

THE Sorby research fellowship has been awarded to Dr. F. C. Thompson, of the department of applied sciences of the University of Sheffield, for research into the constitution of the alloy steels. The fellowship, which is tenable for five years, is awarded by a committee appointed by the council of the Royal Society and the University of Sheffield from a fund bequeathed by the late Dr. H. C. Sorby. Dr. Thompson holds the degrees of Doctor of Metallurgy (Sheffield) and Bachelor of Science (London). He was a Carnegie research scholar of the Iron and Steel Institute, is a member of many bodies concerned with physical and metallurgical matters, and has published a number of papers on metallography and allied subjects.

THE Dr. Jessie Macgregor prize for medical science, of the Royal College of Physicians, Edinburgh, is to be awarded in July to the applicant who presents the best record of original work in the science of medicine, published or unpublished, but must not have been published earlier than three years prior to the date of award of the prize. The prize, which is of the value of 75*l.*, is open to women medical graduates of the University of Edinburgh, or to those who have taken the triple qualification and before being qualified studied medicine for at least a year in Edinburgh. Applications for the prize, with a record of the work of the competitor, must be sent to reach the Convener of the Trustees, Royal College of Physicians, Edinburgh, by, at latest, June 1.

THE Bureau of Education in India has issued a pamphlet by Mr. R. K. Sorabji entitled "Facilities for Indian Students in America and Japan." Mr. Sorabji warns students that it is unwise for anyone to visit the United States on an allowance of 50 or 60 rupees per mensem, even though the student may make some money in the vacations; he requires from 150*l.* to 200*l.* a year, of which he may earn 50*l.* The facilities for technical education and the cheapness of it may attract the student to Japan, but the candidates for admission to the colleges exceed the accommodation, and when a system of competitive examination is introduced, the youth trained in a Japanese school possesses greater advantages than the Indian. As is the case in the United States, the student will require an allowance of from 100*l.* to 150*l.* per annum, and as the teaching is given in Japanese he must acquire that language before he can derive any advantages from Japanese institutions.

## Societies and Academies.

### LONDON.

**Royal Society**, May 6.—Sir J. J. Thomson, president, in the chair.—R. H. Fowler, E. C. Gallop, C. N. H. Lock, and H. W. Richmond: The aerodynamics of a spinning shell. This paper deals with the motion through a gas or a body with an axis of symmetry and a spin about that axis. The range of velocities includes the velocity of sound in the gas. It has special reference to the motion of an ordinary shell through air under gravity. The problem is approached from the aerodynamical viewpoint. The force system imposed by the gas is analysed into its most important constituents by help of the theory of dimensions and by detailed wind-channel experiments. The general equations of motion are obtained in a vector notation, and reduced to tractable approximate forms in certain important special cases; in particular, when the axis of symmetry and the direction of motion of the centre of gravity nearly coincide. An approximate formal solution of these last equations is obtained, and the

errors in the equations themselves and their solutions are shown to be negligible. The solutions obtained are submitted to the test of experiment, and the magnitude of the more important members of the force system determined numerically as functions of the velocity of the shell up to twice the velocity of sound. At the same time the main assumptions made in the analysis are verified. The experimental method used is to fire the shell through a series of cards. The shape of the holes left in the cards determines accurately the angular motion of the axis of the shell. From this the values of the chief components of the force system are deduced. One of the principal results is to determine accurately the spin required to render the shell stable at any velocity. The behaviour of the force components as functions of the velocity appears to be of scientific interest, and of obvious importance in technical ballistics.—Prof. W. E. Dalby: Researches on the elastic properties and the plastic extension of metals. This paper relates to a new type of load-extension diagram recorded automatically by an adaptation of an instrument already described to the society. The extension of the test piece is multiplied 150 times by the instrument. With this magnification, about  $\frac{1}{1000}$  extension is shown on the negative, and the elastic line appears at a slope of about 60°. The shape of the elastic line can therefore be studied and the process of extension can be watched, so that stretching can be stopped at an assigned value and the load removed and then re-applied. The removal and re-application of the load produce a loop on the diagram, and several such loops can be described on each negative. Looped diagrams taken from metals commonly used were shown. Comparisons of these looped diagrams show that each metal is characterised by its elastic line and loops. A succession of plates was taken from a test piece of high carbon steel stretched almost to breaking. These plates set end to end give a procession of loops, and show that the loop area tends to a maximum. The questions of time-interval between the taking of loops and heat treatment between the taking of loops are examined in relation to loop area. It is shown that in the high carbon steel and alloy steel lapse of time has little or no effect in restoring elasticity, nor is the elasticity restored by boiling in water. New data relating to the strength of materials are given by these diagrams, viz.: (1) The area of the loop. (2) The rate of increase of the area of the loop. (3) The maximum area.—C. T. R. Wilson: Investigations on lightning discharges and on the electric field of thunderstorms. The investigations were carried out at the Solar Physics Observatory, Cambridge, by methods already described (Proceedings, 1916). Apparatus has been added to secure a photographic record of the readings of the capillary electrometer used in the measurements. Changes in the electric field which occupy less than a tenth of a second are recorded. The sudden changes produced in the potential gradient by the passage of lightning discharges recorded in 1917 were positive in 432 cases and negative in 270. The mean value of the electric moment  $2QH$  ( $Q$  being the quantity discharged and  $H$  the vertical height through which this charge is displaced) of a lightning discharge is about  $3 \times 10^{16}$  e.s.u.  $\times$  cm. or 100 coulomb-kilometres. The mean quantity discharged is of the order of 20 coulombs. The magnitude of the potentials attained in thunderclouds is of the order of  $10^9$  volts. The rate of vertical separation of charges in a thundercloud may amount to some coulombs per second, i.e. the vertical current through the cloud is of the order of some amperes. A thundercloud or showercloud may be regarded as an electric generator, capable of maintaining between



its poles an electromotive force of the order of  $10^9$  volts. It tends to maintain an electric current from the earth to the conducting layers of the upper atmosphere or in the reverse direction, according as its polarity is + or -. The difference which must exist in the conductivity of the air above showerclouds of + and of - polarity respectively, owing to the large difference between the mobilities of the negative and positive ions dragged out of the conducting layer by the field of the cloud, furnishes a possible explanation of the normal positive potential gradient at a distance from showerclouds. It is also shown that it will account for the prevailing negative sign of the potential gradients associated with showerclouds and for the preponderance of positively charged rain and positive lightning discharges, *i.e.* discharges which produce a positive change of potential gradient.—L. F. Richardson: The supply of energy to atmospheric eddies. Osborne Reynolds investigated the energy of eddies as a balance between income and expenditure. The income was the activity of the eddy stresses upon the corresponding rates of mean strain; the expenditure was by way of molecular viscosity. His theory refers to an incompressible liquid, but it is shown in the present paper that the same applies to an elastic fluid. In a gravitating atmosphere there is an additional channel for gain or loss, because the eddies act as thermo-dynamic engines, either producing or decreasing inequalities of temperature. They are, however, imperfect engines. It is shown that the activity contributed by the eddies by this process is

$$\frac{g}{\gamma\phi} c \frac{\delta\sigma}{\delta h} \text{ per volume,}$$

where  $g$  is the acceleration of gravity,  $\gamma\phi$  the thermal capacity per mass,  $c$  the eddy-conductivity,  $\sigma$  the entropy per mass, and  $h$  the height. In the actual atmosphere this activity is ordinarily an expenditure by the eddies. By balancing it against their income a criterion of turbulence is obtained. Some observations of the quiescence of wind on a clear evening tend to confirm the theory.

**Geological Society**, May 5.—Mr. G. W. Lamplugh, vice-president, in the chair.—S. H. Warren: A natural "eolith" factory beneath the Thanet Sand. The paper describes a section in the Bullhead Bed at Grays, where the conditions have been favourable for the chipping of the flints by subsoil pressure. There is evidence of extensive solution of the chalk beneath the Tertiary deposits, and the differential movements thus brought about have occasioned much slickensiding, and remarkable effects in the chipping of the flints. In the author's opinion the section affords the most complete and conclusive evidence hitherto obtained in support of the theory of the origin of the supposed eolithic implements by purely natural agencies. There are not only the simpler Kentish types, such as notches, bowsrapers, and the like, but also the larger and more advanced forms of rostrocarinates, which are characteristic of the sub-Crag detritus-bed. Careful digging enables the pressure-points of one stone against another and the resultant chipping effects to be studied in detail; and in many instances the flakes removed can be recovered and replaced. A few examples are more than merely eolithic in character. If such exceptional examples were removed from their associates, and also from the evidences of the geological forces to which they have been exposed, no investigator could be blamed for accepting them without question as of Mousterian workmanship. Individual specimens may often deceive: in order to distinguish a geological deposit of chipped

flints from the debris of a prehistoric chipping-floor, it is necessary to base one's judgment upon fairly representative groups, and also to take into consideration the circumstances in which they have been discovered.

## CAMBRIDGE.

**Philosophical Society**, March 8.—Mr. C. T. R. Wilson, president, in the chair.—H. H. Brindley: Further notes on the food-plants of the common earwig (*Forficula auricularia*). The observations on the food-plants of the common earwig made on a small scale in 1917 (Proceedings, xix., part 4, 1918, p. 171) were continued in the summers of 1918 and 1919 on earwigs kept in captivity in connection with a statistical inquiry on variation. Altogether about ninety species of common plants, chiefly garden varieties, were used. Among the most favourite foods were the leaves of Jerusalem artichoke, beetroot, pink begonia, garden cabbage, centaurea, delphinium, leek, *Malvus sylvestris*, vegetable marrow, mignonette, white pyrethrum, scarlet runner, sea-kale, and tomato; and the petals of blue Anchusa, China aster, pink begonia, blackberry, different varieties of campanula, white clematis, dandelion, Gesneria, white marguerite, mint, corn parsley, white phlox, yellow *Eriogonum*, rose, tomato, red valerian, blue verbena, and varieties of vetches. Among fruits green fig, honeysuckle, and plum were well attacked, while apple was neglected until the skin was removed, and then eaten comparatively little. Potato and artichoke tubers, save dormant buds on the latter, escaped attack in their skins, but when sliced they were thoroughly devoured. The hairy undersides of the leaves of raspberry and blue verbena and the curled edges of Scotch kale leaves are very attractive to earwigs for hiding in in the day-time, and onion inflorescences, poppy capsules, buds of hollyhock, petals of garden chrysanthemums and snapdragon are also popular refuges. The last two and Scotch kale leaves were also nibbled moderately, but the conclusion formed in 1917 that the actual damage done to chrysanthemums by earwigs is usually exaggerated was confirmed by the later observations.—Miss Maud D. Haviland: Preliminary note on antennal variation in an Aphid (*Myzus ribis*, Linn.). The red currant Aphid (*Myzus ribis*, Linn.) shows variation of the antennæ in the winged females, according to whether they are fed upon healthy leaves or upon leaves blistered by the sucking of previous generations. In forms from the blisters the large sense-organs, situated upon antennal joints v. and vi., are placed nearer the articulation of these joints than in forms from healthy leaves. Experiments on transference of blister-fed descendants of a single ancestor to healthy leaves showed but slight change in the first two or three generations. Subsequent generations, however, showed marked increase above the ancestral mean, though identical generations, fed only upon blistered leaves, had a mean similar to that of their ancestors.—Dr. Fenton and A. J. Berry: Studies on cellulose acetate. The authors gave a short account of certain observations of general chemical interest obtained in the course of an investigation on aeroplane dopes.—G. T. Bennett: The rotation of a non-spinning gyrostat, and its effect in the aeroplane compass. "A symmetrical wheel free to rotate about its axle is moved from rest in any position by means of the axle, and is finally restored to a position in which the axle again points in the same direction as formerly. Show that the wheel, again at rest, will have rotated through a plane angle equal to the solid angle of the cone described by the varying directions of the axle" (College Examination Problem Paper, 1898). The kinematics of the angular motion of the wheel is



represented by the rolling of the plane of the wheel on a fixed cone of arbitrary form. The surface-angle of the cone differs from four right angles by the final angular displacement of the wheel. The same angle of rotation is also measured by the solid angle of the reciprocal cone described by the axis of the wheel. This movement is not yet among those that are familiarly recognised, though it has important practical applications. Bodies suspended from a point on an axis of symmetry behave in the same way and for the same reason when swung about by movements of the point of support. Aeroplane compass-cards in particular (found to keep practically parallel to the banked floor of the aeroplane under the action of gravity and lateral acceleration during a turn) would, from inertia alone, and apart from all other sources of control or disturbance, turn with the machine through an angle geometrically calculable from the movement of the aeroplane.—C. G. Darwin: Lagrangian methods for high-speed motion. The general form of the kinetic potential is found for any number of electrically charged particles moving in any field of electric and magnetic force, allowing for the variability of mass with velocity and for the "retardation" of the forces of interaction of the particles. The result is applied to the "problem of two bodies." The relative orbit is a distorted ellipse with moving apse, and there is no simply definable centre of mass for the system. The finiteness of mass of the hydrogen nucleus is found to have absolutely no effect on the separation of the doublets in the hydrogen spectrum.—H. P. Waran: The effect of a magnetic field on the intensity of spectral lines. The paper discusses the changes observed in the general spectrum and in the intensity of the lines when the source is placed in a magnetic field. In the case of mercury the field brings out a few lines previously faint or absent, and the abnormal behaviour of the line 6152, which is very prominently brought out, is discussed. In the spectrum of the monatomic gases helium and neon mixed with the diatomic gases oxygen and hydrogen, only the monatomic lines are enhanced very much in brightness, and on this view the fact of the lines getting enhanced in the magnetic field is attributed to atomic radiation. The differences in the degrees of enhancement are said to depend on the series to which the lines belong, and the enhanced lines in the sun-spot spectrum are attributed to this effect of the magnetic field known to exist there.—C. V. H. Rao and Prof. Baker: Generation of sets of four tetrahedra mutually inscribed and circumscribed. This paper shows how the figure is obtainable by a generalised process of inversion from a single tetrahedron, and applies the same method to a certain configuration in four dimensions.—S. Pollard: The term-by-term integration of an infinite series over an infinite range, and the inversion of the order of integration in repeated infinite integrals.—S. R. U. Savoor: Rotating liquid cylinders. This paper applies the method followed by Liapounoff, for the case of ellipsoids, to the consideration of the stability of the so-called pear-shaped cylinder.

## DUBLIN.

Royal Dublin Society, April 27.—Dr. F. E. Hackett in the chair.—Prof. W. E. Adeney and H. G. Becker: The rate of solution of atmospheric nitrogen and oxygen by water (Part iii.). This paper deals with experiments made with bodies of quiescent water, the results of which show that under ordinary conditions mixing of the water takes place to such an extent that a modification of the formula previously deduced can be used to interpret the process. The effect of the humidity of the air above the surface of the water is

also dealt with and its influence on the rate of solution indicated.—Dr. J. Reilly and W. J. Hickinbottom: (1) The influence of electrolytic dissociation on the distillation in steam of the volatile fatty acids. Changes in the distillation constants of the fatty acids are fully accounted for by introducing a correction for electrolytic dissociation. Observations are given on the influence of salts. (2) Some applications of the method of distillation in steam. A survey of the method, discussing its theoretical and industrial applications, especially in the analysis of butter and other edible fats and oils.

## PARIS.

Academy of Sciences, April 26.—M. Henri Deslandres in the chair.—A. Haller and R. Cornubert: The constitution of the methylethylcyclohexanone prepared by the ethylation of  $\alpha$ -methylcyclohexanone. This compound is shown to possess an unsymmetrical structure, both the alkyl groups being attached to the same carbon atom in the ring.—H. Douvillé: The origin of the Orbitoids.—A. Blondel: Theorems on the transmission of energy by alternating current analogous with those of Siemens on transmission by continuous current. Criticism of these theorems.—E. Maillet: Some properties of transcendental numbers.—C. Camichel: The permanent state in water reservoirs.—A. Perot: The variation with pressure of the wavelength of the lines of the cyanogen band.—F. Bourion: A method of physico-chemical analysis of commercial chlorobenzenes. By fractional distillation the specimen is divided into portions each containing only two constituents; measurements of density serve to determine the composition of each fraction. The accuracy obtained is illustrated by examples.—A. Kling and D. Florentin: The differentiation of masked and apparent sulphuric ions in complex salts. The use of benzidine as a reagent, suggested in a recent paper by P. Job and G. Urbain, was anticipated by the authors in 1914 in a study of solutions of the green chromium sulphate.—V. Auger: The salts of nitrosophenylhydroxylamine (cupferron); uranous salts. Uranic salts are not precipitated by cupferron, and vanadium can be quantitatively precipitated by cupferron in the presence of uranium, as was shown by Turner in 1916. If, however, by zinc reduction the uranic salts are converted into uranous compounds, the uranium can be precipitated also by cupferron, and under these conditions vanadium and uranium can be successively determined by means of the cupferron.—G. Denigès: Iodic acid as a microchemical reagent for calcium, strontium, and barium. A 10 per cent. solution of iodic acid forms a good reagent for the microchemical identification of calcium, strontium, and barium salts, soluble or insoluble. One milligram of material is sufficient for the purpose.—Ch. Mauguin and L. J. Simon: The action of chlorine, hypochlorous acid, and cyanogen on cyanamide and its derivatives.—P. Bertrand: Value of the primary centrinetal metaxylem of old or primitive plants.—M. Guilliermond: The evolution of the chondriome during the formation of the pollen-grains of *Lilium candidum*.—H. Devaux and H. Bouygues: The usefulness of sodium fluoride employed as an antiseptic for the preservation of railway-sleepers. The scarcity of creosote has led railway companies to try other antiseptics for the preservation of wooden sleepers, and, among others, sodium fluoride has been extensively used. While there is no doubt as to the efficiency of sodium fluoride as an antiseptic, on account of the ease with which it is extracted by water, it is useless for the preservation of wood exposed to rain, and especially for the case of railway-sleepers.—A. Desgrez



and M. Polonowski: Determination of the total non-amino organic acids of the urine.—H. Colin: The diastatic hydrolysis of inulin. An account of some unsuccessful attempts to isolate products of hydrolysis intermediate between inulin and the reducing sugars.—J. E. Abelous and J. Aloy: Digestive hydrolyses by mechanical ionisation of water. Violent agitation is sufficient to determine a partial hydrolysis of solutions of starch, lactose, neutral fats, and fibrin. The effects increase with rise of temperature.—J. Chaîne: Considerations on the paramastoid apophysis of man.—A. Krempf: Observations on the development of *Pocillopora cespitosa* and *Seriatopora subulata*. Discovery of primitive stages revealing the scyphostrobiliary origin of the Anthozoa.—MM. Weinberg and Nasta: Rôle of the hæmolysins in microbial intoxication and the therapeutic properties of normal sera.—A. Marie, C. Levaditi, and G. Banu: Experimental transmission of the triponeme of general paralysis (*virus neurotrope*) by sexual contact.

**Books Received.**

The Idea of Progress: An Inquiry into its Origin and Growth. By Prof. J. B. Bury. Pp. xv+377. (London: Macmillan and Co., Ltd.) 14s. net.  
 Nauka Polska. Tom ii. Pp. ix+676. (Warszawa.) Cena M.P. 25.  
 Dumbartonshire. By Dr. F. Mort. Pp. viii+155. (Cambridge: At the University Press.) 4s. 6d. net.  
 Orkney and Shetland. By J. G. F. Moodie and H. and T. Mainland. Pp. xii+167. (Cambridge: At the University Press.) 4s. 6d. net.  
 Report on the Quantum Theory of Spectra. By Dr. L. Silberstein. Pp. iv+42. (London: Adam Hilger, Ltd.) 5s. net.  
 Problems of Population and Parenthood: Being the Second Report of and the Chief Evidence taken by the National Birth-Rate Commission, 1918-20. Pp. clxvi+423. (London: Chapman and Hall, Ltd.) 25s. net.

**Diary of Societies.**

*THURSDAY, MAY 20.*

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—A. P. Graves: Welsh and Irish Folk Song.  
 ROYAL SOCIETY at 4.30.—Prof. J. N. Collie: Some Notes on Krypton and Xenon.—Sih Ling Ting: Experiments on Electron Emission from Hot Bodies, with a Preface by Prof. O. W. Richardson.—Dr. L. Silberstein: The Aspherical Nucleus Theory Applied to the Balmer Series of Hydrogen.—Dr. T. E. Stanton, Miss D. Marshall, and Mrs C. N. Bryant: The Conditions at the Boundary of a Fluid in Turbulent Motion.  
 ROYAL SOCIETY OF ARTS (Indian Section), at 4.30.—Brig.-Gen. Lord Montagu of Beaulieu: Roads and Transport in India  
 ROYAL SOCIETY OF MEDICINE (Dermatology Section), at 5.—Annual General Meeting.  
 INSTITUTION OF MINING AND METALLURGY (at Geological Society), at 5.30.—G. Rigg: Roasting and Lead-Smelting Practice at the Port Pirie (S.A.) Plant of the Broken Hill Associated Smelters Proprietary, Ltd.—Capt. H. Tatham: Tunnelling in the Sand Dunes of the Belgian Coast.  
 INSTITUTION OF ELECTRICAL ENGINEERS (at Institution of Civil Engineers), at 5.30.—(Annual General Meeting.)  
 NUMISMATIC SOCIETY, at 6.  
 OPTICAL SOCIETY, at 7.30.—B. K. Johnson: The No. 7 Dial Sight, Mk II.—Lt.-Col. Gifford: A Short High Power Telescope.  
 CHEMICAL SOCIETY (Ordinary Meeting; Informal Meeting), at 8.—D. J. and Mrs. Matthews: Exhibit demonstrating the Methods of Controlling Soil Organisms now being Investigated at the Rothamsted Experimental Station.—Dr. Marie Stopes: Exhibit Specimens and Microscopic Slides of Fusain, Durain, Clarain, and Vitrain, the Four Main Constituents of Banded Bituminous Coal.—E. R. Thomas: Experiments Illustrating the Influence of Temperature, Concentration, Solvent, Constitution, and Catalyst on the Rate of Chemical Change.  
 SOCIETY OF ANTIQUARIES, at 8.30.

*FRIDAY, MAY 21.*

ROYAL SOCIETY OF MEDICINE (Otology Section), at 5.—Annual General Meeting.  
 WIRELESS SOCIETY OF LONDON (at Institution of Civil Engineers), at 6.—P. Coursey: Some Methods of Eliminating Atmospheric Interference in Wireless Reception.  
 ROYAL SOCIETY OF MEDICINE (Electro-Therapeutics Section), at 8.30.—Annual General Meeting.

ROYAL INSTITUTION OF GREAT BRITAIN, at 9.—Prof. J. A. Fleming: The Thermionic Valve in Wireless Telegraphy and Telephony.

*SATURDAY, MAY 22.*

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Frederic Harrison: The Re-action and the Critics of the Positivist School of Thought.

*TUESDAY, MAY 25.*

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Major C. E. Inglis: The Evolution of Large Bridge Construction.

*WEDNESDAY, MAY 26.*

ROYAL AERONAUTICAL SOCIETY (at Royal Society of Arts), at 8.—Sir Richard T. Glazebrook: Some Points of Importance in the Work of the Advisory Committee for Aeronautics.

*THURSDAY, MAY 27.*

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—William Archer: Dreams, with Special Reference to Psycho-Analysis  
 LINNEAN SOCIETY (Anniversary Meeting), at 3.  
 ROYAL SOCIETY, at 4.30.

CONCRETE INSTITUTE (Annual General Meeting, followed by an Ordinary Meeting), at 7.30.

*FRIDAY, MAY 28.*

ROYAL SOCIETY OF ARTS (Indian and Colonial Sections, Joint Meeting), at 4.30.—Prof. W. A. Bone: Lignite.

ROYAL SOCIETY OF MEDICINE (Study of Disease in Children), at 4.30.—(Annual General Meeting.)

PHYSICAL SOCIETY OF LONDON, at 5.—Sir W. H. Bragg and Others: Discussion on X ray Spectra.

ROYAL INSTITUTION OF GREAT BRITAIN, at 9.—Prof. W. L. Bragg: Crystal Structure.

*SATURDAY, MAY 29.*

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Dr. J. H. Jeans: The Theory of Relativity (Tyndall Lectures).

**CONTENTS**

	PAGE
The Officers Training Corps and the Universities	349
Relativity and Geometry. By E. Cunningham	350
Colloidal Therapy	351
Nature Pictures. By W. E. C.	352
Our Bookshelf	352
Letters to the Editor:—	
The Cost of Scientific Publications.—Prof. G. H. Hardy, F.R.S.; Dr. A. B. Rendle, F.R.S.; Dr. B. Daydon Jackson; Dr. Charles S. Myers, F.R.S.	353
The Indian Chemical Service.—Dr. M. W. Travers, F.R.S.	354
A New Method for Approximate Evaluation of Definite Integrals between Finite Limits.—A. F. Dufton	354
British and Metric Systems of Weights and Measures. M. E. Yeatman	355
Scientific Apparatus and Laboratory Fittings.—Conrad Beck; B. H. Morphy; C. Baker; Bellingham and Stanley, Ltd.; Wm. Taylor; H. W. Ashfield	355
Naturally Fractured Eocene Flints.—J. Reid Moir	358
International Council for Fishery Investigations.—Prof. W. C. McIntosh, F.R.S.	358
Sea and Sky at Sunset.—Lt.-Col. K. E. Edgeworth; J. S. D.	358
Scientific Research.—Dr. John W. Evans, F.R.S.	358
Imperial Air Routes. (Illustrated.)	359
Helium: Its Discovery and Applications. (Illustrated.) By Dr. William J. S. Lockyer	360
New Conceptions of Psychology	363
Obituary:—	
Principal R. M. Burrows	364
Notes	366
Our Astronomical Column:—	
A Bright Fireball	370
Conjunction of Mercury with $\epsilon$ Geminorum	370
Longitude by Wireless Telegraphy	370
Periodicity in Weather and Crops. By W. W. B.	370
The National Food Supply	371
The Research Association. By J. W. E.	372
Solid Lubricants. By L. A.	372
Greek Science and Philosophy	373
Life-history of the Periwinkle	373
The Royal Society Conversazione	373
University and Educational Intelligence	376
Societies and Academies	377
Books Received	380
Diary of Societies	380