Societies and Academies.

LONDON.

Royal Society, June 5.—Sir Richard **Paget**: The nature and artificial production of consonant sounds. Human speech appears to be essentially a branch of human gesture which the ear has learnt to identify, without the aid of sight, by means of its secondary effect in modifying the resonance produced by air by or through the gesticulating members of the vocal cavity. Thus, the laughter sound, Ha, Ha! is essentially a smile, made audible and emphatic by the sudden passage of vibrating air. Acoustic observations confirm this view, and indicate that speech is essentially a specialised form of facial expression.—P. L. **Kapitza**: A method of producing strong magnetic fields. An accumulator, which gives a power of the order of 1000 kw. for a small fraction of a second, and time-switches for making and interrupting strong currents up to 12,000 amp., are described. An account is given of a high-frequency oscillograph (20-30,000 per sec.) for measuring strong currents occurring during a small fraction of a second. The construction and measurement of the magnetic constant of coils for producing magnetic fields is discussed.—N. **Ahmad** and E. C. **Stoner**: On the absorption and scattering of γ-rays. The results of previously reported experiments on the absorption of γ-rays from radium B + C, after filtration through 1 cm. lead, are further analysed, and the scattering is estimated from the apparent absorption with the absorbers close to and away from the ionisation chamber. The corrected total atomic absorption is given by $\mu_a = 1{\cdot}92 \times 10^{-25} Z + 1{\cdot}60 \times 10^{-31} Z^4$ (where Z is the atomic number), with close approximation, over a wide range of elements. The scattering per electron is approximately constant, which supports the view that the first term in the above expression corresponds to scattering absorption, the second to true absorption. Estimates of the mean effective wave-length based on the two terms indicate that, for a given wave-length, Compton's mono-electronic quantum scattering formulæ give values, both for the total scattering absorption and for the actual scattering, which are lower than those observed.—V. **Henri** and H. **de Làszlò**: The analysis of the absorption spectrum of naphthalene vapour: structure and activation of the molecule of naphthalene. There is a change in the absorption spectrum of a vapour on approaching high frequencies. For low frequencies we obtain narrow bands with a fine structure. After a first limit the bands become continuous without fine structure; after a second, we get broad continuous bands. The first limit indicates an intra-molecular change in distribution of electrons; the second corresponds to ionisation of the molecule. For naphthalene, the first limit of "intramolecular ionisation" corresponds to an increase of energy of 101,000 cal. gm./mol., the second, "ionisation of the molecule," to 230,000 cal. gm./mol. The absorption spectrum of naphthalene vapour consists of two groups of bands: A, 2820-2500 Å, narrow continuous bands; B, 3200-2820 Å, narrow bands with fine structure. There are more than 400 fine bands in this group. The distribution of the bands of group B can be represented by a single formula with three fundamental atomic frequencies: $a = 474{\cdot}4$, $\beta = 203{\cdot}4$, $\gamma = 62{\cdot}7$ cm.$^{-1}$. The main frequency is about half that of benzene and its mono derivatives. This frequency appears to correspond to the vibrations of the two benzene nuclei in the molecule of naphthalene. The fine structure of the band is represented by the sum of three series, corresponding to a positive, negative and zero branch. The moment of inertia of the naphthalene molecule changes on activation. The distribution of the atoms in the activated and in the normal molecule is therefore different.—W. **Jevons**: On the band-spectra of silicon oxide and chloride, and chlorides of carbon, boron, and aluminium. The uncondensed discharge through silicon tetrachloride vapour develops a characteristic system of ultra-violet bands degraded towards the further ultra-violet, and consisting of two parts, one on each side of a dense cluster composed of chlorine lines and aluminium chloride bands near λ2610. The new system is attributed to a chloride of silicon. When air or oxygen is present a second system of ultra-violet bands is developed, with heads degraded towards the red. This is ascribed to an oxide of silicon. The oxide bands are developed also in the arc in air. The aluminium chloride uncondensed discharge also develops characteristic bands in the ultra-violet, the more prominent occurring together with chlorine lines in a dense cluster near λ2610. They are degraded towards the red, forming several groups, each exhibiting an arithmetical progression of first differences of successive wave-numbers. The same cluster of bands and chlorine lines occurs in $SiCl_4$ and BCl_3 discharge-tubes with aluminium electrodes. The presence of oxygen with the chloride vapour in the discharge tube has the same effect with CCl_4 and BCl_3 as with $SiCl_4$, namely, development of an oxide band-spectrum. Band-systems, attributed originally to boron nitride, but recently to boron monoxide, are not developed with oxide bands in the tube discharge through BCl_3 and oxygen mixture.—J. E. **Littlewood** and A. **Walfisz**: The lattice-points of a circle. We denote by $R(x)$ the number of lattice points (points both of the co-ordinates of which are integers) lying within or upon the circumference of the circle with centre at the origin and radius $\sqrt{x}$, and by $P(x)$ the difference between $R(x)$ and its obvious first approximation πx. It is known that for large x, $P(x) = O(x^{\Theta+\epsilon})$ where Θ is some constant not exceeding $\frac{1}{3}$, and necessarily not less than $\frac{1}{4}$. It has been proved recently by van de Corput that Θ is less than $\frac{1}{3}$ (by some undetermined amount); it is now shown that $\Theta \leqq \frac{37}{112} = \frac{1}{3} - \frac{1}{336}$. The discovery of a different and simpler line of argument than van de Corput's general method leading to $\Theta < \frac{1}{3}$ is probably of greater interest than the actual reduction of the constant.—R. C. **Johnson**: Ultra-violet emission bands associated with oxygen. Of spectra attributed to oxygen the best known are the negative band-spectrum and a system in the far ultra-violet at λλ1830-1930. A well-defined system of bands, degraded to the red and stretching from λλ2280 to 5000, was found in pure oxygen tubes by Stark in 1914. This was attributed by him to ozone on the basis of a comparison with the known absorption bands of ozone. This band system is now attributed to an oxygen molecule. The bands have been found to fall into 9 series well expressed by the formula: $\nu = \left\{\begin{matrix}1620\\1420\end{matrix}\right\} + 16{\cdot}945\, p^2 - 13{\cdot}37\, m^2$, where m takes values from 25 to 34, and p from 55 to 47.—H. S. **Allen**: The band-spectrum of hydrogen. The wave-numbers of the lines forming the first and second bands of Fulcher in the secondary spectrum of hydrogen have been tabulated in such a way as to bring out the relations between them. It is argued that the lines of the various series S_1 to S_7 in the first band are all derived from the same molecular system. These series can be represented by parabolic formulæ of the type required by the quantum theory of the band spectra. The values of the constants in the quantum formula depend on the system of numeration adopted, which makes it difficult to arrive at a definite conclusion as to the moment of inertia of the molecule. One assumption leads to a value in close agreement with Sommerfeld's estimate

$I = 1 \cdot 85 \times 10^{-41}$ gm. cm.^{2} If, however, the series S_1, S_2 and S_3 are treated as " half-quantum " series and the series S_4 to S_7 as " whole-quantum " series, the values for the moment of inertia are practically the same for all the series, being $I = 1 \cdot 761 \times 10^{-41}$ gm. cm.^{2} in the initial and $I = 1 \cdot 827 \times 10^{-41}$ gm. cm.^{2} in the final state of the molecule. In the case of the second band the constants of the formulæ correspond to smaller values of the moment of inertia.

Royal Anthropological Institute, May 20.—Prof. C. G. Seligman in the chair.—Mrs. Scoresby **Routledge**: The Austral Islands and Mangareva, S.E. Pacific. The object of the recent expedition of the author and her husband to the Eastern Pacific was to study the culture of those districts through which the inhabitants of Easter Island must presumably have passed on their way to that island. The party reached Tahiti in July 1921, and while awaiting the means of further transit studied the archæological remains in the adjoining island of Moorea. Here various *maraes* were discovered, similar both in plan—a " truncated pyramid " at one end of an enclosure—and also in structure to the great edifice on Tahiti described by Cook and Banks. On leaving Tahiti they traversed the four islands of the Austral group. In all of these, contrary to what has been asserted, were found numerous megalithic remains. The structure was entirely different from those of Tahiti, and consisted of rectangular enclosures formed by stone slabs up to some fourteen feet in height, set up as palisades, the ground within being paved, each island having its own particular variations of form. On the island Raivavæ are also the remains of various statues, but different from those of Easter; the two principal ones are still erect and measure respectively 6 ft. 6 in. and 7 ft. 3 in. in height. In the island of Rapa-iti *marae* may be said to be non-existent, but the hill-tops are crowned by striking fortifications. From Rapa the party proceeded to the Mangareva or Gambiers. The archæological remains on Mangareva itself were disappointing, but there is a surprisingly large amount of folk-lore, some of which has been recorded in writing. They record at least three expeditions to " Mata-kiterangi," which the natives positively assert is Easter Island. There were also collected over one hundred native songs, divided into various classes, two of which bear the same names (the " Rongo rongo," the " Iau ") as are borne by certain of the Easter script. In addition a large number of folk-tales are verbally transmitted, and these were gathered from the old inhabitants.

Linnean Society, May 22.—Dr. A. B. Rendle, president, in the chair.—Presidential address. The address dealt with the work of Linnæus in Holland, his connexion with Dutch naturalists, especially with George Clifford, and the *Hortus Cliffortianus* descriptive of Clifford's Herbarium. The president also referred to the Cliffortian Herbarium (purchased by Sir Joseph Banks in 1791) and showed evidence of its intimate relation with the *Hortus Cliffortianus*. Other instances of the importance of early collections for interpreting Linnæus's *Species Plantarum* were described, namely, Hermann's Herbarium, the basis of Linnæus's *Flora Zeylanica*, and John Clayton's American collection, of which Gronovius's *Flora Virginica* is an account. These, like Clifford's Herbarium, are now in the Natural History Museum.

PARIS.

Academy of Sciences, May 19.—H. Guillaume Bigourdan in the chair.—Emile **Picard**: On certain general theorems relating to analytical functions.—H. **Deslandres**: Registration of the explosive wave of La Courtine at the observatory of Meudon. A recording microphone showed two distinct waves, with an interval of 0·8 seconds between them.—A. **Haller** and L. **Palfray**: A new mode of preparation of phenyl oxyhomocampholic acid and its constitution. The formula attributed to the acid obtained in 1900 by the action of hydrobromic acid upon benzylidenecamphor is confirmed.—L. **de Launay**: The tertiary strata of Bourbonnaise Limagne.—Gabriel **Betrand**: The fumigation of silkworm cocoons by chloropicrin. This method of treating the cocoons is shown to have advantages over the usual stoving. There is less risk of damage to the silk, the cost is less, and very little supervision is required.—Charles **Richet**: Raw meat juice in the treatment of human tuberculosis and the reconstruction of the muscles. The dried juice of raw meat has given valuable clinical results in the treatment of tuberculosis: the steady increase of weight is the most marked symptom.—Ch. **Depéret** and P. **Russo**: A Senonian fauna of Mosasaurians and Crocodilians at the base of the phosphatic deposits of Melgou (Western Morocco).—Pierre **Weiss** and R. **Forrer**: The spontaneous magnetisation of nickel. Lines of equal magnetisation.—Dr. L. Johannes Schmidt was elected correspondent for the Section of Anatomy and Zoology.—René **Garnier**: Study of the general integral of a differential system, order $2n$, round its transcendental singularities.—F. **Carlson**: Some series of polynomials.—R. **Gosse**: Determination of the equations $s = f(x, y, z, p, q)$ which admit an intermediate integral of the first order and are of the first class.—René **Lagrange**: The reducible ds^2 of two forms of Liouville.—F. H. **van den Dungen**: The determination *a priori* of the true vibrations of torsion.—G. **Grèzes**: The resistance of fluids. Description of experiments on the resistance of fixed spheres in moving water. In earlier experiments the water was at rest and the sphere in motion: the present communication deals with the case when the sphere is immobile and the water in motion.—Paul **Stroobant**: Observation of the transit of Mercury across the sun on May 8, 1924, made at the Royal Belgian Observatory at Uccle: An account of visual and photographic observations taken with five instruments of apertures from 8 cm. to 38 cm.—D. **Eginitis**: Observation of the transit of Mercury across the sun made at the Athens Observatory with the Gautier 40 cm. equatorial.—Luc **Picart, Salet,** and **Schaumasse**: Observations of the transit of Mercury across the sun. Results obtained at Paris, Bordeaux, and Nice.—Louis **Roy**: Electric currents in continuous media in motion.—Léon **Brillouin**: Reflection and refraction of the quanta of light.—Jean **Lecomte**: Qualitative studies on the infra-red absorption spectra of organic bodies. Isomerism and homology.—Max **Morand**: The spectra of ionised lithium.—F. **Wolfers**: A new optical phenomenon: interference by diffusion.—Jean **Thibaud**: The γ-rays, of very high frequency, emitted by radium.—Georges **Kimpflin**: The permeability of synthetic resin to the infra-red radiations. Results of experiments on the transparency to infra-red radiations of bakelite, pure, or charged with colloidal iron or manganese dioxide.—P. **Lemay**, C. **Guilbert**, R. **Petit**, and L. **Jaloustre**: The influence of the X-rays on the leucocyte oxidases.—J. **Escher-Desrivières**: Adsorption of polonium, in soda solution, by various substances.—P. **Lasareff**: The relations between the atomic concentration and the mechanical, thermal, and optical constants of the elements.—H. **Pelabon**: The action of potash on mercuric iodide.—Marcel **Delépine**: A new form of fenchonoxime. The char-

acterisation of fenchone in the presence of camphor.—M. **Tiffeneau** and Mlle. J. **Lévy**: The steric isomerism of the trisubstituted α-glycols, and the preparation of the two steric isomers by inverting the order of introduction of the substituting radicles.—W. **Vernadsky** and Mlle. C. **Chamié**: A pseudomorphosis of curite.—J. **Orcel**: A new type of white aluminous chlorite.—Th. **Négris**: A new objection to Wegener's theory concerning the drift of continents.—P. L. **Rothey d'Orbcastel**: The tectonic relations between the gneiss and schists of Montolieu (Aude).—Paul **Thiéry**: Does the Bartonian exist in the Ajaccio region?—Léon **Moret** and F. **Blanchet**: The problem of the Cretaceous in the intra-alpine zones: the "Marbres en plaquettes" of the neighbourhood of Guillestre (Basse-Alpes), their age and transgressive character.—E. A. **Martel**: The universality and importance of the phenomena of caves or natural conduits of limestones.—A. **Dufour**: The acoustic disturbance, recorded at Paris, produced by the explosion of May 15, 1924, at Courtine. Clear records were obtained although no sound was heard.—Louis **Besson**: The probability of rain.—Octave **Mengel**: The rôle of the Alps in the genesis and morphology of the storms of the western Mediterranean.—J. **Bouget**: The influence on plants of a prolonged stay at a high altitude.—J. **Nageotte**: The subcutaneous grafting of living and dead cornea and the theory of the dead graft in general.—Marcel **Duval**: The relation between the molecular concentration of the blood of the Crustacea and that of the external medium.—Maurice **Nicloux** and Georges **Fontès**: The preparation and estimation of methæmoglobin.—A. **Vandel**: Geographical spanandry in a Branchiopod Crustacean, *Lepidarus apus*.—Marc **Treillard** and André **Lwoff**: An infusorian parasitic in the general cavity of the larvæ of Chironomes: its sexuality.

Official Publications Received.

Bernice P. Bishop Museum. Bulletin 6: Tongan Place Names. By Edward Winslow Gifford. (Bayard Dominick Expedition: Publication No. 7.) Pp. 258. Bulletin 7: Polynesian Decorative Designs. By Ruth H. Greiner. Pp. iv+105+29 plates. Bulletin 8: Tongan Myths and Tales. Compiled by Edward Winslow Gifford. (Bayard Dominick Expedition: Publication No. 8.) Pp. 207. Bulletin 9: The Native Culture in the Marquesas. By E. S. Craighill Handy. (Bayard Dominick Expedition: Publication No. 9.) Pp. iv+358+8 plates. (Honolulu, Hawaii.)

Proceedings of the Indian Association for the Cultivation of Science. Conducted by Prof. C. V. Raman. Vol. 8, Part 3. Pp. 181-230. Vol. 8, Part 4. Pp. 231-288+vii. (Calcutta.)

Department of Fisheries, Bengal. Bulletin No. 20: Statistics of Fish imported into Calcutta for the Year ending 31st March 1923. Pp. 2+15. (Calcutta: Bengal Secretariat Book Depot.) 13 annas.

Memoirs of the Indian Meteorological Department. Vol. 24, Part 5: The Free Atmosphere in India—Introduction. By J. H. Field. Pp. 133-166+13 plates. 1.12 rupees. Vol. 24, Part 6: The Free Atmosphere in India—Observation with Kites and Sounding Balloons up to 1918. By Dr. W. A. Harwood. Pp. 167-216+3 plates. 1.8 rupees. Vol. 24, Parts 7 and 8: The Free Atmosphere in India. 7: Heights of Clouds, and Directions of Free Air Movement. 8: Upper Air Movement in the Indian Monsoons and its relation to the General Circulation of the Atmosphere. By Dr. W. A. Harwood. Pp. 217-273+9 plates. (Calcutta: Government Printing Office.) 1.14 rupees.

University College of Wales, Aberystwyth: Welsh Plant Breeding Station. Series H, No. 3, Seasons 1920-23: Seasonal Productivity of Herbage Grasses, by R. G. Stapledon; The Nutritive Value of Grasses as shown by their Chemical Composition, by T. W. Fagan and H. Trefor Jones; Productivity of different Strains and Nationalities of Red Clover, by R. D. Williams; A Note on Subterranean Clover, by R. D. Williams and W. Davies; Grassland and the Grazing Animal, by R. G. Stapledon, T. W. Fagan and R. D. Williams. Pp. 168. (Aberystwyth.) 12s. 6d.

Journal of the Manchester Egyptian and Oriental Society. No. 11. Pp. 58. (Manchester: Manchester University Press; London: Longmans, Green and Co.) 7s. 6d. net.

Recherches astronomiques de l'Observatoire d'Utrecht. VIII. Première partie. Pp. iv+251. (Utrecht: J. Van Boekhoven.)

Koninklijk Nederlandsch Meteorologisch Instituut. No. 106: Ergebnisse aerologischer Beobachtungen. 11, 1922. Pp. xiv+87. 2 f. No. 108: Seismische Registrierungen in De Bilt. 8, 1920. Pp. xi+62. 1 f. (Utrecht: Kemink en Zoon.)

Stanford University Publications: University Series. Biological Sciences, Vol. 3, No. 3: The Osteology and Relationships of the Uranoscopoid Fishes; with Notes on other Fishes with Jugular Ventrals. By Prof. Edwin Chapin Starks. Pp. 36+5 plates. Biological Sciences, Vol. 3, No. 4: The Growth of Dragonfly Nymphs at the Moult and between Moults. By George D. Schafer. Pp. 36. (Stanford University, California.) 1 dollar each.

Bulletin of the Terrestrial Electric Observatory of Fernando Sanford, Palo Alto, California. Vol. 1: Summary of Observations for the Period May 1920–August 1923. Pp. 32. (Palo Alto, California.)

Department of the Interior: Bureau of Education. Bulletin, 1923, No. 50: Free Textbooks for Public-School Pupils. By William R. Hood. Pp. 14. Bulletin, 1923, No. 52: Schools for the Deaf, 1921-22. By Frank M. Phillips. Pp. 29. Bulletin, 1923, No. 57: Education Tests. By Stephen S. Colvin. Pp. 28. (Washington: Government Printing Office.) 5 cents each.

Norman Lockyer Observatory. Director's Annual Report, April 1, 1923–March 31, 1924. Pp. 8. (Sidmouth.)

The University of Leeds and the Yorkshire Council for Agricultural Education. Crown Rot of Rhubarb. By W. A. Millard. Pp. 28. (Leeds.) 6d.

The Royal Society for the Protection of Birds. Thirty-third Annual Report, January 1st to December 31st, 1923; with Proceedings of Annual Meeting, 1924. Pp. 92. (London: 82 Victoria Street, S.W.1.) 1s.

Diary of Societies.

MONDAY, JUNE 16.

ROYAL SOCIETY OF ARTS (Dominions and Colonies Section), at 4.30.—Dr. C. V. Corless: The Mineral Wealth of the Pre-Cambrian in Canada.

VICTORIA INSTITUTE (at Central Buildings, Westminster), at 4.30.—Rev. C. Gardner: The Philosophy of the Modernist Movement. (Annual Address.)

BRITISH PSYCHOLOGICAL SOCIETY (Education Section) (at London Day Training College), at 6.—D. K. Fraser: Some Modifications in the Teaching of the Three R's to Mentally Defective Children.

ARISTOTELIAN SOCIETY (at University of London Club), at 8.—Prof. A. D. Lindsay: What does the Mind construct?

ROYAL GEOGRAPHICAL SOCIETY (at Æolian Hall), at 8.30.—Major-General Sir Cecil Pereira: Peking to Lhasa (from the Diaries of the late Brig.-Gen. G. Pereira.)

TUESDAY, JUNE 17.

ROYAL SOCIETY OF MEDICINE, at 5.—Special and General Meetings.

ROYAL STATISTICAL SOCIETY, at 5.15.—J. Hilton: An Inquiry by Sample: an Experiment and its Results.

ROYAL PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN, at 7.—Discussion on The Pictorial Group Exhibition and F. C. Tilney's Exhibition of Oil Paintings and Water-Colour Drawings.

THURSDAY, JUNE 19.

ROYAL SOCIETY, at 4.30.—*Probable Papers*:—Lord Rayleigh: (*a*) The Non-luminous Oxidation of Phosphorus in an Oxygen Atmosphere; (*b*) The Light of the Night Sky: its Intensity Variations when analysed by Colour Filters.—Rev. Dr. A. L. Cortie: The 27-Day Period in (Interval) in Terrestrial Magnetic Disturbance.—Dr. E. K. Rideal and C. G. L. Wolf: The Destruction of Rennin by Agitation: A Case of Catalysis at an Air-Liquid Interface.—W. G. Palmer: The Use of the Coherer to investigate Adsorption Films.—W. G. Palmer and F. H. Constable: The Catalytic Action of Copper. Part IV.—R. J. Lang: The Ultraviolet Spark Spectra of some of the Elements.—W. T. Astbury and Kathleen Yardley: Tabulated Data for the Examination of the 230 Space-Groups by Homogeneous X-Rays.—J. W. Campbell: The Drift of Spinning Projectiles.—Dr. A. L. Narayan and D. Gunnaiya: Absorption of Lithium Vapour.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, at 7.45.—Demonstration of Leishmania and other Allied Flagellates.—At 8.15.—Lieut.-Col. T. McCombie Young: Fourteen Years' Experience with Kala-Azar Work in Assam.

C.B.C. SOCIETY FOR CONSTRUCTIVE BIRTH CONTROL AND RACIAL PROGRESS (Joint Meeting with Workers' Birth Control Group) (at Essex Hall, Strand), at 8.—Councillor Reed, Mrs. Malone, and others: Outline of Plans for Legislation if necessary to get Birth Control Information given at the Welfare Centres.

CHEMICAL SOCIETY, at 8.

FRIDAY, JUNE 20.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Geophysical Discussion.—Dr. Harold Jeffreys: Recent Work on the Properties of Matter at High Pressures. Chairman: Hon. Sir Charles Parsons.

PUBLIC LECTURES.

MONDAY, JUNE 16.

UNIVERSITY COLLEGE, at 5.30.—Prof. R. A. Millikan: Atoms and Ethereal Radiations. (Succeeding Lectures on June 17 and 19.)

THURSDAY, JUNE 19.

SCHOOL OF ORIENTAL STUDIES, FINSBURY CIRCUS, at 5.30.—Prof. S. Langdon: Excavations at Kish, 1923–24, by the H. Weld-Blundell (for Oxford University) and Field Museum Expedition to Mesopotamia. (Succeeding Lectures on June 25 and 26.)