

only a uniform brilliant brightness, the centre of which was the spot at which the sun had gone down; other evenings the sun shot rays like long fingers, of a darker colour, athwart the glow, and in one evening the change of the light and darker colours of the evening red were like the incessant wavings of the folds of a perpendicular curtain. The effect of the phenomenon on the ignorant and superstitious inhabitants of Seoul, was of more immediate importance to the writer and his companions than its scientific aspects. They regarded it as a sign of trouble, war, and misfortune. Heavy rain which fell soon after averted any disaster from this cause.

A COMMISSION has been nominated by the President of the French Republic to investigate the archæology of Tunis, and report on the best method of preserving the ancient monuments of that country. A considerable number of specially-qualified French scholars have been appointed, and M. Ernest Renan has been named President of the Commission.

A SARCOPHAGUS with four face-urns has been recently found at Garzigar, near Köslin (Pomerania), and has been sent to the Antiquarian Provincial Museum of the Pomeranian Antiquarian Society at Stettin. A similar discovery was made last year at Klein Barkow (another Pomeranian village). Round one of the urns there was placed a bronze necklace, consisting of a stout bronze wire supporting eight so-called spectacle-spirals as ornaments. Prof. Berndt has proved in his work on Pomeranian face-urns, that they are really of Greek origin, dating from about the years 100 or 200 B.C., when Greek agents or factors went to live on the shores of the Baltic in order to trade with their home country in amber, furs, &c. Prof. Lindenschmidt (Mayence) and Dr. Schliemann indorse this opinion.

THE Imperial Japanese Meteorological Observatory has (according to the *Japan Mail*) issued a volume containing a series of monthly weather summaries for the months March to December 1883, each summary being accompanied by a map. The first weather map in Japan was issued on March 1, 1883, and the compilation therefore begins with that month. The greater part of the issue is occupied by twenty maps, indicating the tracks of centres of areas respectively of high and low barometers for the ten months dealt with, copious notes prepared from the daily telegrams being also furnished. For each month there is given the number of areas of high and of low barometer, with a short synopsis of the course of each, the place and date of highest and lowest temperature and barometric pressure, the number of gales, heavy gales, and hurricanes reported, with their localities, the occasions on which rain or snow fell, and the number of warnings issued. Lists are also given of the light-houses from which gales were reported. These summaries are followed by monthly meteorological tables and illustrative maps, commencing two months earlier, and extending therefore over the whole of the year 1883. In these we find the mean temperature, mean pressure, altitude and rainfall for each month at twenty-two stations, and at the end there is a similarly prepared table for the whole year. The series closes with maps indicating by different degrees of shading the rainfall over the various parts of the empire during the twelve months, the aggregate rainfall for the year being shown by similar means in a final map.

At the meeting of the Royal Physical Society of Edinburgh, held on December 17, the following office-bearers were elected:—Presidents: Benjamin N. Peach, F.R.S.E., John A. Harvie-Brown, F.R.S.E., Rev. Prof. John Duns, F.R.S.E.; Secretary: Robert Gray, V.P.R.S.E.; Assistant Secretary: John Gibson; Treasurer: Charles Prentice, F.R.S.E.; Hon. Librarian: R. Sydney Marsden, F.R.S.E.; Council: Patrick Geddes, F.R.S.E., Frank E. Beddard, F.R.S.E., Johnson Symington, F.R.C.S.E., Andrew Moffat, John Hunter, F.C.S., Robert Kidston, F.G.S., A. B. Herbert, William Evans Hoyle,

M.R.C.S., F.R.S.E., Prof. James Geikie, F.R.S., Prof. J. Cossar Ewart, F.R.S.E., G. Sims Woodhead, F.R.C.P.E., Hugh Miller, F.G.S.

WE have received the October number of the *Proceedings* of the Boston Society of Natural History. It contains a continuation of Mr. Crosby's paper, meeting the objections advanced by Dr. Wadsworth against the author's views of the stratigraphy of the Boston Basin. It also contains a description, by Q. E. Dickerman and Dr. M. E. Wadsworth, of an olivine-bearing diabase, from St. George, Maine; as also the beginning of a paper by Thos. T. Bouvé, on the genesis of the Boston Basin and its rock-formation.

MESSRS. MACMILLAN AND CO. will very shortly publish a translation of the work of Dr. Hertel of Copenhagen on Over-Pressure in Middle-Class Schools in Denmark, with an introduction by Dr. Crichton Browne.

THE additions to the Zoological Society's Gardens during the past week include an Indian Civet (*Viverricula malaccensis*) from India, presented by Mr. W. Getty; a Bengalese Cat (*Felis bengalensis*) from India, presented by Mr. G. T. Egan; a Grey Parrot (*Psittacus erithacus*) from West Africa, presented by Mrs. Whitclow; a Kestrel (*Tinnunculus alaudarius*), a Sparrow Hawk (*Accipiter nisus*), British, presented by Mr. T. E. Gunn; a Broad-fronted Crocodile (*Crocodilus frontatus*), a Nilotic Crocodile (*Crocodilus vulgaris*) from West Africa, presented by Mr. J. M. Harris; an Undulated Grass Parrakeet (*Melopsittacus undulatus*) from Australia, deposited; two Golden-winged Woodpeckers (*Colaptes auratus*), a Blue Jay (*Cyanocitta cristata*) from North America, a Black-tailed Hawfinch (*Coccothraustes melanurus*) from Japan, two Red-headed Finches (*Amadina erythrocephala*) from South Africa, two Banded Parrakeets (*Palaornis fasciatus*), from India, received in exchange.

#### PHYSICAL NOTES

SEVERAL new primary batteries are in the field, and there are more to come. An iron cell invented by Dr. Pabst of Stettin is finding great favour in Germany. Its electrodes are carbon and wrought iron dipping into a solution of ferric chloride. It is practically unpolarisable and self-regenerating. It works at the expense of iron and of the oxygen of the air, which is absorbed into the liquid, whilst ferric oxide is deposited at the bottom of the cell. Its electromotive force is about  $\cdot 78$  of a volt. The Pabst cell ought to prove of value for domestic electric lighting, as its internal resistance is low and its constancy remarkable.

ANOTHER primary cell has the peculiarity that the element consumed in the liquid is carbon. In this cell—the invention of Profs. Bartoli and Papanogli—the electrodes are platinum, and a compacted mixture of retort coke and Ceylonese graphite. The exciting liquid is hypochlorite of soda. The electromotive force is, however, only  $\cdot 2$  of a volt at the most.

M. JABLOCHKOFF announces another battery of great scientific interest. A small rod of sodium weighing about 8 grammes is squeezed into contact with an amalgamated copper wire and flattened. It is wrapped in tissue paper and then damped with three wooden pegs against a plate of very porous carbon. This completes the element. The moisture of the air settles on the oxidised surface of the sodium. It works without any other liquid. The E.M.F. is 2·5 volts, but the resistance is as great as 25 ohms.

M. LAZARE WEILLER has shown that the phosphide of tin, drawn into wires, possesses a higher electric conductivity than platinum or iron.

M. EMILE REYNIER has made some very interesting experiments on the maxima and minima electromotive forces obtained from cells of one electrolyte. For this purpose he constructed two cells, one for determining the maxima and one for determining the minima electromotive forces. His maximum cell consists in giving the positive electrode as large a surface as possible—about 30 square decimetres—while the negative electrode consisted of a wire of 3 mm. diameter. The positive electrode was bent round

in the form of a sharply corrugated circle, and the negative electrode was placed in the centre, so that the resistance should be low, it varied from 2 to 4 ohms according to the liquid used. The E.M.F. was practically constant during its determination, as the current drawn from the cell was only about 0.01 ampere. The minimum cell was of similar form to the maximum, only the positive electrode was in the centre and was a wire of about 0.5 mm. diameter, and the negative electrode was in the form of a cylinder. By using cells of these forms he was able easily to change either of the electrodes or the electrolyte. The method of determining the minima electromotive forces was to short-circuit the cell for several hours, and immediately on opening the circuit to determine the E.M.F. The following are some of the results that he obtained with an electrolyte of acidulated water, 2 parts in 1000 being sulphuric acid:—

	Electrodes		E. M. F. in volts	
	Negative	Positive	Maxima	Minima
Zinc, ordinary ...	Carbon	Carbon	1.22	0.04
„ amalgamated ...	Carbon	Carbon	1.26	0.226
„ ordinary ...	Lead	Lead	0.55	0.144
„ amalgamated ...	Lead	Lead	0.684	0.152
„ ordinary ...	Copper	Copper	0.94	0.194
„ amalgamated ...	Copper	Copper	1.072	0.272
„ ordinary ...	Iron	Iron	0.429	0.309
„ amalgamated ...	Iron	Iron	0.476	0.323
Iron „ „	Zinc, ordinary	—	—	< 0.09
Iron „ „	Copper	Copper	0.49 to 0.51	—

AN experimental reproduction on the screen of the phenomenon of the solar halo has been recently brought before the Physical Society of Paris by M. Cornu. M. Cornu also discussed the phenomenon of the pink corona which has been visible around the sun during the past few months. He thinks it has its seat in the atmosphere at an elevation considerably higher than the level of the cirrus clouds which give the common ring-halo of 22°. According to M. Cornu the polarisation of the sky has been “profoundly modified” by the present phenomenon, especially when viewed through red glass.

SIGNOR A. RICCO sends us a lengthy memoir on a new form of electro-magnet invented by him. It consists of a sheet of iron rolled into a spiral round an iron core, the convolutions being separated by oiled paper. The current traverses the coiled sheet, which thereby becomes powerfully magnetised. A spiral of forty turns of insulated copper wire is added outside. The lifting power of this magnet appears to be very great in proportion to its weight.

A PAMPHLET on the system of simultaneous telephony and telegraphy invented by F. van Rysselberghe has lately appeared from the pen of M. Ch. Mourlon, secretary of the Société belge d'Electriciens.

DR. E. VON FLEISCHL recently communicated to the Viennese Academy a paper on the double-refraction of light in liquids. Concentrated solutions of tartaric acid and of various sugars were employed, also certain active oils, in a compound hollow prism resembling a Fresnel's quartz combination in its general disposition. The research proves the existence of doubly-refracting liquids; but they possess no optic axis. The wave-surfaces are in every case two concentric spheres.

### CHEMICAL NOTES

ATTENTION was lately drawn in these Notes to Schiff's recent researches on the connections between the capillary coefficients of various liquid carbon compounds and the structure of the molecules of these compounds (see also NATURE, vol. xxx. p. 618). The same subject has very recently been examined by J. Traube (*Ber.* xvii. 2294). Traube thinks that the differences between the various capillary elevations observed by Schiff are too small to allow of trustworthy conclusions being drawn: he has therefore undertaken a series of observations with aqueous solutions of various classes of carbon compounds. Inasmuch as the capillary elevation of water in a tube of 34 mm. radius is about 41.5 mm., while that of most liquid carbon compounds does not exceed 25 mm., Traube concluded that there will probably be well-marked differences between the capillary elevations of aqueous solutions, and mixtures of aqueous solutions, of definite concentration, of various compounds of carbon. The height in capillary tubes was determined for each solution for varying degrees of concentration, and the results are stated for

equal weights of compounds in equal volumes of solution. From these results Traube draws the conclusions:—(1) The capillary elevation of the solution of a compound decreases as concentration increases; the differences of elevation are not equal for equal increases in concentration. (2) The capillary elevations decrease in a homologous series of carbon compounds as molecular weight increases. (3) Isomeric compounds in solutions of equal concentration do not always exhibit equal capillary elevations. Schiff's generalisation, that the number of molecules of isomerides raised by capillary action is equal, does not hold good for aqueous solutions of isomerides. As in Traube's experiments the liquids examined were of equal concentration, it follows that the ratios of the capillary elevations are equal to the ratios of the masses of the dissolved compounds raised in the capillary tubes. Calling the capillary elevation  $h$ , and the specific gravity of the solution  $s$ , Traube considers the product  $hs$ , which he calls the capillary coefficient of the solution. The value of  $h$  is conditioned by the chemical constitution of the compounds examined. If  $m$  = molecular weight of compound in solution, then the difference between  $\frac{h}{m}$  for solutions of two compounds, within certain limits of concentration, is a constant which depends only on the relative concentrations of the two solutions. The values of  $\frac{h}{m}$  for an homologous series, dealing with solutions containing equal masses of the compounds in equal volumes, are referred to the value of  $\frac{h}{m}$  for the first member of the series, and the

differences thus obtained, when calculated for a tube 1 mm. radius, are called the *specific capillary constants* of the compounds in the series. The values of this quantity are almost wholly dependent on the nature of the solution, perhaps only on the nature of the dissolved substance, and are independent, within certain limits, for each homologous series, of the absolute concentration of the solutions, and are scarcely, if at all, dependent on temperature. Traube thinks he is justified from his experimental results in concluding that the differences between the capillary elevations of the solutions of two analogous compounds are in the same ratio as the molecular weights of the compounds. Thus, let  $h_a$  and  $h_{a_1}$  represent the capillary elevations of two solutions, of different concentrations, of the compound with molecular weight  $m$ ; and let  $h_\beta$  and  $h_{\beta_1}$  represent the capillary elevations of two solutions, of the same concentration as those of the former compound, of an analogous compound with molecular weight  $m_1$ . Then, according to Traube,

$$\frac{h_a}{m} - \frac{h_{a_1}}{m_1} = \frac{h_\beta}{m} - \frac{h_{\beta_1}}{m_1};$$

therefore

$$\frac{h_a - h_{a_1}}{h_\beta - h_{\beta_1}} = \frac{m}{m_1}.$$

If, therefore,  $h_a$ ,  $h_{a_1}$ , &c., are determined, the ratio  $\frac{m}{m_1}$  can be found; and if  $m$  is known, the value of the molecular weight of the second compound ( $m_1$ ) can be calculated.

### GEOGRAPHICAL NOTES

WE are glad to see that at last there is some probability of the almost unknown but certainly interesting country of Tibet being opened up to outsiders. We know the frequent but unsuccessful efforts which Prjevalsky and others have been recently making to penetrate to Lassa. But now the *Times* Calcutta correspondent informs us that the Regent of the Tashu Lama at Shigatze has sent a most cordial reply to the letter which Mr. Macaulay despatched to him from the frontier through the agency of the Governor of Kambajong, and has also addressed a letter to the Viceroy. With these letters, besides the silk scarves which ordinarily accompany Tibetan correspondence, the correspondent understands he has sent some relics of the late Tashu Lama himself, and has asked Mr. Macaulay to send him a Tibetan-English dictionary and phrase-book and some scientific instruments. This is the first official communication received from Tibet for about a hundred years. The correspondent suggests that the Government should put our relations on a firm footing by sending at once a friendly mission in connection with the identification which takes place this year of the infant in whom Tashu Lama is supposed to have been born again.