

Wiedemann's Annalen der Physik und Chemie, No. 12.—On the change of intensity of light polarised parallel to the plane of incidence by reflection on glass, by Paul Glan. The light reflected from a glass prism was compared with that of a petroleum flame by means of a polarising arrangement consisting of a doubly-refracting prism and a Nicoll, between which a Hofmann prism was placed in order to obtain a spectrum of the reflected light. For crown glass, the ratio of the intensity of the reflected to that of the incident light polarised in the plane of incidence ranged from 0.055 at 30° to 0.293 at 70°, the corresponding values for flint glass being 0.070 and 0.327.—Hydrodynamico acoustical investigations, by W. König. The turning moment exerted by a moving column of a fluid upon a disc suspended in it was subjected to experimental investigation, the torsion being balanced by a magnet. For very small velocities of the column of air employed the form of flow was uniform, but it was found impossible to keep it so in the case of any considerable velocities. The contemplated determination of all the dynamical conditions of Rayleigh's disc swinging in an organ pipe, and its application to the absolute measurement of sound intensities has not yet succeeded.—Experimental investigations concerning elastic longitudinal and torsional fatigue in metals, by Louis Austin. The wires experimented upon were 23 m. long, and were suspended in the tower of the Strassburg Physical Institute. It was found that longitudinal and torsional fatigue phenomena are subject to similar laws. The fatigue effects in copper, silver, and brass were, for torsion, as 7 : 3 : 2, and for tension, as 4 : 3 : 2 approximately.—On the properties of various modifications of silver, by H. Lütke.—On thermopiles made of electrolytes and unpolarisable electrodes, by A. Gockel.—On the magnetism of iron cylinders, by O. Grotrian.—On the passage of electric waves through layers of electrolyte, by G. Udry Yule.—On some modifications of the Thomson quadrant electrometer, by F. Himstedt.—A calibrated electro-dynamometer, by J. W. Giltay.—A new method of measuring self-potentials and induction coefficients of induction, by L. Grätz.

SOCIETIES AND ACADEMIES.

LONDON.

Chemical Society, December 7, 1893.—Dr. Armstrong, President, in the chair.—The following papers were read:—An apparatus for the extraction and estimation of the gases dissolved in water, by E. B. Truman.—The magnetic rotation of hydrogen chloride in different solvents, and also of sodium chloride and of chlorine, by W. H. Perkin. The author confirms his previous observations on this subject, and also shows that isoamyl oxide and hydrogen chloride do not appreciably interact. The magnetic rotation of hydrogen chloride in isoamyl oxide solution is 2.245, in alcoholic solution 3.324, and in aqueous solution 4.300. The magnetic rotations of sodium chloride and of chlorine were also determined.—Analysis of water from the Zem-Zem well in Mecca, by C. A. Mitchell. The author gives analyses of water obtained by the late Sir R. Burton from the holy well in Mecca.—The preparation and properties of bromolapachol, by S. C. Hooker. Bromolapachol is obtained by reducing dibromolapachone; when dissolved in sulphuric acid it yields bromo-β-lapachone. The latter is converted into bromo-α-lapachone by the action of hydrobromic acid, whilst the reverse change occurs on dissolving the α-isomeride in sulphuric acid.—Studies on citrazinic acid (Part ii.), by T. H. Easterfield and W. J. Sell.—The oxides of the elements and the periodic law, by R. M. Deeley. The author obtains a new periodic diagram by plotting the atomic weights of the elements against the numbers obtained on dividing the densities of the oxides by the atomic weights of the corresponding elements.—The freezing points of alloys in which the solvent is thallium, by C. T. Heycock and F. H. Neville. The mean depression of the freezing point by the addition of one atomic proportion of gold, silver, or platinum to one hundred atomic proportions of thallium is 6.31; the addition of lead to thallium, however, raises the freezing point.

Geological Society, December 20, 1893.—W. H. Hudleston, F.R.S., President, in the chair.—The following communications were read:—On the stratigraphical, lithological, and palæontological features of the Gosau beds of the Gosau district, in the Austrian Salzkammergut, by Herbert Kynaston. The author, after referring to the previous literature of the

subject, treated of the situation and physical aspects of the Gosau valley, the distribution of the Gosau beds, their stratigraphy, palæontology, and geological horizon, and the physical conditions under which they were deposited, and a comparison was instituted between the Gosau beds and the equivalent beds of other areas. He showed that Hippurites occur at two horizons in the Gosau beds—a hippurite-limestone immediately above the basement-conglomerate being characterised essentially by *Hippurites cornuvaccinum*, which is overlain by *Actæonella*- and *Nerinea*-limestones and an estuarine series, and above these was a second hippurite-limestone characterised essentially by *Hippurites organisans*. It was pointed out that Toucas similarly distinguishes two hippurite zones in Southern France, the lower, characterised essentially by *H. cornuvaccinum*, being placed by him at the top of the Turonian system, whilst the second, with *H. organisans*, is referred to the summit of the Senonian; and the author gave reasons for regarding the Gosau zones as the equivalents of those of the South of France, in which case the Gosau beds will represent the uppermost Turonian and the whole of the Senonian, i.e. the zones of *Holaster planus*, *Micraster*, *Marsupites*, and *Belemnitella mucronata* in England, whilst the upper unfossiliferous beds may be the equivalents of the Danian beds. The strata are, on the whole, of shallow-water origin, and were deposited in shallow bays in the Upper Cretaceous sea of Southern and Central Europe, on the northern flanks of the Eastern Alps. Probably towards the close of Upper Cretaceous times the southern area of the Gosau district was cut off from the sea to form a lake-basin in which the upper unfossiliferous series was deposited. Mr. W. Whitaker, Sir John Evans, and Prof. J. F. Blake spoke on the subject of the paper, and the author briefly replied.—Artesian boring at New Lodge, near Windsor Forest, Berks, by Prof. Edward Hull, F.R.S. The boring described in this paper was carried down from a level of about 220 feet above Ordnance datum through the following beds:—London Clay and Lower London Tertiaries, 214 feet; Chalk, 725 feet; Upper Greensand, 31 feet; Gault, 264 feet; Lower Greensand, 7 feet. The chalk was hard, and contained very little water; but on reaching the Lower Greensand the water rose in the borehole to a height of 7 feet from the surface. The author discussed the probability of the Lower Greensand yielding a plentiful water supply in the Windsor district. In the discussion that followed, the President said it was satisfactory to learn that there was an area near West London in which the Lower Greensand was full of water. He thought that the section exhibited by the author explained why it was full in that particular locality, for the rainfall about the extensive area of Hindhead, which lay nearly due south, must be considerable. Mr. W. J. Lewis Abbott and Mr. W. Whitaker also spoke, and the author replied.—Boring on the Booyen Estate, Witwatersrand, by D. Telford Edwards. An account was given of a boring on the Booyen estate, situated about two miles from Johannesburg, and about 5000 feet south of the nearest point of outcrop of the "Main Reef" of the Witwatersrand. The "Bird-Reefs" crop out generally at a distance of 4000 feet south of the Main Reef. The borehole, 1020 feet deep, passed through sandstones (often micaceous), quartzites, and conglomerates, the last-named having a collective thickness of 91 feet 7 inches, the two thickest reefs being respectively 26 and 22 feet thick. The dip of the beds was 35°. Traces of gold were obtained. All the reefs were highly mineralised, principally with iron pyrites, and belonged to the "Bird-Reef" series which overlies the Main Reef.

PARIS.

Academy of Sciences, December 26.—M. de Lacaze-Duthiers in the chair.—On the motion of Jupiter's fifth satellite, by M. F. Tisserand. A calculation of the displacement of the "perijove" of the fifth satellite due to the polar depression of Jupiter shows that it would amount to 882° per annum, or one revolution in nearly five months. It is hoped that powerful instruments will enable observers to verify this.—On the propagation of electricity, by M. H. Poincaré. Starting from the "telegraphists' equation," the author shows that when an electrical disturbance proceeds along a wire, the head of the disturbance moves with a velocity such that, in front of this head, the disturbance is nil, as in the case of light and of plane sound waves, with the difference, however, that the electric disturbance leaves behind a residue of finite magnitude.—Numerical verifications relating to the focal properties of plane diffraction

gratings, by M. A. Cornu. The verification of the theory of focal anomalies in gratings already published, by testing actual gratings showing such anomalies, was based upon the following theorem: When the observed pencils make a constant angle with the incident beam remaining fixed, half the sum of the azimuths of the grating corresponding to spectra of symmetric orders is constant, and equal to the azimuth corresponding to the reflected beam.—Remarks on the spontaneous heating and ignition of hay, by M. Berthelot. Hay dried and stacked under normal circumstances loses moisture and oxidises slowly, without being sensibly heated. The initial heating, where it takes place, is due to the action of ferments, but not the higher stages of the process. When the ferments are no longer capable of further raising the temperature without endangering their own existence, it often happens that purely chemical action steps in, and leads up to the ignition of the haystack. The temperature of ignition for these materials is far below red heat.—On the composition of winter drainage waters from bare and from cultivated soils, by M. P. P. Dehérain.—Observations of the minor planets 371 and 372 (1893) made with the great equatorial of the Bordeaux Observatory, by MM. G. Rayet and L. Picart.—The analysis of commercial butters, by M. C. Viollette.—On the approximate development of the disturbing function in the case of inequalities of higher orders, by M. M. Hamy.—Investigation of that part of the coronal atmosphere of the sun which is projected upon the disc, by M. H. Deslandres.—Is there oxygen in the sun's atmosphere? by H. Duner.—New applications of the tables of increasing latitudes to navigation, by M. E. Guyon.—On the successive radii of curvature of certain curves, by H. R. Godefroy.—Calculation of electro-magnetic forces, according to Maxwell's theory, by M. Vaschy.—On the diurnal variation of the tension of aqueous vapour, by M. Alfred Angot. The observations made at the top of the Eiffel Tower since the end of 1889 have shown that at the height of 300 m. the change of vapour tension during winter does not exceed a few hundredths of a mm. During the eight months beginning with March, a single maximum was observed during the day at 9 a.m., and a minimum at 5 p.m., while in the adjacent Parc Saint-Maur, there were two maxima, at 9 a.m. and 8 p.m., and two minima, at 4 a.m. and 4 p.m. It appears that the variation of vapour tension, as observed in ordinary meteorological stations, is a local phenomenon, limited to the lower strata of the atmosphere.—On the diurnal variation of atmospheric electricity, observed near the summit of the Eiffel Tower, by M. A. B. Chauveau. The indications of an electrometer registering photographically the potential of the air, lead to conclusions similar to those of the preceding paper. The two sets of maxima and minima observed on the ground are replaced by one set only, consisting of a maximum at about 6.30 p.m. and a minimum at 4 a.m. The potential, which sometimes exceeded 10,000 volts, was reduced to a convenient amount by the interposition of condensers in cascade.—On the weight of a litre of normal air, and the density of gases, by M. A. Leduc.—Sketch of a system of atomic weights of precision, founded upon the diamond as standard substance, by M. G. Hinrichs.—General method for the volumetric estimation of silver under any form, by M. G. Denigès.—On the stability in air of a 0.001 solution of corrosive sublimate, by M. Tanret.—Remarks on the critical pressures in the homologous series of organic chemistry, by M. E. Mathias.—On caseine and the organic phosphorus of caseine, by M. A. Béchamp.—On a new source of rhodinol, by MM. P. Monnet and Ph. Barbier.—Presence of camphene in essence of aspic, by M. G. Bouchardat.—On the volatile carbides of the essence of valerian, by M. Oliviero.—Contribution to the study of the ptomaines, by M. Echsner de Coninck.—Influence of certain causes upon receptivity; bacterian associations, by M. V. Gattier.—Toxicity of the blood of the viper (*Vipera aspis* L.).—Modifications of the emissive power of the skin under the influence of the electric brush discharge, by M. Lecerclé.—Influence of iron upon the vegetation of barley, by M. P. Petit.—Influence of bark-stripping upon the mechanical properties of wood, by M. E. Mer.—On the natural dessication of grains, by M. H. Coupin.—On the oolitic strata of the Paris Tertiary, by M. G. F. Dollfus.

BERLIN.

Physiological Society, December 8.—Prof. Munk, President, in the chair.—Prof. A. Kos-el gave an account of his further researches on nucleic acid, carried on in conjunction with Dr. Neumann. The acid, as obtained from the thymus, differs from that obtained from other sources, in that during its decomposition it yields only adenin; it has hence been dis-

tinguished as adenylic acid. It occurs in two forms: one readily soluble, the other soluble with difficulty. When boiled with water, this acid yielded a paranucleic acid, which contained no adenin. By boiling with dilute hydrochloric acid a fourth acid (thyminic) was obtained, from which crystalline thymin could be obtained. All the above well-characterised substances possess, when analysed, an extremely complex constitution; thus the molecule of adenylic acid contains 75 atoms of carbon, and that of paranucleic acid 90 atoms. Dr. H. Kossel had studied the action of nucleic acid on bacteria, and found that cholera-germs and streptococci are readily killed by small quantities of the acid; whereas anthrax germs are much more resistant. He therefore considered that the bactericidal action of lymph-cells was attributable, in part at least, to this action of nucleic acid.—Dr. Rawitz spoke on spermatogenesis in Hydromedusæ. Unlike all other animals, the spermatozoa in this animal are developed in the outer layer of the bell, and are discharged direct into the surrounding fluid. The same speaker further described curious large branching villi in the jejunum of Macacus, not met with in the intestine of other species of monkey.

BOOKS PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—The Canadian Ice Age: Sir J. W. Dawson (Montreal).—The Genus Salpa, 2 Vols., Text and Plates: Prof. W. K. Brooks (Baltimore).—The Butterflies and Moths of Teneriffe: A. E. H. White (L. Reeve).—Journal of Microscopy and Natural Science, Vol. 3, Third Series (Baillière).—Linnean Society of New South Wales, the Macleay Memorial Volume: edited by J. J. Fletcher (Dulau).

PAMPHLETS.—Origin of the Pennsylvania Anthracite: J. J. Stevenson (Rochester).—On the Use of the Name "Catskill": J. J. Stevenson (Rochester).—The Marsh Warbler, &c.: W. W. Fowler (Oxford, Blackwell).—On Technical Education in Glasgow and the West of Scotland: H. Dyer (Glasgow).—Imperial Institute Series, Handbooks of Commercial Products, Indian Section, Nos. 1-22, 24-25, 27-29 (Calcutta).—Guides to Commercial Collections, Indian Section, No. 1 (Calcutta).—Agricultural Ledger Series, Nos. 1-13 (Simla).

SERIALS.—Bulletin de l'Académie Royale des Sciences de Belgique, 63 Année, No. 11 (Bruxelles).—Journal de Physique, December (Paris).—Zeitschrift für Physikalische Chemie, xii. Band, 6 Heft (Leipzig).—Zeitschrift für Wissenschaftliche Zoologie, lvii. Band, 1 Heft (Leipzig).—Bulletins de la Société d'Anthropologie de Paris, December 15 (Paris).—Verhandlungen des Gesellschaft für Erdkunde zu Berlin, Band xx. Nos. 8 and 9 (Berlin).—Verhandlungen der Gesellschaft für Erdkunde zu Berlin, Band xxviii. No. 4 (Berlin).—American Naturalist, December (Philadelphia).—Journal of the Royal Agricultural Society of England, Third Series, vol. iv. part 4 (Murray).—L'Astronomie, January (Paris).—The Asclepiad, No. 39, vol. x. (Longmans).—Geological Magazine, January (K. Paul).—Séances de la Société Française de Physique, April-July, 1893 (Paris).

CONTENTS.

	PAGE
Recent Contributions to Meteorology	217
Physico-chemical Measurements. By J. W. Rodger	219
Our Book Shelf:—	
Cooke: "Handbook of British Hepaticæ."—	
C. H. W.	220
Lydekker: "The Royal Natural History"	220
Letters to the Editor:—	
The Origin of Lake Basins.—Dr. Alfred R. Wallace, F.R.S.; Sir Henry H. Howorth, K.C.I.E., M.P., F.R.S.	220
Hindoo Dwarfs.—Surgeon-Captain A. E. Grant.	221
Ewart's Investigations on Electric Fishes. By Prof. Gustav Fritsch	222
Navigation by Semi-Azimuths. By G.	223
Voices from Abroad. By Prof. Henry E. Armstrong, F.R.S.	225
The Effects of Light on Electrical Discharge. By W. W.	226
Neolithic Discoveries in Belgium. By J. E.	227
The Late Sir Samuel Baker	227
Notes	228
Our Astronomical Column:—	
Prizes at the Paris Academy	233
The Tail of Comet Brooks (<i>c</i> 1893)	233
The Planet Venus	233
Geographical Notes	233
New French Law for the Prevention of Forest Fires. By Prof. W. R. Fisher	233
Prize Subjects of the Paris Academy of Sciences	234
Science in the Magazines	235
The Rise of the Mammalia in North America. I. (With Diagram.) By Prof. H. F. Osborn	235
Scientific Serials	238
Societies and Academies	239
Books, Pamphlets, and Serials Received	240