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flowering well this summer in Mr Muirhead's bog garden near Berwick. *Anemone baldensis*, a dwarf plant with rather a running habit and easily grown, has large white flowers about the size of a two-shilling piece, but is not very free in flowering. *Ranunculus glacialis* also requires bog garden treatment; it is a beautiful plant about 8 or 9 inches high, with flowers white on the upper surface, but purple on the under side of the petals. *Pyrola uniflora*, to be found in a fir wood at Comayena near the base of Mont Blanc, is a plant I have never seen in a thriving state in cultivation. Some people fancy it is a parasite, but I am not inclined to think so, and if the proper means were taken it might be grown as readily as any other *Pyrola*. The variety of *Androsace carnea* found in Switzerland has much paler flowers than the one in the Pyrenees, and is a more difficult plant to grow. I have several times had plants sent to me, but have always after a year failed to succeed with them, whereas the fine rich pink-flowered variety from the Pyrenees thrives with me luxuriantly.

Obituary Notice of the late Professor Oswald Heer. By
ANDREW TAYLOR.

(Read 10th January 1884.)

In October 1883 the Society was called to join in mourning the death of Dr OSWALD HEER, the great palæo-phytologist. Heer was born at Glarus, Switzerland, in 1809, and died on 27th September last at Lausanne, aged 74. Elected one of our Foreign Honorary Fellows in 1874: he had been a Foreign Corresponding Fellow since our foundation.

The Swiss Alps, with their variety of living nature, as well as their marvellous stone tablets of past life, inspire boy naturalists with an unique zeal and enthusiasm, resulting, in more than one instance during the last half century, in their becoming leaders in the van of natural science. Heer's collecting of plants and insects began as a boy. At school he bribed his mates by singing-lessons to add to his finds. Designed for the Church—his father was a Lutheran pastor—he entered the University of Halle in 1828. But so accurate had his knowledge of genera and species, principally of the fossil fishes, insects, and plants of the Tertiary deposits of Eningen become, that he mainly supported himself at the university by

selling extensive collections of these fossils for the College Museum of his father's friend, Professor Van Breda, at Haarlem, in Holland. Heer exercised the functions of a village pastor for scarce a year, when he entered on his long career as a professional scientist. The tall, gaunt, narrow-shouldered valetudinarian, with quick eyes and somewhat clerical mien, was henceforth to be pointed out as a celebrity to the Zurich visitant, whilst his friendship was to be prized by the leaders of science.

Heer's life work is marked into two great epochs. The first twelve years of his scientific career were devoted to active observation, and much organising. His latter years were those of a valetudinarian. Though he attained a good age, he battled from a boy with a delicate constitution, which eventually mastered him through the greater part of his manhood. During the first period, living nature, specially in its departments of insects and plants, were studied; palæobotany was the almost exclusive occupation of the closing years.

In 1835 Heer founded the Botanical Garden at Zurich, being its first director. In the following year he became Professor of Botany and Entomology in the University of Zurich. When the Polytechnicon of that city was founded in 1855, his services as Botanical Professor were transferred to it. He founded the Zurich Society of Agriculture and Horticulture in 1845, and was its first president. He had the qualities which combine to make a popular public man, and for twenty years he was a Rathshern, or member of the Grand Council of his adopted city. Early in this period he published two remarkable essays on the geographic distribution of insects and plants of the Alps in their mutual relations. In these may be traced the germ of his ideas on geographic distribution. The intensity of Heer's method of field study has corroboration in the University collection of insects, one of the scientific sights of Europe. It contains no fewer than 30,000 species of the Coleoptera alone, and took Heer seven years to collect and arrange. He also about this time issued memoirs, mainly on the transformations or distribution of the Swiss Coleoptera, as well as the distribution of Alpine plants.

From 1847 Heer devoted his attention almost exclusively to fossil insects and plants; and now his researches became of wide-world interest. This was the epoch of ponderous volumes, issued latterly at the instance of several Governments, by a solitary student, rarely now seen on the street, except passing from the study to the lecture-room. Heer had no literary collaborateurs, excepting—and that for a year or two—the late M. C. T. Gaudin of Lausanne. But his first great work, *On the Fossil Insects of the Tertiary Deposits of Öeningen*, was begun at the earnest instigation, with pecuniary aid, of his life-long friend, Escher von der Linth. Escher possessed a moderate fortune, which was freely spent in aiding Heer's researches. This was done, as far as possible, without the recipient's knowledge, and when that was impossible, in such a way as to make him feel he was conferring an obligation on the donor. The most distinguished scientists in Europe visited the little room in Zurich, piled with books and cabinets, with its solitary sofa, on which Heer reposed after his short but quickly-recurrent spans of work. They have more than once testified to the heroic devotion of the attendant, Heer's only daughter. During the last twelve years, Heer was usually found reclining on a couch, a wooden board stretched along it, on which were fossils, plates, books, or manuscripts he was studying; whilst beside him his daughter waited, ready to change the invalid's weapons of work. Sixteen thick quartos represent some of these labours. Up till 1874 Heer's separated published papers ranked in the Royal Society's Catalogue as 95.

But what of the stability of such extensive work? Heer's conclusions touched many of the most novel points of modern speculative geology, such as a Miocene Atlantis, a uniform warm climate in Tertiary times extending even to the northern Arctic zone. Many scientific writers accept these conclusions as admitted data. What of the verdict of strict classificatory science? The subject is beset with difficulties. The over-multiplication of species in fossil botany, as well as the uncertainty as to the true specific characters of some widely-distributed trees, from which we are accustomed to argue as to recent climatal changes, occur at once to every worker in this field.

Heer's method of determining insects from the wings alone was remarkably successful with so great an entomological specialist. Thus he predicted that a fossil elytra belonged to a living Brazilian form of *Hydrophilus*; and in a few weeks a complete fossil specimen was discovered, which verified the diagnosis. So, two fruits of fossil plants were discovered which confirmed their previous description worked out from the fossil leaves alone. Heer was soon known to have a power in the field of palæophytology, equalling that of Owen in his special branch of comparative anatomy. His fame was spread abroad through the friendship of Sir Charles Lyell. Besides, the fossils of Enningen were in a very perfect state of preservation. In one locality, along with the insects, were vegetable fossils to the extent of 900 species. So Heer was irresistibly drawn simultaneously into both studies. Both plants and insects had alliances far beyond their present limited area. Plant impressions now peculiar to America and the Azores, such as *Clethra* and *Persea*, were very conspicuous; along with these were other forms now having their special *habitat* in Asia, Africa, and Australia. Thus the Swiss professor came face to face with absorbing questions of temperature and geographic distribution. The interest was to be enlarged by fresh discoveries amongst the fossil beds of St Gorge, when on a visit to Madeira in 1854-55 for health. Heer visited England in 1861, on the invitation of Sir Charles Lyell, to find at Bovey Tracy, Devonshire, vegetable remains indicative of a still warmer climate prevailing in Eocene times. Further, in 1866, he intimated to the British Association, that when the fossils of North Greenland were living trees, the climate must have been 29° Fahr. warmer than at present. Thus from this solitary study came forth determinations as to climate and temperature on palæophytological grounds, from the Arctic circle down through the greater part of North America and Europe, including the lost Atlantic continent. Heer also began his speculations on progressive development in plant life from Swiss fossils taken from Carboniferous, Jurassic, Cretaceous, and Tertiary localities. His further study of fossils from quarters wide as the globe apart merely broadened his generalisations. This was done by a

herbarium student of living forms, of a distinctly poetic temperament, which showed itself on more than one occasion in verse, and was no doubt heightened by his consumptive tendency.

Sir Charles Lyell (*Life and Correspondence*, vol. ii. 246, August 1859), writes to Leonard Horner—

“I perceive that Heer is trying to frame a progressive theory for plants, though he is a good deal put about by finding a Palæoxysis in the coal, one of the Bromeliaceæ. In fact, the monocotyledons do not seem as yet to keep their place in the chronological system, as they should do if they knew their real rank in the order of development. Some of them appear before their time. It is, however, striking to observe that the tendency of geological facts (or opinions) carries a man who is working in a new field, and an independent thinker into the speculation that nature began with cellular, and went on to vascular cryptogams, from lichens and seaweeds to ferns, and slowly got up to coniferæ and cycads, then to different divisions of dicotyledonous, apetalous, polypetalous, and gamopetalous in the order of their perfection. Although Heer is too well aware of the exceptions to his rules, and even of the impossibility of classifying the dicotyledons correctly according to relation, dignity, or perfection, yet the attempt shows how seductive such a generalisation is. So long as it is admitted that man came last, and the idea of progress is cherished as the only way of uniting that fact with palæontological data, I suppose these views will find favour. It seems the only prospect of a complete system of uniting all into one grand whole, the supposed absence of fish in the oldest rocks, with the coming in of the mammalia last of all, and with a parallel series of progressive steps from the algæ to the lilies and the roses. But it might be better if we were rather less ambitious. This eager desire to solve the whole problem may mislead zoologically, botanically, and geologically. I suppose most men prefer a doubtful system which enables them to group together a great many facts, than to have none. I spent three days in Heer's collection. He is continually finding fruits which bear out the generic determinations previously obtained from leaves alone.”

Heer's *Primeval World in Switzerland*, which has appeared in English dress, is his only large publication on general geology. Its poetic descriptions of a lost fauna and flora in some instances break out into verse. Heer's other books are classificatory memoirs. A general review of them would be mostly a critique in special on recent additions to Arctic fossil botany. The thorough working

out of such an extensive subject implies a knowledge of the living habits and changes as affected by temperature of which we are still far too ignorant. Thus we may bring in evidence the recent papers on half-hardy plants grown in Britain read to this Society. Mr S. Gairdner has reviewed at considerable length Heer's work amongst the Coniferæ (*Nature*, vol. xxiii.). His charges against it are minute-subdivision and an over-multiplication of species, as well as ignorance of the facts that in some species different kinds of leaves are found on the same tree; thereby invalidating one of Heer's favourite methods of classification. Altogether we are too precipitate in forming vast inductions as to the climate of the ancient earth.

"The moral to be drawn from the history of the Sequoias is that we should not place implicit credence in the minimum temperature of the so-called Miocene Greenland, Spitzbergen, Vancouver's Isle, Sitka, Arctic America and Asia, as settled by Heer. Such bold argument, as for instance that because Sequoia now requires such and such a temperature, therefore former but different species must have required the same, is entitled to but little deference, yet Heer's facts and opinions are quoted as axioms by a wide range of workers. When examined they are seen to be disputable, whether taken as physiological, geological, palæontological, or any other data. Provisionally they were of use, but the questions depending on the accuracy of the data are so important and the evidence so intricate that they should not be deemed settled until some greater amount of care has been bestowed on them."—*Nature*, vol. xxiii. p. 414.

Far be it from us by such quotations to depreciate Heer's heroic life of study and suffering. The detailed titles of published works given below are alone his sufficient monument. But, in truth, does it not also testify to the glory and vanity alike of a mere scientific career? The vast field of research opened up on the solitary sick couch at Zurich, has room and scope enough for many other workers to complete its array of laboriously accumulated facts.

List of Oswald Heer's more important Publications.

His larger works, specially on Fossil Arctic Botany, were published in various countries, and by different Governments. They respectively bear imprints of London, Stockholm, St Petersburg, and Zurich.

Heer's first great work was "On the Fossil Insects of Eningen and of Radoboj in Croatia." 1853.

Flora Fossilis Arctica (7 vols. 1300 pages, 399 plates). 1868-83.

Flora Tertiaria Helvetica (8 vols. 3500 pages). 1855.

Flora Fossilis Helvetica (1 vol. 70 plates). 1876.

Urvell der Schweiz, translated into French by Gaudin in 1865, and into English by J. Heywood in 1876. A new and enlarged edition appeared in 1879.

"Description of the Tertiary Flora of Bovey Tracy," *London Phil. Trans.* 1861.

Professor Allen Thomson, M.D., LL.D., D.C.L., F.R.S.

L. & E. By Professor CLELAND.

(Read 8th May 1884.)

Among the losses which this Society has sustained during the past year by death, it is our painful duty to record the name of Dr ALLEN THOMSON, who died on the 25th March, at his residence in London, and was buried on the 28th, close beside the remains of his brother, in the Dean Cemetery of Edinburgh.

Dr Thomson became a member of this Society on 9th April 1839.

He was the son of Dr John Thomson, Professor of Military Surgery, and afterwards of Pathology, in the University of Edinburgh, well known as the author of a work on Inflammation, and still better remembered as a notable figure in politics, a trusted adherent of the Whigs, and a powerful wielder of influence in that party. Nor was this circumstance without effects on the life of Allen Thomson, who was named after his father's friend, the well-known John Allen, long resident in Holland House, was brought much in contact with the Bedford family, and was assured, as he would sometimes playfully tell, of the Whig interest to secure for him a regius chair.

Though a member of this Society, and though the chair which he long held in the University of Glasgow was formerly termed the chair of Anatomy and Botany, and he was rather proud of his claim to be called a professor of the latter subject, retaining even a certain number of diagrams and preparations for its illustration, Dr Thomson's attention was devoted principally to the phenomena of animal life.