

Flavitzky.—On the preparation of animal colours from albuminoids, by W. Mihailoff.—Notes on the pseudosulphocyanogen, and on the dissolution of fibrine, by A. Lidoff.—On the thermal phenomena due to magnetism, by P. Bakhmetieff.—On the reproduction of curves traced by a point of the axis of a revolving body suspended at a point of its axis, by D. Bobileff. The author publishes a photolithographed plate showing the different curves described by a conical pendulum revolving around its axis of symmetry, and balancing at the same time about its point of suspension. The apparatus having been improved, the curves are very symmetrical, and, notwithstanding the influence of the decrease of the oscillations, the curves are most like those deduced from the integration of the differential equations.—A preliminary note on the electrical properties of quartz, by G. Woulff.—On the conditions of sensibility of the method of Mance, a mathematical inquiry by D. Zolstareff.—On the changes produced in the intensity of an induction current by the introduction of a branch containing a bobbin, by J. Borgmann.—Notes on elementary optics, by P. Ziloff and M. Wolkoff.—Note on friction, by M. Kraiewitsch.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, June 19.—"On the Structure and Development of the Skull in the Mammalia. Part II. Edentata." By W. K. Parker, F.R.S.

My former paper on the structure and development of the mammalian skull was published in the *Philosophical Transactions* in 1874; it was on that of the Pig.

Since then, whilst gathering fresh and fresh mammalian materials, the greater part of my actual work has been on the skull of the other classes.

I have come to the conclusion that the Edentata are nearer of kin to the Monotremata than to the Marsupialia, and that if they did, as indeed they must have done, pass through a Metatherian, or Marsupial stage, they did not utilise it, but ran through it in an *abbreviated pre-natal* stage.

Of course the remarkable modification of their jaws, due to abortion, and in some cases complete suppression, of their teeth, is that which makes these forms so abnormal to the morphologist as well as to the zoologist.

As it happens, the most primitive form of Mammalia existing, the Prototheria (*Ornithorhynchus* and *Echidna*), are also abnormal on the same account, and thus the best standard existing by which to measure the height of the platform on which we find the Edentata is not itself normal, or straight, or perfect.

Now none of the Metatheria or Marsupials have suffered from this kind of degenerative specialisation; they therefore come in well as standards of measurement and comparison for the Insectivora next above them, but of little use here among the Edentata.

Prof. Flower, after working out the general anatomy of this group (*Proc. Zool. Soc.* 1882, pp. 358-367), has come to the conclusion that the Edentata of the Old World have little to do with those of the New.

That sounds like a hard saying to one not familiar with the structure of the group; it did to me, no long time ago, although what I had done at the group, long ago, went to prove the same thing; now, however, I am quite satisfied of the truth of my friend's deductions.

The Neotropical Edentata hold together much more than might have been expected; the Armadillos are the most isolated, but much as the Aard-Vark of the Cape looks like an archaic Armadillo without armour, he is not more than a very distant relative of the modern armed Armadillos.

Indeed, the curious coincidences that I have found between the structure of the Aard-Vark and that of a large Insectivore from a contiguous region, namely, the *Rhyncocyon* from Zanzibar, lead me to suspect that the Cape Anteater is an offshoot from the same stock, and is, indeed, the only Edentate that can be looked upon as probably arising originally from a Metatherian or Marsupial stock, like the Insectivora.

The other Palæotropical Edentata—the Pangolins—are perhaps still more isolated than the Aard-Vark, but they have not come so near extinction, and are found in more than one continent of the Old World.

If the term *Reptilian* might be applied to characters seen in any Placental Mammal, it might to what I find in this. This creature has most remarkable correspondences with the Reptilian

group. Of course, the scaly covering is mimetic of the Lizard's scales, and is in reality made up of cemented hairs; that may pass; but not the structure of the sternum in some species, with its long "xiphisternal horns," as in the *Stellionida*, nor the cartilaginous abdominal ribs, as in the Chameleons and some other kinds. (See my memoir on the "Shoulder-girdle and Sternum," Ray. Soc., 1868, plate 22, fig. 13).

But the curious *ornithic* nasal bones, deeply cleft in front, the imperfect desmognathism of the palate, the feeble and segmented state of the anterior sphenoid, and the open pituitary space of the embryonic cartilaginous skull, all these things suggest that the Pangolins, whatever degenerative specialisation they may have undergone, never did rise to any height as Mammals.

Indeed, to me their *pre-natal* development—the Eutherian placentaion—seems to be their best title to be ranked even amongst the low forms of the high Mammalia.

If a complete series of fossil types could be found, on one hand stretching backwards (or downwards) from the Glyptodons, and, on the other, from the Megatheroids, then, long before these two groups merged into a common Prototherian root-stock, we should find their differences one by one dying out.

Embryology would help us here very much if materials could be obtained. Even with the scanty treasures that I have been able to obtain, most remarkable things are shown.

Of the two Anteaters I have only been able to obtain the young (not the embryo) of the smallest and most aberrant type *Cycloturus*—and of the Sloths only two embryos, and one of these considerably advanced, belonging to two genera, namely, *Cholepus* and *Bradypus* (*Arctopithecus*, Gray).

But every step backward in the structure of the skull of the Sloth brings me nearer and nearer to what I see even in the young of the Little Anteater, and that it is possible for both of these types to have arisen from the same stock is no longer a doubtful thing.

But the skull of developing embryos of the Sloth (of either kind) forms a very valuable and easy-working key to what is difficult in the skulls of the extinct gigantic Megatheroids.

If this be the case, if Sloths, extinct or recent, have arisen during time from the same stock as the great terrestrial Antbear, and the little prehensile-tailed *Cycloturus*, then there is nothing in any other Order to shock the mind or to be a stumbling-block in the path of the most timid evolutionist.

That in the Armadillos the new bandhry, or growth, of hair—the correlate of milk glands—should thrive badly on the old stony ground of Reptilian horn-covered scales, breaking out where it can among the clefts, is not more wonderful than that this same new growth of hair in the Pangolin should mat itself together and imitate the scales of Reptiles and Fishes.

Physical Society, June 14.—Dr. Guthrie, president, in the chair.—New Member, Mr. Stanley Butler.—Mr. Hoffart read a paper on a new apparatus for colour synthesis, which he exhibited. The colours are obtained by sending through prisms the light from a series of platinum wires made incandescent by Grove or other cells. Three different rays can be compared or superposed at a time by the instrument shown. The rays are received into the eye through an adjustable eyepiece; and various ingenious devices are adopted in the construction of the apparatus. The intensities of the lights are regulated by rheostats in the circuits of the platinum electro-pyres. Lord Rayleigh, Mr. Stanley, and Prof. Perry commented on the apparatus, and Dr. Guthrie thought that it would be useful in studying colour-blindness.

—Mr. Blaikley read a paper on the velocity of sound in small tubes—a continuation of experiments formerly brought before the Society by the author. Mr. Blaikley showed experimentally how his measurements were made. He found that pipes in which the upper proper tones were in harmonic order, or, better still, those in which they were far removed from the harmonic order, and therefore dissonant, were best for the purpose. He had obtained velocities from fine tubes varying from 11'4 to 88'2 mm. in diameter, the former giving 324'38, and the latter 330'13 m. per second as the velocity of sound. In free air Mr. Blaikley thought the velocity would come out 331 m. per second. The differences of velocity for the different pipes were very regular. Lord Rayleigh, Dr. Stone, and Dr. Guthrie made some observations on the paper, Dr. Stone remarking that the diameter of a pipe modified the pitch of the same rate, a fact noticed in musical instruments. In experiments on water-waves Dr. Guthrie had found that in rectangular troughs the rate of oscillation was less than in circular ones.—Mr. Howard read a paper by himself and Mr. Hayward, on the thermal relation-

ship between water and certain salts, such as sulpho-ethylate. &c. Curves of results were given and interpreted.

Royal Meteorological Society, June 18.—Mr. R. H. Scott, F.R.S., president, in the chair.—Dr. Benjamin A. Gould, Director of the Cordova Observatory, Argentine Republic, was elected an Honorary Member.—The following papers were read:—The equinoctial gales—do they occur in the British Isles?, by Mr. R. H. Scott, F.R.S. The period investigated was the fourteen years 1870–84, and only those storms were selected which had attained force 9 of the Beaufort scale at more than two stations. The results show that the storms are all but exclusively confined to the winter half-year; and also how, for a certain interval, the stream of storm depressions sets over the British Isles, and then for a time takes another path, leaving this country at rest. In some years there are as many as four or five storms in a fortnight, and in others there are none, or only one. It is further shown that there is no strongly marked maximum at either equinox.—On the physical significance of concave and convex barographic or thermographic traces, by the Hon. R. Abercromby, F.R.Met.Soc. The author shows that a falling barogram is convex when the rate of the fall is increasing, concave when decreasing; and conversely, that a rising barogram is convex when the rate is decreasing, concave when increasing. As the rate of barometric change is proportional to the steepness of the gradients which are passing, and the wind also depends on the gradients, the author suggests the following rules for judging the coming force of a gale from the inspection of a barogram:—A convex barogram is always bad with a falling barometer, and good with a rising one; and a concave trace is sometimes a good sign with a falling barometer, and not always a bad indication with a rising one. The convexity or concavity of a thermogram is likewise shown to depend on the rate of thermal change. A method is given by which the distribution of diurnal isotherms over the globe can be deduced from the diurnal thermograms in different latitudes, and it is shown that the shape of diurnal isotherms on a Mercator chart for a limited number of degrees of latitude is similar to the shape of the curve of diurnal temperature range, if we turn time into longitude, and temperature into latitude, on a suitable scale.—Maritime losses and casualties for 1883 considered in connection with the weather, by Mr. C. Harding, F.R.Met.Soc.—The helm wind, by the Rev. J. Brunskill, F.R.Met.Soc. This is an account of a wind peculiar to the Crossfell Range; and its presence is indicated by a belt of clouds, denominated the “helm barr,” which settles like a helmet over the top of the mountain.—Climate of the Delta of Egypt in 1798 to 1802 during the French and British campaigns, by Surgeon-Major W. T. Black, F.R.Met.Soc. The author has collected and discussed the meteorological observations made in Egypt during the French and British campaigns at the beginning of the present century.

Geological Society, May 28.—Prof. T. G. Bonney, D.Sc., F.R.S., president, in the chair.—John George Goodchild, Alexander Johnstone, and John Taylor were elected Fellows, and Prof. G. Meneghini, of Pisa, a Foreign Member of the Society.—The following communications were read:—The Archaean and Lower Palaeozoic rocks of Anglesey, by Dr. C. Callaway, F.G.S., with an appendix on some rock-specimens, by Prof. T. G. Bonney, F.R.S. The object of the author was to furnish additional proof of the Archaean age of the altered rocks of the island. He held that the Pebidian mass on the north was fringed by Palaeozoic conglomerates containing, amongst other materials, large rounded masses of limestone, derived from the calcareous series on the north coast, these conglomerates being probably a repetition by reflexed folding of those which lie at the base of the Palaeozoic series. In like manner conglomerates which margined the western (Holyhead) schistose area contained angular pieces of altered slate undistinguishable from some of the Pebidian rocks of the north-west. These conglomerates dipped to the east, forming the western side of a syncline. Near Llanfihangel were sections which showed not only the Archaean age of the gneissic and slaty (Pebidian) groups, but also the higher antiquity of the former. These conclusions were derived from the occurrence of granitoid pebbles in the slaty series, and from the presence of masses of the slate, as well as gneissic fragments, in the basement Palaeozoic conglomerates. The author was at present unable to accept the Cambrian age of the Lower Palaeozoic rocks, and considered that the fossils he exhibited tended to confirm the views of the Survey on the correlation of those strata. The paper concluded with a sketch of the physical geography as it probably existed in Ordovician

times. An appendix furnished by Prof. Bonney tended, by microscopic evidence, to confirm the proof furnished by the paper.—On the new railway-cutting at Guildford, by Lieut.-Col. H. H. Godwin-Austen, F.R.S., and W. Whitaker, F.G.S. In this paper the authors described a section exposed in a new railway-cutting just north of Guildford station. The beds exposed are chalk and Eocene strata at the base, with overlying Pleistocene or drift-beds. The Eocene beds appear at each end of the cutting, the London Clay resting upon Woolwich and Reading beds as described in 1850 by Prof. Prestwich; and the interest of the section is due in part to this exposure of the Woolwich and Reading beds, which are rarely seen in this neighbourhood, and in part to the thick mass of Pleistocene clays and gravels overlying the lower Tertiary deposits. The authors pointed out that the most interesting questions connected with these high-level gravels and sands of the ancient Wey are as follows:—1. What was their relation to the topography of the country in the past? 2. What relation do they bear to the outlines of the country at the present day? 3. What is their age? They showed that when the gravels and sands were deposited the main drainage of the country was the same as it now is, though the river was sixty feet above its present level. The sands with mammalian bones were probably an accumulation in a re-entering bend of the river, similar to one now existing a little further north. The river appears at first to have been more rapid, when the lower ironstone gravels were deposited; then slower, when the sands accumulated. Some change of levels ensued, and a considerable portion of the deposits was removed before the upper strata of loam and flints were formed. It is probable that the gorge of the Wey was no longer an outlet to the north whilst these beds were being deposited. In general the loam and flint beds are horizontal, whilst in some localities they are displaced in a manner remarkably like what is seen in the Glacial deposits of Alpine valleys. They contain land shells in places. The land surface indicated by the lower gravels and sands at Guildford is of older date than that described by Mr. R. A. C. Godwin-Austen in the country to the southward, and especially in the valley of the Tillingbourne. The deposits near Guildford belonging to the two epochs were noticed in some detail. Both are pre-Glacial, and have been formed when the climate was temperate. The overlying Glacial deposits formed of chalk-detritus, flints, and loam are attributed to the action of land ice, and the probable effects of a low temperature are described and illustrated by those observed on the plateaus around Chang Cheumo in Tibet.—On the fructification of *Zelleria* (*Sphenopteris*) *delicatula*, Sternb., sp., with remarks on *Ursatopteris* (*Sphenopteris*) *tenella*, Brongn., sp., and *Hymenophyllites* (*Sphenopteris*) *quadridactylites*, Guth., sp., by R. Kidston, F.G.S.—On the recent encroachment of the sea at Westward Ho!, North Devon, by Herbert Green Spearing. Communicated by Prof. Prestwich, F.R.S.—On further discoveries of footprints of Vertebrate animals in the Lower New Red of Penrith, by George Varty Smith, F.G.S.

PARIS

Academy of Sciences, June 16.—M. Rolland, president, in the chair.—Obituary notices of M. Bouisson, by M. Larrey; of M. Girardin, by M. Peligot; and of Mr. MacCormick, by M. Peligot.—Note accompanying the presentation of the second edition of his “Elementary Treatise of the Celestial Mechanism,” by M. H. Resal.—Note on a communication from Dr. Tholozan regarding a meteorite reported to have fallen in February 1880, at Veramin, in the district of Zerind, sixty miles west of Teheran, Persia, by M. Daubrée. An analysis of the fragments submitted to the author revealed the presence of bronzite, pschamite, peridot, nickel, and granulated iron, thus showing the same constitution as that of the remarkable meteorites of Logroño (1842), Estherville (1879), Hainholtz (1856), and Newton County, Arkansas (1860).—Graphic methods applied to the art of engineering; historic aspect of the question and claim of priority of invention of certain appliances for transporting large and bulky masses, by M. L. Lalanne.—Identification of the recently explored Wed Margellil and Lake Kelbiah, Tunis, with the ancient River Triton and Triton Gulf, by M. Rouire. Lake Kelbiah, which still communicates intermittently with the sea between Carthage and Hammamet (Hadrumetum), appears to be the largest in North Africa, with a circumference of nearly thirty miles at low water and a length of twelve miles. It is flooded throughout the year, and was evidently a marine inlet within comparatively recent times.—Description of a new apparatus for evaporating and distilling, specially suitable for the pneumatic

treatment of saccharine juices (two illustrations), by M. P. Caliburocs.—Remarks on the Polar spots observed on the planet Venus at the Meudon Observatory, by M. E. L. Trouvelot.—On the irrational roots in equations of the second degree, by M. A. E. Pellet.—On the position to be assigned to the mean fibre in curved pieces in the theory of resistances, by M. H. Léauté.—Note on some colloidal compounds derived from hydrate of iron, by M. E. Grimaux.—Chemical researches on the nitric acid of the nitrates present in vegetable tissues, by MM. A. Arnaud and L. Padé.—Description of a new and effective process of soldering aluminium and using aluminium in the soldering of other metals, by M. Bourbouze.—Account of a simple process for purifying arseniferous zinc, by M. L. L'Hôte.—Note on the nervous system of *Hyalinocia tubicola*, Mull., *Eunice torquata*, Quatr., *Lumbriconereis imptiens*, Clap., and other members of the Eunice family, by M. G. Pruvot.—Researches on antiseptic substances and the consequences resulting from their use in surgical practice, by M. B. Ratimoff.—Remarks accompanying the presentation of M. Capellini's work on "The Upper Chalk and Priboma Group in the Northern Apennines," by M. Hébert.

BERLIN

Physiological Society, May 16.—Prof. Waldeyer read a communication from Mr. Hoggan of London, on an investigation upon the nerve-endings in the skin of the Polar bear. The results of this investigation have already been published in English. The preparations which had been sent over by Mr. Hoggan were exhibited in the demonstration-hall of the Institution.—Herr Schmey gave a short account of an investigation upon the alterations in the sense of touch which supervene in the skin after certain treatment. After having by several weeks' practice fixed a determinate constant for his "sensation-circles" (i.e. for the territories on his skin which corresponded to a unit of sensation), he made experiments upon himself to determine the influence of the fatigue of an extremity upon the sensibility of the skin, further, as to the effects of the application of a mustard sinapism, of a hyperæmia produced by nitrite of amyl, and again of pressure on the nerve supplying the particular portion of skin experimented upon. He found among other things that in the first stage of skin irritation by a sinapism the sensibility of the skin was increased, in the second stage it was diminished, and that pressure upon the ulnar nerve was followed by a lessened sensibility in the area of its distribution.—Prof. Kronecker described the experiments made by Dr. Markwald to determine accurately the effects of *Secale cornutum* and its various constituents,—the physiological effects of the following preparations in particular, which are known in commerce and have been introduced into practical medicine, were the subject of investigation; these were Extractum Secalis cornuti, Ergotin from various sources, Ergotin, and Sclerotinic acid. All the physiological actions, those upon the uterus as well as those upon the regularity of the heart-beat, upon the blood-pressure, and the hæmostatic effects were investigated, in some cases individually, in others collectively, on dogs and rabbits. The Extractum Secalis cornuti first raised the blood-pressure, which afterwards sank to below the normal, and afterwards gradually rose again to the normal height or to a little above it. The presumption that a complex preparation caused the mixed action was verified in subsequent experiments. For the ergotin produced in different degrees, according to the purity and goodness of the preparation, a more or less marked increase of the blood-pressure, which was followed by a sinking to the normal level; whereas sclerotinic acid always produced a fall of the blood-pressure, followed by a rise to the normal pressure. The pulse showed slowings after the exhibition of ergotin, interrupted by successions of accelerated pulsations, giving rise to the impression that this drug elicited a periodic stimulation of the vagus. This phenomenon did not occur after section of the vagi, and was peculiar to this preparation. Satisfactory evidence of the existence of hæmostatic properties in ergotin could not be obtained, though these were present in an eminent degree in sclerotinic acid; the amount of blood that flowed out of a cut artery in a unit of time after the exhibition of ergotin actually increased to an insignificant extent, whereas it decreased very considerably after exhibition of sclerotinic acid. Upon the contraction of the uterus the preparations secale extract, ergotin, and sclerotinic acid have alike a decided effect, but ergotin, which occurs in commerce in the form of a solution, was in this respect, as well as in the other respects previously investigated, sometimes inoperative and at other times uncertain. Rules for

the therapeutical use of the preparations can easily be deduced from the physiological actions above described, but it is to be remarked that sclerotinic acid is very painful as a subcutaneous injection. This is not the case with a solution of ergotin. The results of the investigations were illustrated by Prof. Kronecker by means of numerous diagrams of curves.

VIENNA

Imperial Academy of Sciences, May 23.—L. Karpelles, on gall-mites (Phytoptus, Dug.).—L. Doederlein, contributions to a knowledge of the Japanese fishes.—R. Wegscheider, on isobutyl-naphthalene.—E. Spiegler, on an acetamine of the fatty series of high molecular constitution.

May 29.—Anniversary Meeting.—The meeting was opened in presence of the Crown Prince Rudolf by the Curator of the Academy, Archduke Rainer.—The Reports of the past year were read by the General Secretary, Prof. Siegel, and the Secretary of the Mathematical and Natural Science Class, Prof. Stefan.—Obituary Notes were read by the Secretaries on the members deceased—Prof. T. W. Gintl (Prague), Sir Edward Sabine, Jean Baptiste Dumas, Joachim Barrande, Julius Schmidt (Athens), Adolphe Wurtz.—The Reports were also read on the work done by the Prehistoric Commission and the Central Institute of Meteorology by Prof. Stefan. It was stated in this Report that the meteorological stations increased in number during 1883, ten stations being added during this year, and that a registering anemometer had been set up on the summit of the Obir Mountain (2147 m.), which works regularly.—Prof. Emil Weyr of Vienna University gave an address on the geometry of the ancient Egyptians, dealing with the contents of the papyrus, Rhind.

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