The following maps, published by the Military Commissariat, deserves also a short notice:—A map of European Russia, showing for each government the surplus, or the want of, rye raised within the government, as also its price, which map leads to very interesting geographical conclusions; a map showing the average crops proportionately to the population; and a map of the sheep-breeding in Russia.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—The first award of the Smith's Prizes under the new regulations has been made. They are now given to the Bachelors of Arts who send in the best essays on any subject in Mathematics or Natural Philosophy before the end of the Lent Term in the second year after each Mathematical Tripos. Thus the competitors this year took their degree in the Mathematical Tripos of 1883–84. The Smith's Prizes this year are awarded to two essays declared equal in merit, viz. that of Mr. H. E. G. Gallop, Fellow of Trinity College, Second Wrangler in 1883, 1st Division in Part III., 1884, subject, "The Distribution of Electricity on the Circular Disk and Spherical Bowl"; and that of Mr. R. Lachlan, Fellow of Trinity College, 3rd Wrangler, 1883, 1st Division in Part III., 1884, subject "Systems of Circles." It is further announced that the essay by Mr. C. Chree, Fellow of King's College, on "Elastic Solids," and that of Mr. A. N. Whitehead, Fellow of Trinity College, on the "General Equations of Hydrodynamics," deserved honourable mention.

The Special Board for Medicine have reported in favour of the immediate appointment of a Demonstrator of Pathology, with a stipend of 100*l.* a year, to assist Prof. Roy, who now gives systematic lectures three times a week, conducts a practical course for two hours twice a week, and undertakes the autopsies at Addenbrooke's Hospital.

The Chemical Laboratory Syndicate have recommended the acceptance of Messrs. Bull, Sons, and Co.'s tender (Southampton) for 19,300*l.*

The following appointments to Syndicates and Boards have been made:—

Botanic Garden: Messrs. A. H. Cooke and W. Gardiner.
University Library: Prof. A. Macalister.
Museums and Lecture Rooms: Messrs. E. H. Morgan and R. T. Caldwell.
Local Examinations: Mr. J. W. Hicks.
Observatory: Dr. Routh and Mr. J. Larmor.
University Press: Prof. A. Macalister.
State Medicine: Prof. Latham and Dr. D. McAlister.
Mathematics: Dr. Routh.
Physics and Chemistry: Mr. C. Trotter.
Biology and Geology: Mr. W. Gardiner.

Great opposition has been given to the new proposals as to the additional subjects of the Previous Examination required of candidates for honours. As Mr. Oscar Browning said, "dealing with this subject seemed to cast an evil influence over every one who takes it in hand." The fact is the University, containing strong elements attached to and connected with the Public School system, refuses to boldly grasp the nettle and introduce English, Modern Languages, or Physical Science into its schemes for the Ordinary Preliminary Examination, and finds itself consequently in endless difficulties whenever it touches the question.

IN addition to the practical instruction in Biology (Zoology and Botany), in preparation for the Preliminary Scientific and B.Sc. Examinations at the University of London, which we have already announced as being given at Bedford (Ladies') College, York Place, Baker Street, we are informed that a class in Geology and Physical Geography has now been formed, in accordance with the requirements of the University, and that it will be conducted by Miss Mary Forster.

SOCIETIES AND ACADEMIES

LONDON

Chemical Society, November 5.—Dr. Hugo Müller, F.R.S., President, in the chair.—Mr. Leonard de Koningh was admitted a Fellow of the Society.—The following papers were read:—The influence of silicon on the properties of cast. iron, part 2, by Thomas Turner, Assoc. R.S.M.—Modifications of double sulphates, by Spencer Umfreville Pickering, M.A.—The relation of diazobenzene-anilide to amidoazobenzene, by R. J. Friswell and A. Green.—An examination of the phenol constituents of blast-furnace tar obtained by the Alexander and McCosh process at the Gartsherrie Iron Works, part 1, by Watson Smith, J. F. H. Coutts, and H. E. Brothers.—The decomposition of potassium chlorate by heat, by Frank L. Teed, F.C.S. Note on the refractive power of metacinname (metastyrole), by H. G. Madan, M.A., F.C.S.

Zoological Society, November 17.—Prof. W. H. Flower, F.R.S., President, in the chair.—The Secretary exhibited to the meeting two curious Millipedes, believed to be *Spirostreptus annulipes*, which had been sent home from the Cape by Mr. Fisk for the Insect House.—An extract was read from a letter addressed to the Secretary by Major S. W. Yerbury, respecting the exact locality of a Chameleon (*Chamæleon calcarifer*) presented to the Society by that gentleman in June, 1885. Major Yerbury had obtained this specimen near Aden.—Mr. Sclater exhibited and made remarks upon two Newts (*Molge vittata*) transmitted to the Society by Dr. E. B. Dickson, of Constantinople, C.M.Z.S., by whom they had been obtained from Brussa, Asia Minor.—Mr. H. E. Dresser exhibited and made remarks on a female specimen of the Kildeer Plover (*Ægialitis vocifera*), killed, in January, 1885, by Mr. Jenkinson on the Scilly Isles; and a young female Desert-Chat (*Saxicola deserti*) obtained near Spurn Head, Lincolnshire, in October, 1885.—Prof. F. Jeffrey Bell exhibited and gave an account of a specimen of a species of *Balanoglossus* obtained by Mr. Spencer at Herm, Channel Islands, being the first recorded instance of the occurrence of this Hemichordate in any part of the British seas.—Mr. F. E. Beddard read the first of a proposed series of notes on the visceral anatomy of birds. The present paper treated of the so-called omentum of birds and its homologies. It was pointed out that this structure, present in many birds, but apparently absent, or only present in rudiment, in a few others, was represented by a structure having similar relations in the Crocodile, but in no other reptile.—Mr. Oldfield Thomas read a description of *Heterocephalus phillipsi*, an extremely remarkable burrowing Rodent from Somali-land, belonging to a genus of which the only other known species was based upon a single specimen obtained by Rüppell's collector in Schoa. Mr. Thomas considered the affinities of this Rodent to be with *Georychus* and *Bathyergus*.—Mr. Sclater read a paper containing a description of an apparently new species of Tanager of the genus *Calliste*, based on a specimen formerly in the Gould Collection, now in the British Museum. Mr. Sclater proposed to dedicate this bird to its former owner as *Calliste gouldi*.—Mr. Boulenger gave the description of a new frog from Perak, Malacca, which he proposed to name *Megalophrys longipes*.

Physical Society, November 14.—Prof. Guthrie, President, in the chair.—Mr. G. M. Whipple described and demonstrated experimentally the process of testing thermometers at and near the melting-point of mercury, as carried on at Kew. About 20 lbs. of mercury are poured into a wooden bowl and frozen by carbonic-acid-snow and ether; the mercury is stirred with a wooden stirrer, and the snow is added till the experimenter feels, by the resistance to stirring, that the mercury is freezing. The stirring is continued for some time, which causes the mercury to become granular instead of a solid mass. The thermometers are then inserted, together with a standard, and compared. About 100 mercury or 40 spirit thermometers can be thus examined in half an hour, using about 200 gallons of carbonic acid gas compressed sufficiently to form the snow. The bowl, ether, and mercury are cooled first to −10° C. by an ordinary freezing-mixture. The average correction at the melting-point of mercury is now less than 1° F.; when the process was introduced in 1872 it amounted to 5°, but has steadily decreased.—On the electromotive force of certain tin cells, by Mr. E. J. Herroun. Mr. Herroun has examined the electromotive forces of cells in which tin in a solution of its salts was opposed to copper, cadmium, and zinc in solutions of their corresponding salts, the solutions being of equal molecular strengths. The salts used were sulphates, chlorides, and iodides, and the cells were of the ordinary "Daniel" form, with a porous vessel. To prevent the formation of basic salts it was necessary to add a little free acid to the solution of the tin salt, and, to counterbalance the influence of this acid upon the E.M.F. as far as possible, an equal proportion of free acid was added to the other

solution. Prof. G. Minchin pointed out the importance of performing these and similar experiments upon tin in the dark, as, by allowing light to fall upon the tin plate, a considerable photo-electric effect would be obtained. Prof. Fleming insisted upon the great importance of temperature corrections in all experiments upon two-fluid cells.—On the law of the electro-magnet and the law of the dynamo, by Prof. S. P. Thompson. It cannot be said up to now that any particular law has been generally accepted, giving the relation between the current in the coils of an electro-magnet and the magnetism induced by it in the core. Many empirical formulæ have been given, most of which are entirely wrong. One, however, recently enunciated by Fröhlich, gives a relation which agrees very closely with observed values. This formula is—

$$m = \frac{i}{a + bi},$$

where m is the magnetic moment of the core, i the current, and a and b constants depending upon the geometrical form of the magnet, and the nature and previous history of the iron core. Fröhlich obtained this relation by experimenting with a series-dynamo. It is purely empirical, but since it agrees so well with the facts as to give values for the magnetism of the core agreeing almost within experimental error with those observed, there is great probability of some law being at its base. And this law Prof. Thompson believes to be one that was stated years ago by Lamont:—"The magnetic permeability varies with the quantity of magnetism the iron is capable of taking up." This may be expressed by the formula—

$$\frac{dm}{di} = k(M - m.)$$

Integrating which and expanding e^{-ki} in powers of i—

$$m = Mki\left\{1 - \frac{ki}{2} + \frac{k^2 i^2}{6} \cdots\right\}.$$

Expanding Fröhlich's equation, in powers of i, we get—

$$m = \frac{i}{a}\left\{1 - \frac{bi}{a} + \frac{b^2 i^2}{a^2} - \quad \cdot\right\}.$$

If ki is not great these expressions will coincide in form very closely, and the results lead Prof. Thompson to accept Lamont's expression as being that of a real physical law. Prof. Perry suggested that Lamont's law gave good results from its being an approximation to Weber's theory of induced magnetism, but Prof. Thompson maintained that it represented observed facts better than that theory, which, as developed by Maxwell, shows a decided discontinuity in the process of magnetisation not actually observed. Prof. Fleming remarked upon the similarity of Fröhlich's expression to that for the current through a voltameter; the part $a + bi$ corresponding to the apparent resistance, which may be considered in this case as the resistance to magnetisation of the core-air circuit, and which, like that of the voltameter, varies with the current.

Geological Society, November 4.—Prof. T. G. Bonney, F.R.S., President, in the chair.—Dr. A. G. Nathorst, of Stockholm, was elected a Foreign Correspondent of the Society.—The following communications were read:—On the premaxillaries and scalpriform teeth of a large extinct wombat (*Phascolomys curvirostris*, Ow.), by Sir Richard Owen, K.C.B., F.R.S. The specimen described in this paper is a cast from a fossil discovered in a late exploration of the Wellington bone-caves, and sent to the author with some other casts from the same collection by the authorities of the Australian Museum, Sydney, New South Wales. The fragments in question consist of the premaxillary bones, containing a pair of scalpriform incisors, 160 mm. (6½ inches) long, measured along the outer curve. The teeth and the fragments of bone in which they are implanted were described in detail, and referred to the wombat family. The animal to which they belonged must have been somewhat larger than *Phascolomys medius*, Owen, but less than the type of the sub-genus *Phascolomys*. The specific name is suggested by the chief characters that distinguish the present form from any hitherto known, recent or extinct.—On the structure and classificatory position of some Madreporaria from the secondary strata of England and South Wales, by Prof. P. Martin Duncan, F.R.S. This paper consisted chiefly of a criticism of the conclusions arrived at by Mr. R. F. Tomes in various papers communicated to the Society.—On the *Astrocœniæ* of the Sutton Stone of the Infra-Lias of South Wales, by Prof. P. Martin Duncan, F.R.S.

Anthropological Institute, November 10.—Mr. F. Galton, F.R.S., President, in the chair.—The following elections were announced:—Prince Roland Bonaparte, Hon. Member; Dr. A. Asher, Dr. Alexander Bain, and Messrs. C. F. Clarke, J. W. Crombie, T. H. Edwards, P. Norman, and E. Tregear, as Ordinary Members.—This being the first meeting of the Session, the President made some opening remarks, in the course of which he congratulated the Institute upon the obvious increase of public interest in the science of man. Besides the gratifying facts that more new members are joining the Institute and that the corresponding Section of the British Association was popular, there are such evidences as that the authorities of Trinity College, Cambridge, have extended the tenure of one of their Fellowships to enable its holder to pursue his anthropological studies, and that at the meeting of the British Association at Aberdeen it was the Rector of the University, Dr. Bain, who contributed one of the most thoughtful of the anthropological memoirs. Mr. Galton proceeded to insist upon the political value of anthropology as the science that best qualifies us to sympathise with other races and to regard them as kinsmen rather than as aliens.—A paper containing a short account of some experiments in testing the character of school children as observers, was read by Mrs. Bryant. In these experiments an attempt was made to read signs of character in an observer from the manner in which he makes an observation and describes it as made. From the written description of (1) a room, (2) a picture, which the children experimented upon were first shown and then required to describe, a rough diagnosis of their character as observers can be made, and hence some idea of their character generally is obtained, which, though very deficient in precision and still more deficient in certainty, may have, nevertheless, a real practical value for educational and other purposes. In the experiments made the most interesting points noticed were:—(1) great variety in the proportions existing between the sensational and intellectual factors of perception; (2) the occasional prevalence of the tendency to substitute feeling for thinking, which is a very characteristic feature of general character where it exists; (3) varieties in degree and kind of orderliness; (4) differences in the degree of colour-interest, as also of interest in form and number; (5) great variety in degree and kind of imaginative play, as shown in the efforts of constructive explanation required to describe a picture.—Mr. Joseph Jacobs then read a paper entitled "A Comparative Estimate of Jewish Ability." In it he applied the same method to Jews and Scotchmen as Mr. Galton had applied to Englishmen in his "Hereditary Genius," with results favourable to the two former races in the order mentioned. The subjects in which Jews seemed to show superior ability were philology, music, metaphysics, and finance.

Royal Meteorological Society, November 18.—Mr. R. H. Scott, F.R.S., President, in the chair.—Messrs. T. R. H. Clunn, R. S. Davies, B.A., H. C. Fox, M.R.C.S., W. E. Jackson, J. Richardson, M.Inst.C.E., F.G.S., A. L. Rotch, and C. Todd, C.M.G., were elected Fellows of the Society.—The following papers were read:—The Helm wind of August 19, 1885, by William Marriott, F.R.Met.Soc. This wind is peculiar to the Cross Fell range, Cumberland, and is quite local, but very destructive. The chief features of the phenomenon are the following:—On certain occasions when the wind is from some easterly point, the helm suddenly forms. At first a heavy bank of cloud rests along the Cross Fell range, at times reaching some distance down the western slopes, and at others hovering above the summit; then at a distance of one or two miles from the foot of the Fell there appears a roll of cloud suspended in mid-air and parallel with the helm cloud: this is the helm bar. A cold wind rushes down the sides of the Fell and blows violently till it reaches a spot nearly underneath the helm bar, where it suddenly ceases. The space between the helm cloud and the bar is usually quite clear, blue sky being visible. At times, however, small portions of thin vaporous clouds are seen travelling from the helm cloud to the bar. The bar does not appear to extend further west than the River Eden. The author visited the district in August last, and was fortunate enough to witness a slight helm. He gives a detailed account of what he experienced, and also his observations on the temperature of the air at the summit and base of Cross Fell, the direction and force of the wind, the movement of the clouds, &c.—The typhoon origin of the weather over the British Isles during

the second half of October, 1882, by Henry Harries. The author shows, by means of daily charts, that a typhoon which originated near the Philippine Islands on September 27 passed over Japan and the Aleutian Archipelago, entering the United States on October 10. Crossing the Rocky Mountain range, it proceeded through the Northern States and Canada to Labrador and Davis Strait. In the Atlantic it was joined on the 18th by another disturbance which had come up from the Atlantic tropics, the junction of the two being followed by a cessation of progressive movement from the 19th to the 25th. During this period the severe gale which passed along our southern counties on the morning of the 24th was formed, its sudden arrival upsetting the Meteorological Office forecasts of the previous night. Observations are quoted showing that it would have been impossible for the Department to have been aware of its existence before about 3 a.m. of the 24th. Following in the wake of this storm the parent cyclone reached the French coast on the 27th, its advent being marked, as in Japan and America, by violent gales and extensive floods over the whole of Western and Central Europe and Algeria. The village of Grindelwald was destroyed, and in the Austrian Tyrol the damage caused by floods reached at least two millions sterling. Passing through France and the Netherlands the disturbance showed signs of exhaustion, and on November 1, in the Baltic, it quietly dispersed, after accomplishing a journey of over 16,000 miles in thirty-six days. This is the first storm which has been followed day by day from the Pacific to Europe.—Notes as to the principle and working of Jordan's photographic sunshine-recorder, by J. B. Jordan and F. Gaster, F.R.Met.Soc. This instrument consists of a cylindrical dark chamber, on the inside of which is placed a prepared slip of photographic paper. The direct ray of sunlight being admitted into this chamber by small apertures in the side, is received on the sensitised paper, and, travelling over it by reason of the earth's rotation, leaves a distinct trace of chemical action whenever the light is of sufficient intensity to show a definite shadow on a sun-dial. The cylinder is mounted on a stand with adjustments for latitude, &c. The record is fixed by simply immersing it in water for a few minutes. As this instrument records the actinic or chemical rays, it usually shows more sunshine than is obtained by the ordinary "burning" sunshine-recorder.

EDINBURGH

Mathematical Society, November 13.—Mr. George Thom, Vice-President, in the chair.—Sir William Thomson communicated a theorem in determinants, which was read by Dr. Muir. Mr. J. S. Mackay gave an account of the ancient methods for the duplication of the cube.—Mr. William Harvey contributed some geometrical notes.—Mr. A. J. G. Barclay read a paper on physical science in schools.—The following office-bearers were elected:—President: Dr. R. M. Ferguson; Vice-President: Mr. George Thom; Secretary: Mr. A. Y. Fraser; Treasurer: Mr. John Alison; Committee: Messrs. R. E. Allardice, A. J. G. Barclay, W. T. Macdonald, J. S. Mackay, Dr. Thomas Muir, Mr. William Peddie.

PARIS

Academy of Sciences, November 16.—M. Jurien de la Gravière in the chair.—Researches tending to show that the trigemini nerves contain, from the first, vaso-dilatator fibres, by M. Vulpian.—Obituary notice of the late W. B. Carpenter, Corresponding Member for the Section of Zoology, by M. A. Milne-Edwards.—Treatment of the vine by a mixture of lime and sulphate of copper: determination of the distribution of the copper on the plant, and its persistence in the fruit and must, by MM. Millardet and Gayon. From these researches it appears that most of the copper remains deposited on the leaves, the must containing extremely small quantities, and the wine only doubtful traces, or at most 0·1 gramme in 1000 litres.—Letter accompanying the presentation of a new edition of Ptolemy's "Optics," by M. Gilbert Govi.—On the irregular integrals of linear equations, by M. H. Poincare.—Dynamic effects produced by the passage of locomotive and carriage wheels at the junction of the rails, by M. A. Considère. It is shown that these effects constitute a new and important element in estimating the wear and tear of traffic on the metals of railways. Several experiments show that they are much more serious at the points of contact of the rails than had hitherto been supposed.—On the tension of saturated vapours, by M. E. Sarrau.—Theory of refrigerating mixtures, by M. A. Potier.—Theory of the flow of gases: adiabatic lines, by M. Marcellin Langlois.—On the theory of the receptor electro-magnetic telephone, by M. E. Mercadier.—Description of a new spectroscopic optometer, by M. Ch. V. Zenger. Besides its use in spectroscopic studies, this ingenious little instrument is expected to render great services to physiologists in determining the defective achromatism of the human eye and its variations with age.—Spectroscopic study of the flames of blast furnaces and of the Bessemer process, by M. Ch. V. Zenger.—On the numerical laws of the chemical equilibria, by M. H. Le Chatelier.—Fixation of free atmospheric nitrogen in cultivated ground, by M. H. Joulie.—Note on the physiological action of safranine, and of the crystallised sulfo de fuchsine used in colouring wines, by MM. P. Cazeneuve and R. Lépine. From various experiments made on dogs, pigs, and human subjects, the authors conclude that the fuchsine is a perfectly harmless substance without physiological or therapeutic interest, whereas safranine gives rises to serious toxic phenomena when injected into the veins in a solution of salt water containing 7 per cent. of this substance.—Note on the zymotic properties of charbon and some other kinds of virus, by M. S. Arloing.—Researches on the comparative anatomy of the chord of the tympanum in birds, by M. L. Magnien.—Note on the nerve centres of the cephalopods, by M. Vialleton.—Influence of the number of individuals in the same vessel, and of the form of the vessel on the development of the larvæ of the frog (*Rana esculenta*), by M. E. Yung. The author finds that the rapidity of development is in inverse ratio to the number of tadpoles in the vase, although the supply of food may be superabundant; also that the development is the more rapid the larger the diameter (and consequently of the surface exposed to the air) of the vessels.—Note on the respiration of leaves in the dark, by MM. Dehérain and Maquenne.—On the variations presented by the composition of the gases in the foliage of plants growing in the air, by M. J. Peyron.—Note on the floral polymorphism of aquatic ranunculi, by M. Louis Crié.—A study of the Quaternary deposits in the district of Perreux, east of Paris, by M. Emile Rivière.—Note on an experiment undertaken to determine the direction of the Atlantic currents, by the Prince of Monaco.—Observation of the crepuscular lights on November 2 and 16, in Paris, by M. A. Boillot.

BERLIN

Physical Society, October 23.—Prof. Neesen reported on the experiments he had made on sounding air columns, with the object of determining the relation of Kundt's dust-figures to the tone-pitch. By means of an electric tuning-fork, whose tone-pitch, through the imposition of weights, might be variously modified, the air was maintained in permanent vibration in a glass tube closed at the bottom by a membrane, and the intervals of the sand-ribs from each other measured. To further extend the scale of tone-pitches, rubbed pieces of wood were utilised as sources of sound. The very numerous measurements taken led to a negative result, no relation of the intervals of the ribs from each other to the tone-pitch could be established. On the other hand, however, the speaker succeeded in making some interesting observations of a different kind and prosecuting them to an important stage. He first established that the long-known wandering of the ribs in a permanently sounding tube stood in no demonstrable relation to the vibrations of the air, and in one and the same tube was found at one place directed one way, and at another place another way. Herr Dworzak's presentation of the matter, that this wandering of the ribs was induced by air-currents setting in at the wall of the tube in one direction, and at the middle in another, the speaker was unable to confirm. The cause of the wandering of the ribs could not be ascertained. On the subject of the origin of the ribs several observations had been made, at spots in the tube, namely, where the wanderings of the ribs issued in contrary directions, and where, accordingly, comparative rest obtained. Here, first, a cork sand granule was seen executing movements hither and thither, in which, shortly, ever more and more granules, and at last a whole series, took part. This layer of granules next began to roll up towards the sides, growing ever thicker in the process, and ending in the formation of a rib. The ribs further showed elevations of a character like to that of waterspouts, the branches of which, falling downwards, assumed the shape of whirls, and returned to the rib. On viewing them with intermittent light, these formations appeared at rest, when the number of light intermissions corresponded with the number of vibrations of the exciting sound. A

very interesting phenomenon was observed on taking the measurements of pressure in the sounding-tube. A narrow glass tube, open on both sides, with an oil index, the movements of which were observed, served as manometer. No displacement of the index was ever noticed, but out of the interior end of the manometrical tube there appeared to issue a current of air impelling the cork sand a long way. This current of air was stronger when the mouth of the narrow tube was conical than when it was cylindrical. The current of air was present both when the upper end of the tube was open and when it was closed, as also when the lower end turned towards the source of sound was diverted from it, in consequence of an incurvation. The current of air was finally identified at all points of the sounding-air column, but the intensity of the apparent air-current varied according as the lower end was in the belly or in the node of the tube, and according to its length. The maxima of the current were more pronounced than the minima. If the upper end were likewise in the sounding-tube, then was there a current from the manometrical tube forthcoming. The index in the manometer, however, remained persistently unmoved, a demonstration that in point of fact there was no actual current in the narrow tube. The strength of the apparent air-current might be measured by little mills, and when small radiometers with paper wings were introduced into the sounding-tube, they fell into very lively rotation. If instead of full paper wings the radiometers had small conical paper tubes, directed all alike, they rotated just as fast, and in just the same manner as did the other radiometers. When, however, one approached the node of the sounding-tube, the rotation became slower, ceased, assumed the contrary direction, in order, after further progress, to pause again, and next pass into the former lively rotation. The fast rotation of the sound radiometers Prof. Neesen explained as anemometrical movements which, as was known, were independent of the direction of the wind. The contrary movement of the tube radiometers in the node were explained as determined by the currents of air in the little tubes which had been observed in the manometers as stated above; they entered into the phenomena in which the vibratory movements were less. The attractions and repulsions produced by the sound appear to be based on similar processes.

Meteorological Society, November 3.—With reference to a recent publication of Dr. Lender, Prof. Spörer made some observations regarding the line of demarcation which must be drawn between meteorology and hygiene, and by way of illustration related a number of personal experiences gathered in the course of his stay in the tropics, pointing out how the explanation of them did not properly belong to the office of meteorology.—A paper on the brown ring and the solar eclipses, by Dr. Zenker, who was unable to be present, was read. The abnormal sunset glows which had appeared in the skies since the autumn of 1883 and the brown-red ring round the sun were still visible, though in reduced intensity. The fact that these phenomena were not earlier observed showed that they owed their existence to something novel which had been introduced into the atmosphere, and were not at all due to the presence of ice-crystals or globules of fog in the higher strata of the air. The fine particles giving rise to the reflex-phenomena in question might be of terrestrial or of cosmic origin. The first of these two assumptions had to contend with the facts that the dust concerned with the phenomena kept so long afloat that the constituent dust-particles were of a very different character from that of the Krakatão ashes, and that it was at very great altitudes that they appeared to be suspended. Against the second of these assumptions—that, namely, of their cosmic origin—there was the fact of the absence of metallic particles from the dust and also the fact that the dust was found occurring likewise in lower strata. No decision had yet been arrived at in the matter, and it was therefore of great importance to determine precisely the altitude of the dust-cloud floating above the earth. The measurements hitherto taken had yielded very different results. In this respect it was a most striking fact that on one and the same day in Steglitz, near Berlin, the height of the reflecting dust was calculated from the glowing phenomena at from 2 to 17 kilometres, while in Dresden the glow was observed the whole night; and that for the end of the astronomical twilight about midnight, on taking a single reflection, the height of the reflecting surface gave itself as equal to 900 kilometres, and, on taking a double reflection, showed a height of from 200 to 300 kilometres. Dr. Zenker suggested that on the occurrence of the next solar eclipses observations of the brown ring be made. For the zone of totality he calculated the formulæ for the exact determination of the height of the dust-cloud. These formulæ were not communicated, because the paper itself would shortly appear in the *Meteorologische Zeitschrift*. It was only briefly mentioned that if during the totality the whole of the brown-red ring were seen, a height of $6r$ would be the result, r being the diameter of the cone of shadow. An exact representation of the total solar eclipse in the year 1886, visible in America, and that of 1887, visible in Europe and Asia, was appended to the paper.—In the discussion which followed the reading of this paper Prof. von Bezold referred to the fact that the brown ring was very difficult of perception in the plain, being not at all visible in Berlin, for example; while even at a slight elevation it could be very beautifully observed. He further advised caution against the assumption that the brilliant sunset phenomena were something entirely new. He himself occasionally observed such phenomena as far back as 1863, though it was formerly not possible to awaken general interest in the spectacle as can now be done. Regarding the brown ring, too, he conjectured that it had been formerly seen, though attention had not been paid to it.

VIENNA

Imperial Academy of Sciences, July 9.—On some experiments made on total reflection and abnormal dispersion, by E. Mach and T. Arbes.—Experiments on electrical double-refraction of liquids, by G. Taumann.—On phenomena of absorption in crystals of zircon, by E. Linschmann.—On a mite (*Tarsonemus intectus*, n.sp.) living on man and corn, by L. Karpelles.—On the epithelium of the mouth of *Salamandra maculata*, by M. Holl.—On the determination of solubility of some salts in water at different temperatures, by G. A. Raupenstrauch.—On the botanical results of Dr. Polak's expedition to Persia in the year 1882, by O. Stapf.—On the development of chlorophyll-corpuscles, by K. Mikosch.—Determination of the orbit of the Kriemhild (242) planet, by N. Herz.—On rotation and precession of a liquid spheroid, by S. Oppenheim.

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