

HERR STEINEGER has been so fortunate as to secure eleven crania and numerous bones of the extinct sea-cow, *Rhytina stelleri*, which have been forwarded to the Smithsonian Institution at Washington.

A SPLENDID meteor was seen at Frankfort-on-the-Maine on December 8 at 6.45 a.m. It moved from west to east, and illuminated the whole neighbourhood.

A *Times* correspondent writes from Iceland that reports of a volcanic eruption in the interior were current last year, and were founded on peculiar appearances of the sky, and especially on the observation from some of the remote inland farms of columns of smoke or vapour rising in the far distance. Nothing definite has, however, been ascertained as to these phenomena. An unusually large number of scientific men, geologists, botanists, and philologists, chiefly German and Swedish, have this year visited Iceland and investigated its structure, flora, and language; and at present Prof. Sophus Tromholt, well known in scientific circles by his researches as to the aurora borealis, is pursuing these investigations here, and intends to remain all the winter, as, from the clearness of the atmosphere and the frequency and brilliancy of the aurora, Iceland is exceedingly well suited for his observations.

THE extensive collections of American Coleoptera made by the late Dr. J. L. LeConte, containing an immense number of original types, become the property of the Museum of Comparative Zoology of Cambridge, Mass.

THE French Société des Électriciens has completed its arrangements, and has been divided into six sections:—Theoretical electricity, M. Marie Davy president; Dynamo-electrical machinery, transmission of force to a distance, distribution of energy, M. Tresca president; Electric lighting, M. Du Moncel president; Telegraphy and telephony, M. Blavier president; Electro-chemistry and electrotherapy, M. Jamin president.

WHEN Arago was director of the Observatory of Paris, the dotation of this establishment was less than 4000*l.* a year. This sum was greatly increased when Leverrier was appointed by Napoleon III., and before his death it had reached 10,000*l.* Now the sum allotted is about 16,000*l.*, although the meteorological department has been set apart as a special service.

THE Italian Geographical Society awards its great gold medal to Count Pietro Antonelli, in consideration of the important results of his last journey to Shoa.

FROM advanced sheets of the *Proceedings of the Anthropological Society of Washington*, Col. F. A. Seely of the United States Patent Office, we learn from *Science*, publishes a pamphlet entitled "An Inquiry into the Origin of Invention." The author is accustomed, day by day, as new claims for patents come before him, to eliminate the successive steps in the classes of machinery until he reaches the fundamental idea. This is the plan pursued in tracing backward the whole subject of invention to its sources in the mind of primitive man. The subject is illustrated, first, by the story of the steam-engine, and then by the examination of the bow and arrow and other implements of the lower races. The author rejects Prof. Gaudry's Dryopithecus, and affirms, "Obviously, archæology can find no trace of a remoter age than that of stone; but I mistrust that the thoughtful anthropologist will accept the evidence of earlier ages, one of which, taking one of its perishable materials as the type of all, we may call the age of wood. Still farther back must lie an age, as indefinite in duration as any, when man existed in his rudest condition, without arts of any kind, except such as he employed in common with lower animals; and this is the true primitive period."

WE have received the report for the years 1880 and 1881 of the administration of the artistic and scientific collections in the Royal Museums of Dresden. The Zoological and Anthropological Museum was visited by 61,129 persons in 1880, and by 65,455 in 1881. An index to Reichenbach's ornithological works has been prepared by the director, Dr. A. B. Meyer, who has also issued an important work on the picture-writings of the Eastern Archipelago and Pacific Islands. The staff of this museum now consists of the Director, Th. Kirsch, curator, L. Römer and J. C. G. Wilhelm, first and second conservators, C. A. Kippe, preparator of specimens, a scientific assistant, and two attendants. The zoological and anthropological collections were enriched in the years 1880 and 1881 by 2242 specimens of the higher animals, and 17,753 of insects, by 237 anthropological and 1351 ethnographic objects, including 61 crania and 56 photographs and drawings of human types from various quarters. The library attached to this department was increased by 332 works, including donations from the British Museum, Smithsonian, and other sources. The systematic catalogue of the fishes was completed in three volumes, with alphabetical index of the 294 genera, 726 species, and 2901 specimens contained in the collection. The nests, to the number of 800, were also rearranged and catalogued, and progress was made with the catalogues of the birds (from No. 1688 to 2948) and insects (Hymenoptera concluded, Diptera thoroughly revised, of Coleoptera three families arranged and catalogued).

MESSRS. BAILLIÈRE AND Co. of Paris have issued the first number of a new scientific weekly, *Science et Nature*, profusely illustrated.

M. ÉD. MAILLY has brought out, in two volumes, a "Histoire de l'Académie Impériale et Royal de Bruxelles," from which so much good work has emanated. The history abounds in interest. F. Hayez of Brussels is the publisher.

SPAIN does seem to be progressing in the right direction. We have the second volume of Mr. F. Gillman's very useful and carefully compiled "Enciclopedia-Popular Illustrada" (Madrid), with a large atlas of plates. Also the first number of *La Industria Ibérica*, a weekly paper devoted to the industry and science of the whole peninsula, well printed, and, to judge from the first number, judiciously edited.

MESSRS. CHARLES GRIFFIN AND Co. announce the following scientific publications as forthcoming:—"A Manual of Geology," by Robert Etheridge, F.R.S., and Prof. H. G. Seeley, F.R.S.; "A Manual of Chemistry," by Prof. Dupré, F.R.S., and Dr. H. Wilson Hake; "A Manual of Botany: the Morphology, Physiology, and Classification of Plants, for the Use of Students," by Prof. W. R. M'Nab; "A Pocket-book of Electrical Rules and Tables, for the Use of Electricians and Engineers," by John Munro, C.E., and Andrew Jamieson, C.E., F.R.S.E.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus*) from India, presented by Miss P. Crabtree; a Campbell's Monkey (*Cercopithecus campbelli*) from West Africa, presented by Mr. Walter van Weede; an Alligator (*Alligator mississippiensis*) from the Mississippi, presented by Mr. Thick; a Ring-tailed Coati (*Nasua rufa*) from South America, deposited.

PHYSICAL NOTES

M. E. REYNIER has described, in *l'Électricien*, a research made by him on the maxima and minima of electromotive force of certain batteries in which polarisation takes place. These he calls "single-electrolyte" batteries, instead of "single-fluid" batteries, following a suggestion of the late M. Niaudet. The

difference consists in the relative size of the electrodes. For example, in the case of a zinc-copper cell containing a single electrolytic fluid, the maximum cell is made with a kathode of sheet-copper folded and curved, presenting 300 times as much surface as the thin copper rod which serves as anode, whilst in the minimum cell the proportion is reversed, so that the polarisation at the surface of the copper attains at once its maximum value. The value of the E.M.F. of the cells when filled with dilute sulphuric acid, and having the zinc amalgamated, was 1.072 volts maximum, and 0.272 volts minimum. Many other electrolytes were examined by M. Reynier. The electromotive force was measured upon a galvanometer of high resistance.

M. REYNIER has suggested a modification of his maximum cell to serve as a standard of electromotive force—namely, a cell having a very large copper electrode, and a very small amalgamated zinc electrode, immersed in a solution of sea-salt. According to M. Reynier, this battery has an E.M.F. of 0.82 volts, and maintains this value within 1 per cent, even when the circuit was loosed for two hours through a resistance of 820 ohms. M. Reynier prefers this combination to one containing sulphate of zinc in solution, because of the liability of the latter salt to contain free acid.

M. HENRI BECQUEREL has been pursuing his researches upon the infra-red rays of the spectrum. For the investigation of this region there are four methods, the first of them involving the use of a line-thermopile and a rock-salt prism; the second, Abney's photographic method; the third, Langley's method, with bolometer and a reflecting diffraction grating; the fourth, that of Becquerel, depending upon the discovery that the infra-red rays have the effect of extinguishing the glow of a phosphorescent body exposed previously to ultra-violet rays. M. Becquerel finds that water, for example, gives in the region to which this method is applicable three well marked absorption-bands, having wave-lengths respectively of 930, 1080, and 1230.

THE newest result of Becquerel's researches is worth more than passing mention. He finds that there exist in this wholly invisible region of the spectrum bright-line spectra—equally invisible, of course—just as in the visible parts of the spectrum, observable in the radiations of hot vapours. Thus, incandescent sodium vapour prints upon the previously "insolated" phosphorescent substance two well-marked lines (wave-lengths 819 and 1098), corresponding to two bright lines hitherto unknown. The extent of the region which is capable of being explored by this novel process is from wave-length 760 to 1300, or exceeding in extent that of the whole of the visible and ultra-violet rays.

AN interesting experiment is described in the *Zeitschrift des elektrotechnischen Vereins*, in Vienna, by Prof. von Waltenhofen, made by means of Noe's thermo-electric generators. If a current from a voltaic battery has been sent for a few moments through one of these generators, it is capable of yielding a discharge like a secondary battery. This effect is so far a mere repetition of a well-known experiment of Peltier, and is due to the change of temperature at the junction, called the Peltier effect. But von Waltenhofen observes that the effects are different according to the sense of the charging current. In one case, with increasing charging currents the discharge currents also increased, and were always in the opposite sense to that of the charging current. But when the charging current was reversed, it was found that with increasing charging currents the discharge currents at first increase, then attain a maximum, then decrease to zero, then actually recommence in the converse sense, namely, in the same sense as that of the charging current. Prof. von Waltenhofen is disposed to attribute this anomalous result to the lack of symmetry in the disposition of the alternate solderings of the generators, and to their alternately unequal resistance causing alternately unequal developments of heat due to resistance.

IN proof of the law of proportion between the thickness of a square vibrating plate and its pitch, Dr. Elsas gives the following neat experiment. Let three plates be cut from the same sheet of material, of the same size and form. Cement two of these together so as to produce a plate of double thickness. Then, on exciting the single plate and the double plate by communicating to them respectively the vibrations of two tuning forks whose pitches are as 1 : 2, the plates will be excited in identical manners, as will be seen by dusting sand upon them, the clang-figures being identical.

LORD RAYLEIGH has reprinted for private circulation in pamphlet form several of his most valuable optical papers,

including those on the manufacture, reproduction by photography, and theory, of diffraction-gratings, and those on colour-mixtures.

LORD RAYLEIGH has also reprinted some of his papers on electricity and on absolute pitch, from NATURE and from the Reports of the British Association, in a convenient pamphlet form.

THE question whether condensation of steam is a cause of electrification has been examined afresh by S. Kalischer in the Physical Laboratory at Berlin. According to the views of Faraday, this is a cause of electrification, and upon the alleged phenomenon Prof. Spring has founded a theory of the origin of thunderstorms. Landerer thought he had heard sounds in the telephone due to condensation of moisture on the line wires. Kalischer has in vain repeated the experiment. He has also examined, by means of the quadrant electrometer, whether any such electrification could be observed from the deposit of moisture upon the surface of a vessel containing ice or some artificial cooling mixture. The whole of the results were negative.

AMONGST the many recent suggestions for primary batteries is one due to MM. Lalonde and Chaperon, in which oxide of copper is used as a depolarising agent. The oxide, in powder, is placed in or on a sheet of copper or iron. The positive element is zinc, and the exciting liquid caustic potash. A zincate of potash is formed by the solution of the zinc. The cell is absolutely inactive when the circuit is open. When closed, the current is remarkably constant. According to Hospitalier, the electromotive force is 0.98 volt. It must of course be closed from the air, to prevent absorption of carbonic acid by the potash. The reduced copper is reoxidised by simple exposure to the air.

IN a series of studies on the copper voltameter, published in the *Repertorium der Physik* by Dr. H. Hammerl, the following conclusions are formulated:—1. The material condition of the surface of the electrode, that is to say, whether it is covered with a bright copper film or not, has no influence on the amount of the deposit. 2. The changes of concentration of the copper solution, brought about in the voltameter by the current itself, cannot be sufficiently prevented by stirring. 3. Heating the fluid to boiling causes the deposit to come down almost completely in the state of cuprous oxide: it is partially oxidised even at temperatures between 40° and 60° C. 4. The greatest permissible strength of current, for which the deposit may be safely assumed to be a measure of the current, is about 7 amperes per square decimetre of the cathode surface.

THE EVIDENCE FOR EVOLUTION IN THE HISTORY OF THE EXTINCT MAMMALIA¹

THE subject to which I wish to call your attention this morning requires neither preface nor apology, as it is one with the discussion of which you are perfectly familiar. My object in bringing it before the general session of the Association was in view of the fact that you were all familiar with it in a general way, and that it probably interests the members of sections which do not pursue the special branch to which it refers, as well as those which do; also, since it has been brought before us in various public addresses for many years during the meetings of this Association, I thought it might be well to be introduced at this meeting of this Association, in order that we might not omit to have all the sides of this interesting question presented.

The interests which are involved in it are large: they are chiefly, however, of a mental and metaphysical character; they do not refer so much to industrial and practical interests, nor do they involve questions of applied science. They involve, however, questions of opinion, questions of belief, questions which affect human happiness, I venture to say, even more than questions of applied science; certainly, which affect the happiness of the higher grades of men and women more than food or clothing, because they relate to the states of our mind, explaining as they do the reasons of our relations to our fellow-beings and to all things by which we are surrounded, and the general system of the forces by which we are surrounded. So it has always appeared to me: hence I have selected the department of biology, and have taken a great interest in this aspect of it.

¹ A lecture by Prof. E. D. Cope of Philadelphia, given in general session before the American Association for Advancement of Science at Minneapolis, August 20, 1883. Stenographically reported for *Science*.