

## Societies and Academies.

## PARIS

Academy of Sciences, Aug. 1.—A. Sacroix: The composition and structure of the meteoric iron of Tamentit. The oxidation of meteoric iron at a high temperature. Analyses gave iron 91 per cent., nickel 8 per cent., cobalt 0.38 per cent., with some manganese, phosphorus, sulphur, carbon, and silicon. The meteorite weighed 510 kilograms, and a piece was cut off by means of the oxyacetylene blowpipe. Analyses of the magnetic oxide produced showed it to be free from nickel, and the metal fragments taken from the scoria showed a concentration of the nickel. The bearing of this on the composition of meteorites containing silicates is discussed.—F. E. Fournier: The resistance of water to the translation of hulls.—Gabriel Bertrand and Hirosi Nakamura: The physiological importance of nickel and cobalt. In an earlier communication (Bertrand and Macheboeuf) it has been shown that traces of nickel and cobalt are normal constituents of man and of animals. Experiments on mice suggest that these two metals have a direct action in nutrition.—d'Arsonval: The heating of the tissues by high frequency currents. The thermal ammeter is generally employed to measure the strength of the currents used; but it is not a trustworthy guide when used as a measure of the heating of the tissue under treatment.—Léon Guillet, de Fleury, and Sensaud de Lavaud: The aluminium-silicon alloy known as 'alpac': its applications. Mechanical properties of the alloy cast at 575° and 775° C., after addition of sodium. It can be used in the construction of motor-car chassis.—G. Friedel: Forms assumed by myeline in contact with water.—Amé Pictet and H. Vogel: The synthesis of lactose. Equal weights of  $\beta$ -galactose and  $\beta$ -glucose, with a little zinc chloride, are heated under reduced pressure to 175° C. That lactose was obtained was proved by its melting point, solubility, and rotation. The osazone, nitrate, and acetate were prepared.—Charles Nicolle, Charles Anderson, and Jacques Colas-Belcour: A new pathogenic spirochæte (*Sp. Normandi*) transmitted by an *Ornithodoros* (*Orn. Normandi*).—Krawtchouk: The poles of analytical functions.—C. Irañez de Irero: A submarine link between Spain and Morocco, by means of an intercontinental tunnel. A tunnel across the narrowest part of the Straits would be impossible, as there are depths of more than 900 metres. A possible line is sketched out which would have a length of 48.2 kilometres, of which 32 kilometres would be under the sea.—F. Gonseth and G. Juvet: The equations of electromagnetism.—James Basset: An apparatus for carrying out physical or chemical experiments at varying temperatures and under pressures of 15,000 kilograms per square centimetre. The description is accompanied with photograph and sectional drawing of the apparatus.—B. Cabrera: The theory of paramagnetism.—Armand de Gramont: Monostatic telemetry during twilight.—R. de Malleman and P. Gabiano: The circular dichroism of the alkaline cuprotartrates.—Lucien Mallet: The luminescence phenomena in the course of oxidising reactions in aqueous solutions. During the oxidation with alkaline hypochlorite of various organic substances (albumen, methylene blue, eosin, quinine, etc.) light is produced. The intensity is increased when the temperature is raised.—Eugène Delauney: A new method of quantitative analysis applicable to a mixture of rare earths. The method is based on the measurement of the thickness of an absorption band, as shown in a small Hilger spectrograph. Various examples of the use of the method are given.—W.

Ipatieff and J. Andrews: The precipitation of iridium and its solutions by hydrogen under pressure. At temperatures of 100° and 103° C. the proportion of iridium reduced by hydrogen has been studied for pressures between 1 and 10 atmospheres. The reduction increases with the dilution, with the pressure of the hydrogen and with the time of exposure. The general results are very similar to those previously obtained with platinum.—Dedebant: The field of instantaneous displacement of isobars.—Mlle. M. Gauthier: The French larvæ of Ephemeroidea referred to the genus *Iron*.—F. Mercier and Raymond-Hamet: The vaso-constrictive action of hydrastine.—Mlle. L. Randoin and Mlle. A. Michaux: The variations in the proportions of iron in the liver, the spleen, and the blood, under the influence of feeding in the complete absence of the antiscorbutic vitamin.—Raoul M. May: Microchemical studies on the nervous system. The proportion of sulphur and phosphorus in the cerebral hemispheres of the guinea-pig.—Charles Lebailly: The preventive and specific vaccination of dogs against distemper.

Aug. 8.—The president announced the death of Emile Schwœerer, correspondent for the section of mechanics.—Charles Nicolle and Charles Anderson: The transmission of the spirochæte of the shrewmouse by *Ornithodoros moubata* and the mechanism of the transmission of recurrent spirochætes by ticks.—S. Finikoff: Stratifiable congruences.—Pierre Dive: The most general internal movements of a heterogeneous fluid mass in rotation round an axis.—Louis de Broglie: The rôle of the continuous  $\psi$  waves in undulatory mechanics.—Maurice Lambrey: The absorption and emission spectrum of nitric oxide in the ultra-violet. Nitric oxide has been considered as completely transparent, but has now been found to have absorption bands in the ultra-violet. The same lines were found in the spectrum given by the gas in discharge without electrodes. Carbon monoxide was also found to give a fine absorption band in the same region.—René Dubrisay and Jean Bravard: The influence of absorbent materials on chemical equilibria in solution. In the reaction between ammonium chloride and calcium carbonate in aqueous solution, the equilibrium is displaced by the addition of absorbent substances, such as kieselguhr, sand, precipitated silica, clay, and kaolin.—Emile André and Mlle. Th. François: The study of oleic alcohol and its derivatives. Preparation of oleicerine, elaidicerine, and stearolylic alcohol.—J. Dugué: Modifications of methods and of treatments resulting from the application of the theory of antioxygens. Discussion of the preparation of india-rubber from the point of view of the antioxygen theory.—R. Abrard, L. Joleaud, and Paul Lemoine: The conditions of the deposit of the Montian of Port-Marly (Seine-et-Oise).—E. Rothé, J. Lacoste, and Mlle. Y. Dammann: Earthquakes in France in 1926. Fifteen well-characterised earthquakes were felt in France during 1926. The Pyrenees region and the Central Plateau were more stable than in preceding years; the most important phenomena affected Alsace and the Channel coasts.—Henri Humbert: A new *Compositæ* remarkable from the phylogenic point of view, *Tisserantia africana*.—A. Lebediantzef: The modifications of the solubility of the phosphoric acid and the biological properties of the soil observed in earth lying fallow and previously dried in the open air.—A. Th. Schlœsing: Remarks on the preceding communication.—Edouard Chatton and Mme. M. Chatton: The conditions necessary for determining experimentally the conjugation of the Infusoria *Glaucocoma scintillans*.—F. Viès and A. de Coulon: The experimental modifications of the receptivity

index of mice for grafts of tumours.—George F. Jaubert: The origin of the yellow colour of beeswax.—Weinberg and J. Barotte: Researches on antitoxic and antimicrobial sera.

## SYDNEY.

Royal Society of New South Wales, July 6.—J. W. Fielding: Observations on rodents and their parasites. The author examined 222 rats collected alive at Townsville, N. Queensland, for ectoparasites. On them he found 536 fleas, of which 493 were *Xenopsylla cheopis*, 33 *Ctenocephalus felis*, 8 *Ctenocephalus canis*, 1 *Pulex irritans*, and 1 *Ctenopsylla muscui*. Two were covered with an undetermined genus and species of mite. Data as to leprosy in rats, and also the presence of *Trypanosoma lewisi*, *Leptospora icterohamorrhagica*, *Eimeria* sp. and worms were given.—The late Sydney Dodd: Swelled head in merino rams. Although the almost invariably fatal condition known among sheep-owners as 'swelled head' is generally regarded as affecting only young merino rams, it also occasionally affects older sheep. The condition has been ascribed from time to time to a number of different causes, including plant poisoning and streptococcal infection. A bacillus has been found in the cedematous fluid of the face, in the tissues of the affected muscles of the head and in the heart's blood during post-mortem examinations made immediately after death on typical cases. Experimental inoculation of pure cultures of this bacillus into the leg of a sheep produced lesions similar to those met with in cases naturally affected. The organism is anaerobic and shows evidence of gas formation with dissociation of muscular tissue, but not particularly of a rancid nature.—W. F. Blakely: Descriptions of nine new species of Eucalyptus. Five of these belong to the Stringybark group, two to the Peppermint group, one is Ash, and one Bloodwood. Eight are indigenous to New South Wales, and one to the Northern Territory.—A. R. Penfold: The essential oil of *Eucalyptus Bakeri*. This pendulous willow-like tree of 30 ft.-50 ft. in height has a range from northern New South Wales to central Queensland. The principal constituents of its oil are cineol (70-77 per cent.), cymene, the aromatic aldehydes (cuminal, phellandral, cryptal), phloracetophenone-dimethyl ether and the esters (isobutyric, isovaleric, and formic) of cuminol and phellandrol. Australol (p-isopropyl phenol) d-a-pinene and sesquiterpene alcohol were also present in small quantities.

## WASHINGTON, D.C.

National Academy of Sciences (*Proc.*, Vol. 13, No. 6, June).—H. Walter Leavitt and John W. Gowen: Mineralogical content of Maine sands in relation to mortar strength. The percentage of granitic material in the sand plotted against the tensile strength after 7 days and 28 days setting, shows that strength decreases with increase of granitic material; thus quartz sand is not the best for making strong concrete. Increased strength goes with increased iron content and the latter with decreased granitic content, but there is also an independent effect of iron.—Dickinson W. Richards, Jr.: On the mechanics of blood flow, with special reference to the influence of change of posture. On changing from recumbancy to the standing posture, blood pressure increases and the volume of blood flow decreases in man. Applying Poiseuille's law of flow of a viscous liquid in a cylindrical tube, it is suggested that the changes are associated principally with arterial constriction.—Francis G. Benedict and Cornelia Colay Benedict: The nature of the insensible perspiration. The subject

lies on the balance and breathes into a closed circuit respiratory apparatus also on the balance. Loss of weight then measures the loss through the skin (chiefly water), and it averages 50 per cent. of the total loss. The total insensible loss of a woman is 20 gm.-30 gm. per hour; that of a man is nearer 40 gm. per hour. Of this, about 45 per cent. is water from the skin, about 45 per cent. is water from the lungs, and 10 per cent. is the difference between oxygen intake and carbon dioxide output. The temperature of the environment and clothing make little difference. The total insensible loss is a good index of the total metabolism.—A. M. Showalter: Hermaphroditism in a dioecious Hepatic.—Raoul M. May: Modifications of nerve centres due to the transplantation of the eye and olfactory organ in anuran embryos. The grafts develop synchronously with the corresponding organs of the host. There is at first marked affinity between the optic neuroblasts and those of the central nervous system (neuroblastotropism). The pia mater is only penetrated with difficulty by axons from the grafts.—Samuel F. Hildebrand and Charles Hatsel: On the growth, care, and behaviour of loggerhead turtles in captivity. The incubation period for the eggs appears to be 64 days, and the young remained at the surface of the water in the aquarium. Even when grown, they are sensitive to cold. Two specimens reared from eggs were kept for six years, their food being mainly fish, with occasional blue crabs and hard clams. Their weights when released were 55 lb. and 61 lb.—William Albert Noyes: (1) Magnetic hydrogen atoms and non-magnetic molecules. Suppose that under the catalytic effect of a metal, the orbits of the electrons of loosely joined hydrogen atoms are made to take opposite directions: the electrons are held by their nuclei but fall closer because there are now two nuclei instead of one. This might account for the dissipation of energy when the molecule forms. (2) The relation of the octet of electrons to ionisation. Close approach of atoms, molecules, or ions in solution involves strong repulsion between the external shells of electrons, leading to elastic collisions in which the components maintain their independent existence after collision.—Edison Pettit: Ultra-violet solar radiation. Two quartz cells, each consisting of a lens and plate, one silvered and the other gilded on the inner surfaces, are mounted at opposite ends of a diameter of a disc. The disc is carried by a spindle operated by an escapement so that an image of the sun formed by the silvered cell falls in turn on the junctions of a compensated thermocouple, after which the same procedure is carried out with the gilded cell. The galvanometer deflexions are recorded photographically and give the ratio of ultra-violet to green radiation every four minutes. The green radiation remains fairly constant, whereas the ultra-violet is zero for some time after sunrise and reaches a maximum at noon. The monthly mean of the ultra-violet radiation follows roughly the solar constant and the Mount Wilson daily sunspot numbers, but runs counter to the atmospheric ozone curve.—B. P. Gerasimovic and W. J. Luyten: On the distance of the sun from the galactic plane. The mean elevation of the sun above the galactic plane defined by the Cepheid variables, the O, B, and c and ac stars is +33 parsecs, with a mean error of not more than 3 parsecs.—Walter S. Adams and Alfred H. Joy: (1) The relationship of spectral type to period among variable stars. There is a practically linear correlation between spectral type and logarithm of period of light variation for the best known Cepheids. Long period variables and the mean for short period cluster type variables fall nearly on the Cepheid curve. (2) High-

dispersion stellar spectra and some results of a study of  $\gamma$  Cygni. A spectrograph of 15 ft. focal length and 6 in. aperture has been installed with the 100 in. reflector at Mount Wilson; the linear scale of the spectrographs obtained is about 2.9 Å.U. to the millimetre at H $\gamma$ . Lines of rare earths have been identified in the spectra of  $\gamma$  Cygni and those of Ce<sup>+</sup> show a systematic displacement, possibly caused by relative upward motion of the gases where they originate.—M. S. Knebelman: Groups of collineations in a space of paths.—P. Ehrenfest and P. S. Epstein: Remarks on the quantum theory of diffraction.—Richard M. Badger: Absolute intensities in the hydrogen chloride rotation spectrum. The probabilities of transition from the initial to the final state with absorption of radiation are calculated from integral absorption coefficients, but the experimental results are not in agreement with the predicted values.—R. B. Lindsay: Note on 'pendulum' orbits in atomic models. The 'pendulum' orbit involves the notion of an electron penetrating the nucleus. This may be avoided by assuming a repulsive force in the neighbourhood of the nucleus. Assuming this obeys an inverse cube law, reasonable values of the effective radius of the nucleus are obtained.—Bergen Davis and Harris Purks: Measurement of the Mo K doublet distances by means of the double X-ray spectrometer. One crystal is mounted as usual on the spectrometer table and a second crystal is carried on a rotating arm; radiation is reflected from the first to the second and thence to the ionisation chamber. The angle through which the second crystal is turned is twice the difference between the angles for reflection of two radiations. The results are closely independent of horizontal slit width, so that it is possible to have sufficient intensity of radiation to permit accurate measurements.—J. C. Slater: The structure of the helium atom (1). A method is developed of obtaining an approximate solution to the problem of calculating the spectrum of helium from the wave equation of mechanics. It can also be applied to yield qualitative results with higher atoms and molecular structure.—Walter A. MacNair: The Zeeman effect of the hyperfine structure components of  $\lambda$  2537 of mercury. Each of the five lines found by Wood has a triplet Zeeman pattern.—Paul S. Epstein: The dielectric constant of atomic hydrogen in undulatory mechanics. For the excited states of the atom, in weak fields the orientation is arbitrary; in strong fields this is not so. Owing to the complete symmetry of the atom in the normal state, the question of orientation is here without meaning.—Evelyn F. Aylesworth: The dielectric constant of atomic hydrogen from the point of view of Bohr's quantum theory. The calculations lead to results similar to those recorded in Epstein's paper above.—David L. Webster: Direct and indirect production of characteristic X-rays. Indirect rays will be produced at depths in the target averaging more than the mean depth of rays producing the continuous spectrum. With a target of silver 25 microns thick plated with copper, the majority of the K-radiation is direct when the cathode rays are driven by a steady voltage of 35 kv., d.c. Other targets used were blocks of cadmium with one or two sheets of silver foil 6 microns thick and a block of graphite plated with silver 3.5 microns thick. With 50 kv., the ratio of the direct to the indirect rays was 2.36.—Carl Barus: Mucronate electrode with micrometer.—Carl Eckart: The reflection of electrons from crystals. Electron reflection differs from X-ray reflection in that a single plane of atoms reflects an appreciable fraction of the electrons and that the wave-length of the electron wave inside the crystal differs from its wave-length in free space.—Edward Uhler Condon:

(1) Coupling of electronic and nuclear motions in diatomic molecules. (2) Wave mechanics and the normal state of the hydrogen molecule. A discussion based on the quantum theory of the binding of atoms into molecules (valency forces) gives results in fair accord with experiment.—Gilbert N. Lewis: A new equation for the distribution of radiant energy.—C. F. Richter: The hydrogen atom with a spinning electron in wave mechanics. It is claimed that the fine structure of hydrogen-like spectra can be represented completely by the Schrödinger wave mechanics with the Uhlenbeck-Goudsmit spinning electron.

### Official Publications Received.

#### BRITISH.

The North of Scotland College of Agriculture. Guide to Experiments and Demonstration Plots at Craibstone, 1927. Pp. xii+56. (Aberdeen.)  
 Memoirs of the Department of Agriculture in India. Botanical Series, Vol. 14, No. 4: Studies in Gujarat Cottons. Part iv: Hybrids between Broach-deshi and Goghari Varieties of *Gossypium herbaceum*. By Maganlal L. Patel and S. J. Patel. Pp. 131-176. (Calcutta: Government of India Central Publication Branch.) 14 annas; 1s. 6d.  
 Aeronautical Research Committee: Reports and Memoranda. No. 1079 (E. 24): Summary by the Secretary, Engine Sub-Committee, of a "Report on Anti-knock Investigations." By A. Egerton and S. F. Gates. (I.C.E. 561.) Pp. 18+13 plates. (London: H.M. Stationery Office.) 9d. net.  
 Royal Commission on Agriculture in India. Vol. 1, Part 2: Evidence of Officers serving under the Government of India. Pp. lxi+378+18 plates. (London: H.M. Stationery Office.) 6s. 3d. net.  
 The Journal of the Institute of Metals. No. 1, 1927. Vol. 37. Edited by G. Shaw Scott. Pp. xii+886+75 plates. (London: The Institute of Metals.) 31s. 6d. net.  
 Straits Settlements. Annual Report on the Raffles Museum and Library for the Year 1926. By C. Boden Kloss. Pp. 14. (Singapore.)  
 Western Australia. Annual Progress Report of the Geological Survey for the Year 1926. Pp. 26+7 plates. (Perth: Fred. Wm. Simpson.)  
 Western Australia: Geological Survey. Bulletin No. 84: The Field Geology and Broader Mining Features of the Leonora-Duketon District, including parts of the North Coolgardie, Mt. Margaret and East Murchison Goldfields, and a Report on the Anaconda Copper Mine and Neighbourhood. By E. de C. Clarke. Pp. 66+4 plates. Bulletin No. 86: The Geology and Mineral Resources of the Yalgoo Goldfield. By E. de C. Clarke. Part 2: The Mining Centres of Rothesay and Goodingnow (Payne's Find). Pp. 41+3 plates. Bulletin No. 90: The Geology of a portion of the East Coolgardie and North-East Coolgardie Goldfields, including the Mining Centres of Monger and St. Ives. By E. de C. Clarke. Pp. 41+6 plates. (Perth: Fred. Wm. Simpson.)  
 Public Library, Museum and Art Gallery of South Australia. Records of the South Australian Museum. Vol. 3, No. 3. Pp. 219-341. (Adelaide.) 10s. 6d.  
 Indian Journal of Physics, Vol. 1, Part 4; and Proceedings of the Indian Association for the Cultivation of Science, Vol. 10, Part 4. Conducted by Prof. C. V. Raman. Pp. 329-456. (Calcutta: Indian Association for the Cultivation of Science.) 3 rupees; 4s.  
 Uganda Protectorate. Annual Report of the Geological Survey Department for the Year ended 31st December 1926. Pp. 43. (Entebbe: Government Printer.) 3s.  
 Memoirs of the Department of Agriculture in India. Chemical Series, Vol. 9, No. 3: Some Digestibility Trials on Indian Feeding Stuffs, II. By Dr. P. E. Lander and Pandit Lal Chand Dharmani. Pp. ii+63-83. 10 annas; 1s. Chemical Series, Vol. 9, No. 4: The Effect of Manuring a Crop on the Vegetative and Reproductive Capacity of the Seed. By B. Viswa Nath and M. Suryanarayana. With a Summary of the Results of certain Animal Nutrition Experiments carried out by Lt.-Col. R. McCarrison. Pp. ii+85-124. 14 annas; 1s. 6d. (Calcutta: Government of India Central Publication Branch.)  
 The Hundred and Fifth Report of the Commissioners of Crown Lands, in Obedience to the Acts 10 George IV. (Cap. 50) and 2 William IV. (Cap. 1), being the Seventy-Sixth Report under the Act of 14 and 15 Vict. (Cap. 42), dated 30th June 1927. Pp. 38. (London: H.M. Stationery Office.) 4s. net.  
 Aeronautical Research Committee: Reports and Memoranda. No. 1078 (Ae. 259): The Application of the Algebraic Formulae of R. and M. 1056 to Problems of Aircraft Performance. By W. G. Jennings, N. E. Rowe and I. Bowen. (D.I. Special Technical Questions. 195 and a.—T. 2375 and a.) Pp. 11+11 plates. 9d. net. No. 1088 (Ae. 267): Preliminary Report on the Fitting of Slots and Flaps and Slot-and-Aileron Control to a Bristol Fighter. By H. L. Stevens. (A.2.b. Stability—Full Scale Experiments.—T.2420.) Pp. 3+2 plates. 4d. net. No. 1092 (Ae. 271): A Distant-Reading Instrument for the Measurement of Small Displacements. By E. F. Relf and L. F. G. Simmons. (C.I. Accessories—Instruments, 95.—T. 2429.) Pp. 4+1 plate. 4d. net. (London: H.M. Stationery Office.)  
 The British Research Association for the Woollen and Worsted Industries. Publication No. 78: An Outline of the Activities. By S. G. Barker and Arnold Frobisher. Published on the Occasion of the Leeds Meeting of the British Association for the Advancement of Science, August 31st-September 7th, 1927. Pp. 48+4 plates. (Leeds.)  
 Report of the Progress of the Ordnance Survey for the Financial Year 1st April 1926 to 31st March 1927. Pp. 9+5 plates. (London: H.M. Stationery Office.) 9d. net.  
 London County Council. Lectures and Classes for Teachers: Handbook for the Session 1927-28. Pp. 78. (London: London County Council.)