prepare all the members in the following series, and, with the exception of Nos. 4 and 10, all of them have been isolated: (1) CsI_3, (2) $CsBrI_2$, (3) $CsBr_2I$, (4) $CsClI_2$, (5) CsClBrI, (6) $CsCl_2I$, (7) $CsBr_3$, (8) $CsClBr_2$, (9) $CsCl_2Br$, (10) $CsCl_3$. The characteristics of these compounds have been fully studied.—The law of elastic lengthening, by J. O. Thompson. The author has made an extended and thorough investigation on Hooke's law. The experiments were carried out at the Physical Institute of the University of Strassburg, with the advice and help of Prof. Kohlrausch. They lead to the following conclusions:—(1) The generally accepted law of elastic lengthening, $x = \alpha P$, according to which the lengthening x is proportional to the stretching weight P is only an approximation. (2) The relation between elastic extension and stretching weight can be expressed by an equation of the following form:—

$$\chi = \alpha P + \beta P^2 + \gamma P^3.$$

(3) The modulus of elasticity of the undeformed body can be calculated with the help of the equation

$$\left(\frac{d\chi}{dP}\right)_{P=0} = d.$$

(4) The true moduli of elasticity, calculated in this way, may be as much as 16 per cent. larger than those determined in the ordinary way. Consequently it will be necessary to recalculate physical constants which depend on the modulus of elasticity.—A method for the quantitative separation of strontium from calcium by the action of amyl alcohol on the nitrates, by P. E. Browning.—The relation of melting-point to pressure in case of igneous rock fusion, by C. Barus. From the experiments on diabase the relation of melting-point to pressure at 1200° is $dT/dp = 0.021$; at 1100°, $dT/dp = 0.029$. And since the probable *silicate* value of $dT/dp = 0.25$ at 1170°, and as this falls within the margin (0.020 to 0.030) of corresponding data for organic substances such as spermaceti, paraffin, &c., it is inferred that the relation of melting-point to pressure, in case of the normal type of fusion, is nearly constant, irrespective of the substance operated upon.—The discovery of Clymenia in the fauna of the Intumescens zone (Naples beds) of Western New York, and its geological significance, by John M. Clarke.—A new meteoric iron from Garrett Co., Maryland, by A. E. Foote. A plate accompanies this paper.—Farrington, Washington Co., Kansas, aërolite, by G. F. Kunz and E. Weinschenk.—The skull of Torosaurus, by O. C. Marsh.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 21.—"Additional Observations on the Development of *Apteryx*." By T. Jeffery Parker, B.Sc., F.R.S.

The paper is founded upon the study of three embryos of *Apteryx australis* obtained since the author's former communication on this subject was written.

The youngest (stage E′) is intermediate between E and F of the former paper, the next (F′) between F and G, the most advanced (G′) between G and H.

In E′ the characteristic form of the beak has already appeared.

In F′ the pollex is unusually large, giving the fore-limb the normal characteristics of an embryo wing.

Several important additions and corrections are made to the former account of the skull, especially with regard to the presphenoid region, the basi-cranial fontanelles, and the relations between the trabecular and para-chordal regions.

The account of the shoulder-girdle is amended. In *Apteryx oweni* the coracoid region is solid, and no pro-coracoid appears ever to be formed: in *A. australis* a ligamentous pro-coracoid is present at a comparatively early period (stage F′, and perhaps E).

An intermedium is present in the carpus in all three specimens, in addition to the elements previously described.

The brain in stage G′ is interesting, as being at what may be called the critical stage; the cerebellum is fully developed, and the optic lobes have attained the maximum proportional size and are lateral in position. In all essential respects the brain of this embryo is typically avian.

Royal Microscopical Society, January 20.—Dr. R. Braithwaite, President, in the chair.—The Society adjourned after passing a vote of sympathy and condolence to His Royal Highness the Prince of Wales (Patron of the Society) on the sad loss he had sustained.—This being the annual meeting, the President's address, which was to have been read, was therefore postponed till the next meeting, February 17.

EDINBURGH.

Royal Society, January 4.—Prof. Sir W. Turner, Vice-President, in the chair.—Dr. Noel Paton read a paper on the action of the auriculo-ventricular valves. It has hitherto been supposed that, when these valves close, the two flaps are floated up by the fluid, and, partially overlapping, prevent the passage of the fluid by being pressed against each other. Thus it has been supposed that, when closed, the upper surface of one flap presses against the under surface of the other. Dr. Paton has found, by direct experiment, that the flaps remain, on the whole, in a pendant position, the upper surfaces of the two being pressed together.—Mr. John Aitken read the second part of a paper on the number of dust particles in the atmosphere of certain places in Great Britain and on the Continent, with remarks on the relation between the amount of dust and meteorological phenomena.—Dr. Thomas Muir read a paper on a theorem regarding a series of convergents to the roots of a number. The investigation was suggested by some work of the late Dr. Sang. The series does not converge rapidly, and so cannot be of great practical use.—Mr. Malcolm Laurie read a paper on the development of the lung-books of *Scorpio*, and the relation of the lung-books to the gills of aquatic forms. He was led to investigate this subject by observations made on the allied fossil forms described in his paper read at the previous meeting of the Society. He concludes that the lung-books are not formed by a process of invagination, as is usually supposed to be the case. He considers that the cavities are formed by the growth of a protecting plate which finally adheres to the body.

SYDNEY.

Royal Society of New South Wales, November 4, 1891.—H. C. Russell, F.R.S., President, in the chair.—The following papers were read:—Notes on Artesian water in New South Wales, by Prof. David.—On the constitution of the sugar series, by W. M. Hamlet.

December 2.—H. C. Russell, F.R.S., President, in the chair.—The following papers were read:—On kaolinite from the Hawkesbury sandstone, by H. G. Smith.—Notes on some New South Wales minerals (Note No. 6), by Prof. Liversidge, F.R.S.—Notes on the rate of growth of some Australian trees, by H. C. Russell, F.R.S.—Some folk-songs and myths from Samoa, translated by the Rev. G. Pratt, with introductions and notes, by Dr. John Fraser.

PARIS.

Academy of Sciences, January 18.—M. Duchartre in the chair.—Obituary notice on the late Sir George Biddell Airy, by M. Faye.—On the mass of the atmosphere, by M. Mascart. It is shown that the determination of the mass of the atmosphere by observations of the pressures at the surface is open to serious objections, and involves a notable error. The mass, calculated by means of the formulæ developed by M. Mascart, is one-sixth greater than that usually obtained. The quantity of air situated at a height of 64 kilometres is 1/700 of the total mass. Particles of ice and water are suspended at this height, although the air is so rarefied. It is therefore presumed that the density does not diminish uniformly with increase of height above sea-level, but decreases more slowly in high than in low strata. [On this point see a note in NATURE, p. 259.]—New note on the resistance and small deformations of helical springs, by M. H. Resal.—On solar statistics for 1891, by M. Rodolf Wolf. (See Our Astronomical Column.)—Observations of Wolf's periodic comet, made in 1891 with the great equatorial of Bordeaux Observatory, by MM. G. Rayet, L. Picart, and Courty. Observations of position are given, extending from June 27 to December 27.—On integrals of differential equations of the first order, possessing a limited number of values, by M. P. Painlevé.—On an arithmetical theorem of M. Poincaré's, by M. Victor Stanievitch.—On organic compounds as solvents for salts, by M. A. Etard.—Action of carbon monoxide on iron and manganese, by M.

Guntz. Pure finely divided manganese, obtained by heating an amalgam formed electrolytically, at 400° completely absorbs pure carbon monoxide as follows :—Mn + CO = MnO + C. The reaction is probably the same in the case of iron. This explains the facility with which C is taken up by iron in the blast furnace. The spongy iron reduces CO, and finely divided C is deposited in contact with the FeO formed ; at a higher temperature the FeO is reduced by CO, when the metallic Fe readily takes up the finely divided C intimately mixed with it.—Action of carbon on sodium sulphate, in presence of silica, by M. Scheurer-Kestner.—Lithium nitride, by M. L. Ouvrard (See Notes.)—Action of phosphorus pentachloride on ethyl oxalate, by M. Ad. Fauconnier (See Notes).—On the thermal value of the substitution by sodium in the two alcoholic hydroxyl groups of glycol, by M. de Forcrand.—An isomeride of camphor, by M. Ph. Barbier.—The fixation of iodine by starch, by M. E. Rouvier.—The rotatory power of silks of different origin, by M. Léo Vignon.—Action of boric acid on germination, by M. J. Morel.—Contribution to the embryogeny of *Smicra clasipes*, by M. L. F. Henneguy.—On some new Coccidia, parasites of fishes, by M. P. Thélohan.—On the prevention of hiccough by pressure on the phrenic nerve, by M. Leloir. Five years ago the author was consulted by a girl twelve years of age who hiccoughed every half-minute. She was thus prevented from sleeping, or masticating her food, and her life was despaired of. Anti-spasmodic prescriptions were tried in vain. After pressing the left phrenic nerve, however, for about three minutes, the hiccoughing disappeared. The method has since been successful in many other cases.—On the muciferous apparatus of Laminaria, by M. Léon Guignard.—On the dorsal insertion of the ovules of Angiosperms, by M. Gustave Chauveaud.—On chloride of sodium in plants, by M. Pierre Lesage. It appears that when *Lepidium sativum* and *Raphanus sativus* are watered with a solution of sodium chloride the elements of this salt are found in these plants, consequently a certain proportion of each is absorbed by the plants.—Observation of a lunar corona on January 14, 1892, by M. Chapel.

BERLIN.

Physical Society, January 8.—Prof. Kundt, President, in the chair.—Dr. Kurlbaum described a surface-bolometer which he had constructed in conjunction with Dr. Lummer. It is cut out of platinum foil whose thickness is 0·012 mm., and possesses the great advantage of very rapidly coming to rest. It is a trustworthy instrument for the measurement of the differences in luminosity of two sources of light.—Dr. Pringsheim described a lengthy series of experiments made in order to determine whether the emission of light by gases is the outcome of mere elevation of temperature, or whether electrical or chemical processes play a necessary part in their incandescence. Sodium vapours were found to yield their characteristic spectral lines and absorption spectra, when passed through a highly heated porcelain tube, only in the case where chemical processes (of reduction) could be ascertained to take place inside the tube. In the absence of these reduction processes, both the emission and absorption of light by the sodium vapours were wanting. The experiments further showed that Kirchoff's law holds good not only for the emission of light resulting from a rise of temperature, but also for that which results from chemical processes, since in all cases the emission spectrum corresponded absolutely to the absorption spectrum.

Meteorological Society, January 12.—Prof. Schwalbe, President, in the chair.—Dr. Sprung exhibited his improved sliding-weight balance, demonstrated its mode of action and extreme sensitiveness, and explained its use in the registration of changes of atmospheric pressure, temperature, and humidity.—Prof. Boernstein spoke of a case of extraordinarily rapid evaporation from both the surface of his body and his clothing, which he had recently observed while on a glacier. He expressed his belief that the evaporation was due to the lesser tension of aqueous vapour, for any given temperature, over a surface of ice as compared with its tension, at the same temperature, over a surface of water. Dr. Assmann put forward the view that the phenomenon was due to the extreme and sudden dryness of the air often observed in elevated regions, and to the powerful effect of solar radiation.—Dr. Andries read a passage from Virgil's "Æneid" which contains a most clear description of a cyclone.

Physiological Society, January 15.—Prof. du Bois Reymond, President, in the chair.—Dr. Max Levy described his experiments on the influence of blood-supply to the skin on the secretion of sweat as seen in the paw of the cat. He found that blood only supplies the material necessary for the secretion. Secretion can be obtained even after complete occlusion of the blood-vessels supplying the glands. After anæmia lasting for 35 minutes the sweat-glands are paralyzed, but can recover their functional activity even after having been deprived of blood for five hours.—Dr. Th. Weyl gave an account of the results of his experiments on animals (pigeons and fowls) rendered immune to anthrax. When anthrax spores were introduced on a silk thread under the skin of these animals, the spores retained their full activity at the end of one day's sojourn under the skin. If kept there for a longer period, they lost some of their virulence, and were found to have become quite harmless at the end of six days in the pigeon, and three or more in the fowl.

Erratum.—In the report of the Meteorological Society for December 1, 1891 (see NATURE, vol. xlv. p. 168) for "maximum and minimum thermometer" read "sling thermometer."

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Cooley's Cyclopædia of Practical Receipts, 2 vols., 7th edition; W. North (Churchill).—Manual of Chemical Technology: R. von Wagner; translated and edited by W. Crookes (Churchill).—The Human Mind, 2 vols.: J. Sully (Longmans).—The Rainfall of Jamaica: M. Hall (Stanford).—The Horse: W. H. Flower (Kegan Paul).

PAMPHLETS.—A New Departure in Astronomy: E. H. (Chapman and Hall).—Hand-book on Viticulture for Victoria (Melbourne, Brain).—Royal Commission on Vegetable Products: I. Ensilage; II. Perfume Plants and Essential Oils (Melbourne, Brain).—Report upon the Condition and Progress of the U.S. National Museum during the year ending June 30, 1889: G. B. Goode (Washington).—List of Institutions and Foreign and Domestic Libraries to which it is desired to send future Publications of the National Museum (Washington).—Te Pito te Henua, or Easter Island: W. J. Thomson (Washington).—Aboriginal Skin Dressing: O. T. Mason (Washington).—The Development of the American Rail and Track, as illustrated by the Collection in the U.S. National Museum: J. E. Watkins (Washington).—Preliminary Hand-book of the Department of Geology of the U.S. National Museum: G. P. Merrill (Washington).—Les Odeurs: M. C. Henry (Paris, Hermann).

SERIALS.—Zeitschrift für Wissenschaftliche Zoologie, liii. Band, 3 Heft (Williams and Norgate).—Morphologisches Jahrbuch, xviii. Band, 1 Heft (Williams and Norgate).—Bulletin of the Buffalo Society of Natural Sciences, vol. v. No. 3 (Buffalo).—Records of the Geological Survey of India, vol. xxiv. Part 4, 1891 (Calcutta).

CONTENTS.