

to these, people in general, and also specialists, are apt to accept by preference statements which are bold and extreme, rather than those which are more moderate. Experience teaches that such extremes are usually somewhat remote from the actual facts. I have therefore striven, on such points, to follow a quiet middle course, which, however unattractive to the sensation-loving public, is most likely in the end to be correct. I have endeavoured to assume this attitude, not only on many minor questions, but on such general doctrines as uniformity and the cataclysmic question, in relation to the glacial period, on Darwinian evolution, and on the relations of the Bible to Science.

CHAPTER IX

VISITS TO ENGLAND IN 1865 AND 1870

IN 1865 I revisited England with my daughter, (now Mrs. Harrington), and enjoyed for the first time the great pleasure of a short tour on the continent of Europe. On our way to Paris we spent a day at Amiens, to see that ancient city, and the gravels of the Somme, then exciting much attention as affording evidences of prehistoric man. We collected some of the flint "haches" found there, noting their mode of occurrence, and relation to the gravels of manifest post-glacial age, and the absence of any good evidence of the excessive antiquity at that time attributed to them by some writers. This view has since been generally abandoned, though I then stood almost alone in the matter, and even had to differ from my friend Lyell on the subject, which he however took very good-naturedly. We had time also to examine the old historic cathedral, and were witnesses of a grand procession and celebration on the part of the clergy of the diocese, one feature of which

was an eloquent sermon on the degeneracy and shortcomings of the time, which might have been made even more emphatic had it been delivered a few years later, when the empire of Louis Napoleon had fallen.

Proceeding to Paris, we devoted a few days to its various sights, not forgetting the works of art in the Louvre, and the vast collections in the museum of the Jardin des Plantes. We then made our way south, geological map in hand, to Dijon, and thence over the Jura to Geneva, where we had our first view of the snow-capped range of Mont Blanc, near to which we were to spend some pleasant days. The road to Chamonix is full of wonderful surprises in mountain scenery and geological structure. On arriving at that place, we made it our headquarters for excursions to the Mer de Glace, the Bossons, the Argentière glacier, and the Flagère, which commands so fine a view of the group of Mont Blanc and its surrounding peaks. I was specially anxious to judge for myself as to the motion, and the erosive power of the glaciers, and the nature of their moraine matter. I saw no reason to doubt the gravitation and viscosity theory of Forbes, but, on comparing the polishing action of the glaciers with the erosion caused by the

mountain torrents, became a confirmed sceptic as to the erosive action of glaciers, more especially as the material in their moraines is so manifestly derived from the subaerial decay and frost action on the sides of their valleys. In like manner, the finer material carried off by the glacier streams is the result of the grinding of the earthy and stony matter thrown into the ice from above. The glacier is thus a mill, and its rocky floor is the nether millstone, which is in most cases protected rather than eroded by the overlying ice. The carrying power of the glacier is undoubtedly great, within its range, but it is altogether inferior to that of sea-borne ice, whether in the form of ice-fields grinding on the shores, or of the icebergs, detached from glaciers which terminate in the sea. These views, arrived at and published in 1865, I have ever since consistently maintained, in their application to the glacial phenomena of the northern hemisphere, and especially to those of Canada.

At and near Chamonix, I was naturally much impressed with the remarkable evidences of the folding and overturn of rocks, with the altered condition of the Carboniferous shales and the Cretaceous greensands, and with the evidence of enormous uplifts and

denudation since the Cretaceous age,—phenomena equally manifest in our Canadian Rocky Mountains, although at the time this had not yet been made known. From Chamonix, we passed to Martigny, by the Tête-noir Pass, collecting, by the way, in the hard mountain slates, fossil plants of the same genera, and some of them of the same species, as those in the coalfields of Nova Scotia, and comparing the modern alpine vegetation with that of the American mountains. I walked from Chamonix to Martigny in order to observe more closely the features of this most interesting section. Our course from Martigny was down the beautiful Rhine, across to Brussels, and thence back to England, in time to attend the meeting of the British Association, in the busy and public-spirited city of Birmingham.

At the Birmingham meeting of 1865, Professor John Phillips of Oxford, one of the founders of the Association, was the president, and the subject of geology was especially well represented. Murchison, the president of the geological section, and Lyell, vice-president, were acknowledged heads of English geological science, and they were supported by a host of able and eminent men. As a worker from beyond the seas, I was made one of the

vice-presidents of the section. Twenty years after, in 1886, I had the further honour of occupying the presidential chair of the Association in the same city. Before going to Birmingham, I spent a few days in Edinburgh, and was present at the annual convocation of the University, travelling thence with Sir David Brewster, then principal of the University of Edinburgh, and other Scottish friends, who were going to the Birmingham meeting. From notes made at this time, I may copy some portions referring to my impressions of the meeting:—

“At a luncheon given to the members by the Mayor of Birmingham, Sir Roderick Murchison, who called himself one of the ‘Palæozoic members,’ alluded to the origin of the Association, stating,—‘that when, in 1831, he was president of the Geological Society of London, his young friend, John Phillips of York, with whom and his distinguished uncle, he had previously worked along the coast of Yorkshire, wrote to him in London, asking him to promulgate a suggestion which he had sent up for consideration. He endeavoured, to the best of his ability, to carry out the wishes of his friend, but what was the result? He could get scarcely anybody to hear of the

matter, when he first laid it before them, and he could get none to accompany him save his friend, Mr. Greenhow, of the Geological Society, and the late Mr. John Taylor. But though London did not respond, Manchester answered to the call, and sent that most eminent philosopher, Dalton; Ireland sent the Provost of Trinity, Dr. Lloyd; and Scotland was represented by Brewster, and by Professor Forbes, the eminent mathematician. Cambridge was not represented, but from Oxford came Dr. Daubeny with an invitation to the Association to meet there in the following year. Next year they met under Buckland, at Oxford, and they had with them the most eminent scientific men of the day.'

"Since that time the Association has grown to be one of the great institutions of England. Peripatetic, and without local habitation, essentially free and easy in its management, loose in its regulations, and democratic in its character, it is the most popular of British scientific societies. Its meetings attract thousands of auditors, and its influence, by the wide circulation given to its proceedings through the press, is felt throughout all parts of the British Empire.

"The British Association is by no means to be viewed as a scene of scientific dissipa-

tion. Nor must its utility be regarded as confined merely to the diffusion of popular information, though this is no small or despicable part of its work. It has important uses to the cultivators of science themselves. It drags them out of their dens, and brings them face to face with each other, and with the world. It gives scope for free and open interchange of ideas and arguments. It makes those who have attained to high positions, acquainted with the humbler workers in their several spheres. It gives the younger men opportunities of coming forward into notice. It throws those who are the oracles of little coteries at home, into the wider competition of the world. It enables scientific men in general, better to appreciate the work of each other, and to form more accurate notions of the powers, and mode of thought, of fellow labourers. It affords excellent opportunities for bringing out new facts and discoveries, under circumstances which give the means of testing their real value, and (if they pass this ordeal) of giving them general currency.

"To a student of science, whose ordinary sphere of labour is at a distance from the great centres of scientific work, and who can but rarely have conference with men engaged in

the same pursuits with himself, these meetings are particularly valuable, and their value is enhanced by the rarity of the opportunities for enjoying them. In our day the aspects of science rapidly change, and the student who depends for his information regarding them on books and on scientific journals has, after all, but a faint impression of the newer phases of scientific inquiry.

"On attending the meeting of the British Association at Birmingham in 1865, after a lapse of ten years, I had forcibly presented to my mind many changes in men and things. Some of the older men had passed away, or were disabled by age and infirmity from active labour. Those who were young and little known had attained to maturity of years and an established reputation. A host of younger men had risen up! In those departments of science, in which I am more especially interested, many new discoveries had been made, or new theories broached. The striking and prolific doctrine of the correlation of forces had been worked out. The method of spectrum-analysis had been devised, enabling us to obtain a knowledge of the chemical composition even of distant heavenly bodies. The hypothesis of the indefinite variation of species had

been revived, and had rapidly become popular among the younger scientific men. The later Tertiary deposits had yielded evidences of the possible existence of man in the time of the extinct mammoth, while the oldest rocks, before esteemed azoic, had afforded traces of animal life. In physics, in chemistry, in geology, and in natural history a multitude of new and important facts, filling great volumes of proceedings and transactions, had been discovered and given to the world. Thus every department of science might be said to occupy a new standpoint in 1865, as compared with 1855, when I had last been present at a meeting of the Association.

"On the other hand, to an observer in 1865, it seemed as if the age of geological giants, only culminating in 1855, was passing away, to be succeeded by less able men. This has often been the case in the history of science. One generation produces a crop of good men, the next, perhaps, a multitude of useful, but not brilliant or distinguished followers. It is quite apparent that such men as Lyell, Murchison, Sedgwick, Phillips, and Owen, who were aged men in 1865, have no equal successors in their special departments of science in England."

After the meeting we spent a most pleasant day with Phillips and his able colleagues, Dr. Acland and Professor Rolleston, at Oxford, in studying the admirable arrangements in the new museum and scientific library of that University,—institutions which are now, thanks to these eminent men and their colleagues, second to none in England, in facilities for the study of physical and natural science. In all that relates to the arrangement of specimens for study, and in affording due facilities to the student, Professor Phillips is as careful and enthusiastic as in his original investigations, and I can imagine no man better suited to cultivate scientific enthusiasm among students, and to send out from the old University educated naturalists for the next generation.

A little supplementary episode to this visit to the old world was a course of public lectures, delivered on my return to Montreal, in the interests of the Young Men's Christian Association. One of these was on "The British Association in the Black Country," and another on the "Glaciers of Mont Blanc, and the Icebergs of Belle Isle." The Young Men's Association was at that time in financial straits, and these lectures contributed, among other things, to form a turning-point in its affairs.

In connection with this visit to England, I have to note the great kindness and hospitality of my friend Dr. Bigsby, a true man of science, an earnest Christian, and full of a genial spirit, which endeared him to young and old. In addition to his kindness to me when I visited London, he was for many years one of my most valued correspondents, sending me notes of scientific gossip, and of minor events not chronicled in public prints, copies of new memoirs, and papers likely to be of interest, as well as wise advice regarding the propriety or expediency of taking part in discussions, or replying to criticisms. Dr. Bigsby had, many years before, been a member of the Boundary Survey between Canada and the United States, and knew much of Canadian geology, on which he had written several important papers, being in reality one of the principal pioneers of that science in British North America. He continued to the last to have a deep interest in Canada and its scientific development.

The year 1870 took me again to Britain, this time in company with my wife. My business on this occasion was partly educational, in connection with the Higher Education of Women, to be noticed in the sequel,

and partly that referred to in a previous chapter, arising out of my researches in the Devonian flora. Another object was to see our eldest son, who had entered the Royal School of Mines. Our friends in London had received him with much kindness, but his health had been delicate, and we wished to see for ourselves how he had got through the work of the session. We arrived in London at the end of April, remained there two months, and had the satisfaction of knowing that our son had passed through his first year in health and with credit. I have already referred to the lectures given at this time before the Royal Society and the Royal Institution. I had again the pleasure of spending a short time at Oxford, in company with Mr. Peter Redpath, and of seeing there Dr. Hatch, Dr. Acland, Mr. Prestwich, and others. We visited Cambridge also, especially to learn what was being done there in regard to the higher education of women, in which matter the new college of Girton had taken a leading part. I here met Sir Gabriel Stokes, Professor M'Kenney Hughes, and many other new and old friends, and learned much as to the educational movements in progress. At this time too, I owed a pleasant visit to the

Lias quarries of Street, in Somerset, to the ruins of Glastonbury, and to see for a friend in Montreal (Mr. Clarke) to purchase for our museum some fossil reptiles found at that place. I wrote me a letter to Mr. Clarke, the manufacturer of Street, who entered into the matter pitably, and whose son and I were engaged in procuring what I desired.

We went from London to Edinburgh, and took up our summer quarters at Edinburgh on the Firth of Forth, re-visited old friendships in the Scottish Highlands, and the learning of the new discoveries of the Geological Survey and by Mr. Grieve, too, a short visit to Mr. Davison at his country seat near Bervie, and some pleasant excursions in the neighbourhood.

At Burntisland, I became acquainted with Mr. Grieve, a very successful geologist, and fossils of the Carboniferous beds, and had the pleasure of introducing him to Dr. Williamson of Manchester, who rightly judged that his well-known specimens of fossil-stems from the King's Craigs would be the subject of brilliant investigations of the

then in process of publication Society. In Edinburgh, we met the assistance of Miss Louisa Stevenson, Secretary of the Ladies' Association, and at her house met a person interested in the higher education from whom we learned much to be of value in the work of which we contemplated establishing

the necessity of returning early to college work, so left my wife and crossed over to Belfast, to the Queen's Causeway, and joined the Londonderry. This was my first visit, but it gave me a strong impression of the richness of the country, and the beauty of its climate. At Belfast I met Dr. Wyville Thomson, a geologist, and an able zoologist, as well as a naturalist of wide attainments. At that time surrounded with specimens of the deep sea, the results of the Atlantic dredgings, to many of which I had been introduced for the first time. His deep-sea sponges were of great interest to me some years afterwards, and I became interested in the

extinct species of the Quebec group of Canada.

At Portrush I examined the baked Jurassic and Cretaceous beds, similar to those I had seen in the Alps; and while admiring, as every one must, the grand basaltic flows which are the remains of the Tertiary volcanoes of Antrim, was also able to see something of the lignite and plant-bearing igneous strata, included in the great ash beds. My knowledge of the locality of the so-called coal, included in the basaltic cliffs, and strong desire to examine it, astonished a Celtic guide who accompanied me, and who assured me that the thing was of no interest, and difficult to reach. Before visiting the cliffs of Antrim, I had made microscopic studies of the indurated chalk overlaid by the basalt, from specimens from the Holmes collection in Montreal, and had used them to demonstrate to my classes the identity of the microscopic shells composing this hard limestone with those of the soft English chalk. It was not till some years afterwards, that I learned that this was only beginning to attract the attention of British geologists.

This was the last time I was to see many of my British scientific friends;—Lyell, Murchi-

son, Sedgwick, Phillips, Bigsby, Thomson, Owen, and many others were gone, and my old Edinburgh professors were represented only by their busts in the college library, when I returned some twelve years later. Such an interval makes sad havoc among those nearing the end of life's journey, and as we become old ourselves, we feel like the last survivors of a wreck, clinging to some frail support, and soon ourselves to disappear. The old, however, are soon replaced by younger men, and in 1883, I found a host of new workers, more of specialists, and to a large extent on new lines, but carrying forward, each in his own way, the progress of knowledge.

While we were on the sea, the news of the opening of the great Franco-Prussian war was cabled across the ocean. On reaching Quebec I remained there a day to call on my friend Dr. Chauveau, the Superintendent of Education. He was full of the news, and quite sure that in a few weeks we should hear of the triumphant entry of the Emperor Napoleon into Berlin. I told him that some good military authorities thought differently, but he could not believe anything else possible. This was the universal opinion of French Canadians at the time, and until the final

catastrophe of the Empire came, even the more educated could scarcely believe that there was any truth in the cabled despatches of German victories. In the following year, I found that many of the common people on the lower St. Lawrence, whom I met in my collecting expeditions, still believed that the Emperor had annihilated the Prussians. This is a curious illustration of the old saying, that "blood is thicker than water"; but it should be borne in mind that the French-Canadian press persisted in claiming victories for the Emperor Napoleon, who, ever since his invasion of Mexico, had been represented to the Roman Catholics of Canada and of the United States, as the champion and defender of the true religion, as opposed to Protestantism.