

The approximation of the orbit of Biela's comet to that of the November meteor-stream, and consequently to that of Tempel's comet, 1866 (I.), was first pointed out by Prof. Bruhns, of Leipsic, in *Astron. Nach.*, No. 1681, but the heliocentrics there employed were deduced from the geocentric places of Santini's rough ephemeris.

PROF. FLOWER'S HUNTERIAN LECTURES  
ON THE RELATION OF EXTINCT TO EXISTING MAMMALIA<sup>1</sup>

IX.

THE disputed zoological position of the Lemurs, and the great importance which has been attached to them by some zoologists, who regard them as the direct transition between the lower and higher mammals, and as survivors of a large group now almost extinct, through which the higher Primates must have passed in the progress of their development, give great interest to the consideration of their ancient history.

Until very recently fossil Lemurs were quite unknown, at all events the affinities of certain remains provisionally assigned to the group were much questioned, but within the last few years the existence of Lemuroid animals in Europe during the early Tertiary period has been perfectly established, and remains of a large number of animals attributed, though with less certainty, to the order, have been found in beds of corresponding age in North America.

In 1872, a nearly complete skull of an animal somewhat allied to the modern African Pottos and Galagos, though of a more generalised character both of cranial conformation and dentition, was described by M. Delfortrie, under the name of *Palæolemur betillei*. It was found in phosphatic deposits, probably of early Miocene age, in the department of Lot. It was soon afterwards discovered that certain more or less fragmentary specimens which had been long before described, and had been generally though doubtfully referred to the *Ungulata*, were really nothing more than animals of the same group, and probably even of the same species. These are *Adapis parisiensis*, Cuvier, from the Paris gypsums, *Aphelotherium duvernoyi*, Gervais, and *Cænopithecus lemuroides*, Rutimeyer. The recognition of these animals as Lemuroids shows how little reliance can be placed upon the characters of the molar teeth alone in judging of affinities, and should also lead to the re-examination of some of the smaller mammals of our own Tertiaries, such as *Miolophus*, as it is not improbable that Lemurs may be found among them. The same deposits in which M. Delfortrie's specimen was found, have since yielded two other skulls, one of smaller and the other of larger size, named by M. Filhol, *Necrolemur antiquus* and *Adapis magnus* respectively. It should, however, be mentioned that M. Filhol only admits the first to be a true Lemur, and considers the genus *Adapis* as the type of a hitherto unknown group of mammals, intermediate between the Lemurs and Pachyderms, to which he gives the name of *Pachylemur*.

Of the supposed low and generalised forms of Primates from the Tertiaries of North America, the existence of which was announced almost simultaneously by Professors Marsh and Cope in 1872, it is difficult to speak with certainty at present, as the descriptions which have reached this country are not very detailed. As many as fifteen genera have already been named. They are nearly all from the Eocene formations, two only having been found in the lower Miocene.

The remains of no true monkeys have hitherto been discovered in the Eocene, but several species have been found both in Miocene and Pliocene formations in

<sup>1</sup> Abstract of a course of lectures delivered at the Royal College of Surgeons "On the Relation of Extinct to Existing Mammalia, with Special Reference to the Derivative Hypothesis," in conclusion of the course of 1873. (See Reports in NATURE for that year.) Continued from vol. xiii. p. 514.

Europe. The most abundant and best preserved are those from Greece, *Mesopithecus pentelici*, allied to the existing genus *Sennopithecus*, though with shorter and stouter limbs. Others have been found in the Siwalik Hills of India allied to the same form, and in France, the South of Germany, and Italy, related to the Macaques and to the Gibbons. The most interesting species is one known by the lower jaw only, from a Miocene bed at St. Gaudens, in France, described by Lartet under the name of *Dryopithecus fontani*. Its affinities have given rise to some discussion, but as far as can be decided from the evidence before us, it appears intermediate between the chimpanzee and gorilla, and of the size of the former. Considering how nearly the Miocene fauna of Europe resembles in its general features the actual fauna of Africa, it is not surprising that an ape of the genus *Troglodytes* should have formed part of it. No remains of monkeys allied to the existing American forms have been found in the Old World, and conversely, all those discovered by Lund in the Brazilian caverns belong to the families now inhabiting the same part of the world. No monkeys have yet been found in the alluvial deposits of the plains, which are so rich in the great Edentates, nor in fact have they been met with in any older South American Tertiaries. The ancient history of the group, as revealed to us by palæontology, is therefore extremely incomplete. Further researches into the fauna of the North American Eocenes may throw some light upon it.

No actual remains of man have been met with which can be said with certainty to be older than the Pleistocene period, though it is asserted that his existence upon the earth in the Pliocene and even Miocene epoch is proved by works of art found in deposits of those ages. These, however, are questions to be decided by the antiquary and the geologist, and are beyond the scope of the anatomist. The oldest known remains of man from European caves (with perhaps the exception of the celebrated skeleton from the Neanderthal, the age of which is doubtful) do not differ more from modern Europeans than do several of the lowest modern races. In other words, no proof of the existence in former times of a race of men inferior in general organisation to the Australians, and forming any nearer approach to the lower animals, has yet been discovered.

In reviewing our present knowledge of the palæontology of the Mammalia we see immense progress of late years, giving hopes for the future. Here and there we have tolerably complete histories of gradual modification of forms with advancing time, and adapted to the exigencies of changing circumstances, as among the *Ungulata* and the *Carnivora*; and we have many instances of extinct forms filling the gaps between those now existing. But still there are great gaps or rather gulfs between most of the large groups or orders, without at present any trace of connecting links, or anything to indicate how they were once filled up, as must have been the case if they have all been gradually evolved from a common origin. We have very much to learn before we can speak with any confidence upon the manner in which all the diversities of form we see around us have been brought about, or attempt to construct pedigrees or phylogenies, except in the most provisional and tentative manner.

INTERNATIONAL METEOROLOGY

THE Permanent Committee of the Vienna Meteorological Congress has just held its third meeting in London, which lasted from the 18th to the 22nd April inclusive. The members present were Prof. Buys Ballot (Holland), president, Professors Bruhns (Germany), Cantoni (Italy), Mohn (Norway), Wild (Russia), and Mr. Scott. Prof. Jelinek (Austria) was unfortunately absent owing to ill-health.

Among numerous subjects which came up for consideration, it appeared that the scheme for publication, in a uniform manner, of actual observations and monthly results from a limited number of stations in each country, which are to be considered as international, had been already accepted almost without exception or suggestion of amendment by all the countries which had been present at Vienna. It is hoped that this measure will ultimately tend to bring about uniformity in hours and methods of observation.

In weather telegraphy it was resolved to calculate gradients in the metric scale, as millimetres per one degree (sixty nautical miles). In this country they will be referred to English units. It was not found practicable to endeavour to introduce uniform hours for observations in weather telegraphy in Europe at present. As to weather charts, a proposal for the exclusion of all meridians except that of Greenwich was postponed to the next Congress. It was resolved to take advantage of that meeting to attempt to effect the comparison of the principal standard barometers by means of travelling barometers to be conveyed to the place of meeting, and left there for a considerable time.

It was recognised as impracticable at present to create an International Meteorological Institute, and consequently it was decided that international investigations must be carried on at the expense of individual nations, other nations to be requested to furnish materials, as far as possible, in a usable form. A list of upwards of 200 subscribers to the international synoptic weather charts of Capt. Hoffmeyer was announced.

Resolutions were adopted in favour of the establishment of stations on high mountains, and in distant localities, and Lieut. Weyprecht's proposition for a circle of observing stations in the Arctic Regions round the Pole was recognised as scientifically of high importance and deserving of general support.

With reference to universal instructions for observations it was stated that no general form of instructions could be drawn up to suit all climates, and it appeared to the committee that the instructions recently prepared in the German, Russian, and English languages respectively, as well as in Italian (as soon as some contemplated modifications shall have been introduced), were sufficiently in accordance with the requirements of the Vienna Congress. It was hoped that ere long French instructions of the same tenor would be issued.

It was announced that the Italian Government was prepared to invite the next Congress to meet at Rome in September 1877, and the proposal was most gratefully accepted. In preparation for this meeting a number of reports on the present state of the different departments of the science are called for from various meteorologists. The questions to be treated in these reports are mainly instrumental, and they are of great importance in the present state of the subject. The detailed Report of the Committee will be published without delay.

#### SOIRÉE OF THE ROYAL MICROSCOPICAL SOCIETY

ON Friday, April 21st, Mr. H. C. Sorby, president of the Royal Microscopical Society, gave a large *soirée* in the apartments of King's College. Invitations had been issued for above 1,500, including the whole of the Fellows of the Royal Microscopical Society, the presidents and leading officers of many of the London Scientific Societies; all the distinguished foreigners now in London as commissioners from the various foreign Governments to the Exhibition of Scientific Apparatus at South Kensington; and many of the President's private friends. About 800 were present, including about 300 ladies. After having been received by the President and one of the secretaries, the visitors passed into the

various rooms of the College, in which were exhibited many objects connected with microscopical science. For the number, variety, scientific value, or general interest of the specimens, this exhibition has probably never been surpassed. Amongst the new instruments may be mentioned Mr. Sorby's arrangement for accurately measuring the wave-length of the centre of absorption-bands in spectra; a new form of Stephenson's erecting binocular microscope, by Mr. Bevington, and another by Mr. Browning, of somewhat different construction. Mr. Browning also exhibited his new portable microscope, which is so constructed that the body can be turned on one side and reversed in such a manner as to reduce the height to about one half. The President also exhibited a large series of specimens illustrating his own special subjects, shown by means of fifty microscopes, lent to him by four of the principal makers in London (Becks, Browning, Crouch, and Ross), and about 150 first-rate instruments and objects were contributed by the Fellows of the society and other friends. These were so distributed over the large apartments of the College as to avoid crowding in any part. Almost every branch of science to which the microscope has been applied was well represented, and many of the finest specimens ever prepared were shown and described. Many very interesting living objects were sent direct from the Brighton Aquarium and elsewhere. In the lecture theatre were exhibited Dr. Hudson's most beautiful drawings of microscopic objects shown in a new manner as transparencies; Mr. Spottiswoode's splendid polarising apparatus, and various objects shown with the oxy-hydrogen microscope by How and Company. The large entrance hall was decorated with plants and flowers, and used as a promenade. The two museums of the College were also thrown open. Refreshments were supplied by the steward of the College. The guests were provided with a classified catalogue of the objects exhibited, but they were so numerous that it was impossible for any one to examine more than a small part of the whole. One of the most satisfactory results of the *soirée* is the great impression produced by it on the foreign scientific men, who appear to have been quite unprepared for, and greatly surprised at, what they saw during the evening.

#### ON CERTAIN METHODS OF CHEMICAL RESEARCH<sup>1</sup>

THE lecturer began by describing the simple form of apparatus which he employed many years ago in his researches on the heat evolved in the combination of oxygen, chlorine, bromine, &c., with other bodies. In every case the bodies to be combined were inclosed in a vessel surrounded with water, and the combination was effected either by the ignition of a fine platinum wire, or where they acted directly upon one another, by the fracture of a glass capsule containing one of the combining bodies, the heat being measured by the rise of temperature of the water. He next referred to the arrangement by which he had been the first to decompose water so as to render visible the hydrogen and oxygen, and to measure their relative volumes by means of atmospheric electricity and of electrical currents from the ordinary machine. For this purpose fine platinum wires were hermetically sealed into fine thermometer tubes, which were then filled with dilute sulphuric acid by withdrawing the air by ebullition. The same current of frictional electricity will decompose the water in almost an indefinite number such couples arranged in a consecutive series. Capillary tubes of this kind may be employed for eudiometric experiments, which would be exceedingly tedious in wide tubes. Thus oxygen gas can at once be absorbed by passing the silent discharge through it while standing

<sup>1</sup> Abstract of a Lecture to the Chemical Society by Dr. Andrews, F.R.S., April 28. Communicated by the author.