history of the Queen's University in Ireland, Wyville Thomson's influence was felt, as we believe, for good. In 1866 a Supplemental Charter was given by the then Government to the Queen's University to enable it to confer degrees on students who might come up from any College that might be recognised as such by the Senate of the Queen's University. It seems hard to believe that such a charter should have been granted, for it might have given to any large school a position of equality to the three Queen's Colleges, and so have practically destroyed all middle-class education in Ireland. Wyville Thomson saw that the interests of education were at stake, and with commendable promptness and immense energy he initiated the formation of a committee and the collection of a sum of several thousands of pounds to try the validity of the new Charter in a court of law. In this the committee were successful, for the Charter was rendered inoperative by an injunction granted in 1867, after long and protracted arguments, by the then Master of the Rolls in Ireland.

Wyville Thomson was vice-president of the jury on raw products at the Paris Exhibition in 1867; he took the lead in organising the very flourishing School of Art in

Belfast under the Science and Art Department, and was the first chairman of the Board of Directors. He is a Conservative in politics, and a magistrate and Commissioner of Supply for the county of Linlithgow.

In 1868 Dr. Carpenter, at that time one of the vice-presidents of the Royal Society, paid Prof. Wyville Thomson a visit in order that they might work out together the structure and development of the Crinoids. As the friends discoursed about these Lily stars, Wyville Thomson told Carpenter of his own firm conviction that the land of promise for the naturalist, indeed the only remaining region where there were endless novelties of most extraordinary interest, was the bottom of the deep sea; here were treasures ready to the hand which had the means of gathering them, and he urged him to use his influence at head-quarters in London to induce the Admiralty to lend to science, for a time, some small vessel properly fitted with dredging gear and the other necessary scientific apparatus, so as to definitely settle all these weighty questions. The Admiralty gave their sanction to the use of a Government vessel for the investigation, and the surveying ship *Lightning* left Oban for a cruise in the North Atlantic Ocean in August, 1868, returning to Oban by the end of September. For an account of this cruise we must refer to the "Depths of the Sea." The results of the *Lightning* expedition were fairly satisfactory. It was shown beyond question that animal life was varied and abundant at depths in the ocean down to between 600 and 700 fathoms; and it had been determined that great masses of water at different temperatures were moving about, each in its particular course; and, further, it had been shown that many of the deep-sea forms of life were closely related to fossils of the Tertiary and Chalk periods.

In 1869 the Admiralty once again acceded to the request of the Royal Society, and assigned the surveying vessel *Porcupine* for a survey to extend from May to September, 1869. The 1869 survey divides itself into three sections; the first when the *Porcupine* surveyed off the west coast of Ireland, Mr. Gwyn Jeffreys being in scientific charge; the second in the Bay of Biscay, in charge of Wyville Thomson; and the third, in which the track of the *Lightning* was carefully worked over, and all previous observations were duly checked.

Once again, in 1870, the Admiralty placed the *Porcupine* at the disposal of the Royal Society, and it was arranged that the year's expedition should be divided as in 1869, into cruises. Mr. Gwyn Jeffreys was to undertake the scientific direction of the first cruise from Falmouth to Gibraltar, and Wyville Thomson and Dr. Carpenter were to relieve him at Gibraltar, and to superintend the survey of the Mediterranean. Unfortunately a severe attack of fever prevented Wyville Thomson from joining the *Porcupine* at Gibraltar, and Dr. Carpenter took charge of the scientific arrangements.

In 1869 Wyville Thomson was elected a Fellow of the Royal Society.

In 1870 Dr. Allman resigned the Professorship of Natural History in the University of Edinburgh. Wyville Thomson was a candidate for the vacant chair, and amid the hearty congratulations of all men of science he was elected, vacating the chair in the Queen's College, Belfast, to which Dr. Cunningham was appointed.

On the return of the *Porcupine* from her last cruise, so much interest was felt in the bearings of the new discoveries upon important biological, geological, and physical problems, that a representation was made to the Government by the Council of the Royal Society, urging the despatch of an expedition to investigate each of the great oceans, and to take an outline survey of that vast new field of research, the bottom of the sea. The proposition of the Royal Society met with great and general support, and the *Challenger* was fitted out as England never before fitted out a vessel for scientific research.

The University of Edinburgh having given their consent, Prof. Wyville Thomson accepted the post of Director of the Civilian Staff; for this post none could have been better qualified; through his energy was it that this question of what lived in the ocean depths came to be investigated at all; the practical experience he had now gained could not be better utilised, while the subjects to be worked out were all within his reach. Able as a biologist to hold a high position, he combined with this more than an ordinary knowledge of chemistry, mineralogy, and geology, a knowledge far more than enough to enable him to encourage and sympathise with the labours of his staff.

The *Challenger* has now returned to our shores, her mission worthily accomplished, her officers and crew in the best of health and spirits.

All England welcomes Prof. Wyville Thomson back again, and thanks him for his voluntary exile of three and a half years from home and wife and friends for Science sake; and while we congratulate him on having laid a new realm at our feet and on having given us new food for thought, may we express in addition the hope that he will not long delay to give to the world the narrative of a cruise novel in its conception, successful in its results, and destined to live long in story.

THE CRUELTY TO ANIMALS BILL

IT is important that those who understand the national importance of science, as well as those who know how completely the art of medicine depends upon physiology should agree upon a common defence, now that both are so seriously threatened by legislation.

We do not think that scientific investigators can fairly claim to be entirely free in their choice of methods, on account of the importance of their objects, the purity of their motives, or the respectability of their character. Claims to absolute immunity from the interference of the State were maintained on precisely the same grounds by Churchmen in the Middle Ages, and the result proved how dangerous it is for any class of men to seclude themselves from the healthy atmosphere of free criticism and from contact with the popular conscience. A much better plea might be found in the small number of physiologists in this country, and in the important fact that, after many months of agitation and invective, their enemies were not able to bring before the Royal Commission a single authentic instance of cruelty. Still, considering the strong popular feeling on the subject, there are probably few who will deny that some legislation is necessary, if only to save physiologists spending their whole time in writing newspaper articles and going on deputations to Ministers.

What scientific men have a right to demand is that any regulations made should interfere as little with their legitimate objects as is compatible with the purpose of legislation. No one except a few obscure fanatics pretend that it is never lawful to subject animals to pain, or even to death, for self-preservation forbids such a rule; and no one can maintain that it is right to bleed calves and swallow oysters alive, for luxury, to geld horses for convenience, and hunt hares to death for sport, and yet that it is wrong to give one animal a disease that we may learn how to prevent or cure the same disease in thousands, or to perform a well-considered experiment which will certainly increase our knowledge of the laws of our being, and, more or less probably, tend to the relief of human suffering.

It is, therefore, of great importance that none of the objects which justify experiments on animals should be sacrificed in the effort to save the rest. Teachers of physiology in large and well-equipped schools might be content with a registration Bill which would leave them unmolested and forbid all research to outsiders; physicians and surgeons might demand liberty to do anything they choose which has a direct and immediate bearing on the relief of human suffering, and this appeal to self-interest would probably always be successful; independent investigators might see, without complaint, the teaching of physiology reduced to a study of words and opinions, and the advance of medical knowledge brought to a standstill, so long as they were left in peace. But such short-sighted narrowness would bring its own punishment. The results of independent research can only be obtained by those who have themselves been trained in genuine workrooms and can only be properly criticised by a properly instructed audience. Teaching without any attempt at original observation soon becomes lifeless and inexact; and medicine is far less indebted to experiment for the knowledge of the effect of certain drugs or operations, than for the broad basis of demonstrated facts as to the functions of the healthy organism on which all rational attempts to remedy them when disturbed must depend.

The scientific objects, then, which must, if possible, be protected from the mischievous Bill now before Parliament are, first, freedom of original investigation by competent persons; secondly, freedom of teaching by necessary demonstrations; and thirdly, freedom of experiment with the definite aims of the practical physician.

The best method of securing these objects while preventing the stain of cruelty from debasing the fair fame of science, would probably be that indicated by the Report of the Royal Commission. Laboratories would then be licensed under the control of responsible persons. Special certificates would be granted to competent investigators who, from distance or other causes, were not able to make use of these laboratories. The advance of sound physiological knowledge as well as the direct prevention or cure of disease, would be recognised as a legitimate object of experimental inquiry. The general condition of the licence or certificate would be that every experiment on a living animal should be rendered free from pain by the skilled use of chloroform (or other anæsthetic better adapted to the animal), except when this would defeat the object of the inquiry, and happily these exceptions