

# SCIENCE.

FRIDAY, NOVEMBER 2, 1883.

## OSWALD HEER.

OSWALD HEER, whose death in his seventy-fifth year we announced a fortnight since, was

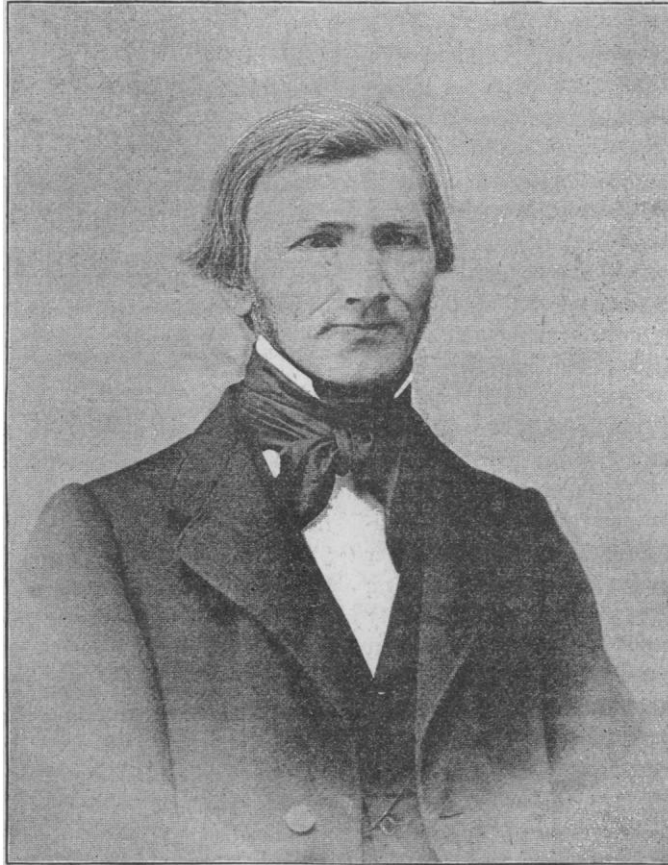
born in Glarus, Switzerland, Aug. 31, 1809. In 1828 he went to Halle to study theology and natural history. He began his career as a pastor at Glarus; and certain habits and manners of a clergyman clung to him throughout life, and traces of them may even be seen in his special paleontological writings. He soon gave up the ministry, and devoted himself exclusively to natural history; and we next find him settled in Zurich, where, in 1835, he founded the botanic garden, and became its director.

In the following year he was attached to the university as professor of botany and entomology,—the two studies which divided his time throughout his life. Later, about 1855, he transferred his alle-

giance to the Polytechnicum, an institution of world-wide fame, where he remained the rest of his life. In 1845 he founded and became president of the Zurich society of agriculture and horticulture. And for twenty years he

was a Rathsherr, or member of the Grand council of Zurich.

It was not until 1840 that he turned his attention to paleontology, studying first of all the fossil insects of Oeningen. This task he undertook at the instance of his friend Escher von der Linth. Knowing him from his childhood, Escher quickly perceived that a mind so delicately adjusted to observation, which no detail escaped, was well prepared for the difficult work of determining and classifying the numerous plants and in-



*J. H. Escher von der Linth*  
*Dr. O. Heer*

sects of Oeningen. It was a virgin field. Yielding to the solicitations of his friend, Heer bravely undertook the suggested work; and with scarcely an interruption, notwithstanding a constitution always delicate, he

brought out the remarkable and numerous memoirs which have given him a place among the first paleontologists of our time.

Soon after his return to Switzerland, Heer associated himself with Froebel (since renowned for his reforms in pedagogy) in the publication of a magazine under the title of '*Mittheilungen aus dem gebiete der theoretischen erdkunde*,' of which only four numbers were ever issued. In the first of these, in 1834, Heer printed two memoirs on the geographical distribution of insects and plants in the Swiss Alps, drawing his material mainly from his native canton,—memoirs which show, especially the longer one on insects, that he must have gathered his facts through patient, diligent observations of many years. These two memoirs appear to have been his earliest essays. He afterwards expanded the first into a long and better known memoir on the Swiss Coleoptera. These studies on geographical distribution formed an excellent basis for the paleontological work to which he was shortly to devote himself, one great value of which lies in his careful studies of the relations which the extinct insects and plants investigated bear to living forms in the same or other parts of the world. From this time on, not a year has passed without some sign of activity from this indefatigable student; and his last volume was only last month reviewed in our columns. At first the memoirs concerned mainly the transformations or distribution of Swiss Coleoptera, and the distribution of alpine plants; but from 1847, when his first memoir on the tertiary beetles of Europe appeared, his attention was directed almost exclusively to fossil insects and plants, especially those of the tertiary epoch; and it is here he has won his renown. The volume upon tertiary insects, issued between 1847 and 1853, opened a new world to science, and will forever remain the classic work on fossil insects. He brought to it a painstaking and faithful investigation, which in many cases will bear the closest scrutiny at the present time, notwithstanding the advance of entomology in the generation since elapsed. Finding that

the determination of fossil insects must depend largely upon a study of their wings, he made a special investigation of the neururation in living types, and proposed for the first time a uniform nomenclature for all orders of insects. From its burial in a memoir on fossil beetles, this scheme received little attention; but it remains to-day the most philosophical presentation of the subject.

Although his earlier paleontological papers were mainly devoted to insects, his attention was from the first attracted to the plants associated with them. And, the mass of insects from Oeningen disposed of, his memoirs now became more and more largely paleobotanical. To these he gave a living interest, from his discussions of the probable physical condition and climate of tertiary time, drawn from the data furnished by the plants. He was a strong believer in a miocene Atlantis. His first essay, dealing with ancient climates, was published in Giebel's *Zeitschrift* in 1859, and was afterwards expanded into a volume, which passed immediately through a much enlarged second edition (in French) by the assistance of his friend Gaudin.<sup>1</sup> Then followed that remarkable series of illustrated quarto memoirs, published in various countries and languages in London, Stockholm, St. Petersburg, Zurich, etc., in which the collections of various government expeditions are described and figured, and which he afterwards collected into the volumes which compose his '*Flora fossilis arctica*' (7 vols.), companion volumes to his '*Flora tertiaria Helvetiae*' (3 vols.) and '*Flora fossilis Helvetiae*.' His studies upon past climates were also carried into wider geologic fields, and resulted in his '*Urwelt der Schweiz*,' a living picture of the past of his native country, clothed in popular language. His imagination was here brought into play, and occasionally expressed itself in verse. This volume, issued in 1865, was translated into French by Gaudin (1875), and into English by Heywood (2 vols. 1876). To each of these editions he added supplementary matter,

<sup>1</sup> This last was also enriched by contributions from several naturalists, notably Matheron and Saporta.

and himself published a considerably enlarged German edition in 1878.

Heer, who, as we have said, was instigated to his paleontological studies by Escher, was glad to acknowledge his debt to his friend, whose most illustrious pupil he was. Rarely have such cordial relations existed between two men. He always spoke of Escher in terms of warm friendship and admiration, and always seemed to be asking, Did you ever know his equal? And, indeed, Escher merited his praise.

Without personal fortune, and very often obliged by illness not only to suspend his courses, but even to make expensive journeys to Madeira, Italy, etc., to regain his strength, Heer would have been greatly embarrassed but for his friend. Escher possessed a fair fortune, especially in the latter part of his life; and, being childless, he constantly sought opportunity to assist Heer, and, so far as possible, without his knowledge. Escher urged his gratuities with such delicacy and kindness that he seemed to be the one under obligation when his dear friend would accept his offerings. Escher recognized the worth of his *protégé*, appreciated the value of the services he was rendering to science, and welcomed with a beaming face every fresh memoir from Heer's pen.

Heer was a man of very retiring habits, being rarely seen in public, even on the street. His delicate health forbidding his travelling or making personal explorations, he lived in his study, where he received fossils from all parts of the world. Here he accumulated specimens from the arctic regions, from every country of Europe, from Asia, and from America. Here in the midst of cabinets, and with books piled up on every side, he passed all his time, yet always receiving his geological friends with manifest pleasure. Many a scientific man came here to visit the illustrious paleontologist,—Leopold von Buch, Sir Charles Lyell, von Hauer, Geinitz, Fraas, Oppel, Sismonda, Ramsay, Falconer, Pictet, Studer, Merian, Agassiz, de Zigno, Mojsisovics, Gumbel, Schimper, Zittel, Schmidt, Abich, etc. While he was asso-

ciated with Heer in the Polytechnicum, Jules Marcou was a visitor almost daily, and relates how, with a pleased and contented smile, Heer always greeted him after his fashion, grasping his hand in both of his. Reclining on a sofa (for Heer could only work a brief time without seeking rest), he would gladly converse for an hour or two upon geological topics and the numerous problems still requiring solution.

We have said he undertook no explorations; yet, in the winter of 1854–55, he visited Madeira for his health, in company with Ziegler and Hartwig. Several memoirs resulted from that visit; and in 1861, with his friends Escher and Merian, he visited Paris, London, the Isle of Wight, and Holland. An unusual exception was his accompanying his friend Marcou on short journeys to Oeningen, Schambelen, Dürnsten and Utznach, and Hohe Rhonen,—favorable localities for fossil plants and insects.

Heer worked quite alone, unaided by others; and he never worked in collaboration with other men, unless we may except the late C. T. Gaudin of Lausanne, who translated several of his important works, and in one at least, that on the climate of the tertiary epoch, may be said to have been a collaborator. Heer so called him. Indeed, it is possible, that had Gaudin not died in the flower of his age, eighteen years ago, he would have worked still further in concert with Heer, and given his works a wider circulation. Heer also found an assistant, as excellent as devoted, in his daughter, especially during the last twelve years of his life, many of which, after the disease which attacked him in 1872, he passed upon his bed. She was ever ready to place before him specimens, books, plates, descriptions, manuscripts. Always by his side, all his wishes were cared for by her in the most assiduous and intelligent manner.

A man more lovable, more sympathetic, a life more laborious and pure, one could scarcely imagine. As a man, he possessed the same irresistible attraction to all who came under his influence as that which characterized the late Lady Lyell.

The portrait given here has been photo-engraved from a photograph taken in 1864 by Heer's brother, kindly lent for the purpose by Professor Jules Marcou. The signature is taken from a letter addressed to the writer, under date of Aug. 13, 1883.

#### A HEARING OF BIRDS' EARS.<sup>1</sup>—III.

SECTION of bone is required for further examination of the ear parts. There being no mastoid affair to be considered as such, we may proceed directly to the 'petrous part of the temporal' (the periotic or petrosal bone); the otocrane, or otic capsule, enclosing the essential organ of audition just as the eyeball does that of vision, or the ethmoid bone that of olfaction. None of this bone is ordinarily recognizable on the outside of the skull; though in the embryo that part which is in especial relation with the posterior semicircular canal appears to a slight extent upon the occiput. The foundation of the bone is laid very early in cartilage; traces of the cochlea and canals being visible in the chick at the fifth day of incubation, if not sooner, in the primitive cartilaginous *basis cranii*, — the parachordal plate of cartilage on each side of the notochord. On longitudinally bisecting the adult skull, or otherwise gaining access to the brain-cavity, the whole cerebral surface of the petrosal bone is brought into view, as in fig. 4, *po*, *op*, *ep*. In a skull of any size, as that of an eagle (from which my description will be mainly derived), there is no difficulty in making out the parts, although the periphery of the petrosal is completely consolidated with surrounding bones. The petrosal or periotic bone consists of three distinct bones, which in some animals may remain long or permanently separate, or be consolidated with surrounding bones and not with one another. To see them it is usually necessary to examine a young skull, like that figured. These are the *pro-otic*, *po*; the *opisthotic*, *op*; the *epiotic*, *ep*. In the present case of the adult eagle, they are absolutely fused with one another, as well as with contiguous bones. The consolidated petrosal appears as an irregular protuberance upon the inner wall of the brain-cavity, much as the human petrous bone protrudes between posterior and middle cerebral fossae. It appears to be much more extensive than it really is, because the superior semicircular canal, too large to be accommodated in the petrosal, invades the occipital bone, — the track of the canal being

sculptured in bas-relief, — as at *asc*, fig. 4. Behind this semicircular trace, the deep groove of a venous sinus (*sc*) is engraved upon the bone, throwing the track of the canal into still stronger relief. The top of the petrosal and contiguous occipital surface floors a fossa which lodges the enormous optic lobes (*corpora bigemina*) of the brain; in the eagle partly divided from the general cavity for the cerebral hemisphere by a bony tentorium, like that which in some mammals separates the cerebellar from the cerebral fossae. On the vertical face of the petrosal, or on the corresponding occipital surface, is a large smooth-lipped orifice leading to a tongue-like excavation which lodges the flocculus of the cerebellum, and would therefore seem to correspond to that slight chink of the human petrous bone, near the *meatus internus*, which lodges a process of the *dura mater*. In front, between the petrosal and the alisphenoid (or in the apposed border of one or the other of these bones), is a considerable foramen, — the exit of the second and third divisions of the trifacial (figs. 1 and 4, the hole marked 5). Below the petrosal, between opisthotic and exoccipital, near the *foramen magnum*, is a foramen (which may be subdivided into foramina) representing the human *foramen lacerum posterius*, for transmission of the pneumogastric, etc. (fig. 4, the hole marked 8). Thus, as always, the bony auditory capsule lies between the exits of the third division of the trifacial and the pneumogastric. The general space under description is continued to the margin of the *foramen magnum* by the exoccipital bone (fig. 4, *eo*). Now, on the vertical face of the petrosal itself, and in the pro-otic part, far behind the foramen marked 5 in fig. 4, considerably above that marked 8, will be seen the large smooth-lipped orifice of the *meatus auditorius internus*, marked 7 in the figure. Here enter, as usual, both *portio dura* and *portio mollis* of the old seventh pair of cranial nerves. At the bottom of the meatus are at least two openings, small, but separate from each other. A bristle passed through the upper (anterior) one of these traces the course of *portio dura* (the facial nerve) through the fallopian aqueduct ('nerviduct,' it would be better called), and emerges in the tympanic cavity near the eustachian orifice. This orifice of exit of the facial is virtually a 'stylo-mastoid' foramen, though within the tympanic; for the nerve burrows through no more bone in reaching the surface of the skull. A bristle passed through the other one of the two foramina at the bottom of the meatus practically traces the course of the *portio mollis*, or auditory nerve,

<sup>1</sup> Concluded from No. 38.