

in geology; Dr. Shore, in physiology; and Mr. J. H. Grace, in mathematics. Mr. C. Warburton has been reappointed demonstrator in medical entomology for a period of three years.

GLASGOW.—On June 21 the honorary degree of Doctor of Laws (LL.D.) was conferred upon Prof. G. B. Mathews, F.R.S., formerly fellow of St. John's College, Cambridge, and Dr. G. S. Middleton, president of the Association of Physicians of Great Britain and Ireland. Other doctorates conferred on the same day were:—Doctor of Philosophy (D.Phil.), H. A. Reyburn; and Doctors of Science in Public Health (D.Sc. Pub. Health), A. A. Jubb and P. L. Sutherland.

LONDON.—Sir Alfred Pearce Gould has been elected Vice-Chancellor in succession to Sir Wilmot Herringham. For several months past Sir Alfred has been acting Vice-Chancellor in view of Sir Wilmot's absence on active service.

The Senate, at its meeting on June 16, appointed Dr. W. H. Bragg, F.R.S., to the Quain chair of physics, tenable at University College, in succession to Prof. F. T. Trouton. Dr. Bragg is at present Cavendish professor of physics in the University of Leeds.

The D.Sc. degree in chemistry has been granted to Mr. H. V. A. Briscoe, Imperial College (Royal College of Science), and the D.Sc. degree in physics to Mr. Thomas Barratt, Imperial College (Royal College of Science) and East London College, and to Mr. A. E. Oxley, an external student.

OXFORD.—The School of Geography has announced courses of lectures and practical instruction to be given next term on the following subjects:—Central Europe, physical and economic; geographical distribution of man and of rural occupations; form and movements of the earth (Prof. Herbertson); geography of Britain (Mr. Beckit and Miss MacMunn); land forms (Mr. Beckit); meteorology (Mr. Kendrew); surveying (Mr. MacKenzie). Lectures will be given on general geology and the geology of India by Prof. Sollas, and on the historical geography of Great Britain by Mr. C. Grant Robertson.

The committee for anthropology announces lectures and informal instruction on physical anthropology, psychology, geographical distribution, prehistoric archaeology and technology, social anthropology and philology. The lecturing staff includes Prof. A. Thomson, Mr. H. W. Blunt, Mr. H. Balfour, the Rector of Exeter College, Prof. J. L. Myres, Prof. Sollas, Mr. E. T. Leeds, Mr. E. F. Carritt, Mr. Griffith, Dr. Marett, Prof. Vinogradoff, Mr. C. Bailey, Prof. Macdonell, Mr. V. A. Smith, Mr. S. Langdon, Mr. P. Manning, Prof. Wright the Principal of Jesus College, Prof. J. A. Smith, and Mr. A. C. Madan. Special lectures for Sudan probationers will be given by Mr. H. Balfour and Dr. R. R. Marett.

MR. S. C. LAWS, principal of the Loughborough Technical Institute, has been appointed principal of the Wigan Mining and Technical College.

IN its issue for June 4 *Science* announces the following gifts to American universities. Dr. L. D. Waterman, of Indianapolis, professor emeritus in the Indiana University School of Medicine, has made a gift to Indiana University amounting to 20,000*l.*, subject to an annuity during his lifetime, on the condition that the University devotes an amount equal to the income from this gift, the entire proceeds to be used for scientific research. The conditions and gift have been accepted by the University. Mr. A. Bonnheim, of Sacramento, has given to the University of California an endowment of 6000*l.*, with provision for

its subsequent increase to 32,000*l.*, the income to be devoted to the maintenance of scholarships. Another gift of 17,000*l.* has been made for the erection of dormitories at Cornell University. This gift comes from the same anonymous contributor of 50,000*l.* some time ago.

IN his last report to the Union Government of South Africa, the Secretary for Agriculture points out that the difficulty of procuring good men to fill the scientific and administrative posts in the Department, which has been commented on before, continues. Men of moderate attainments are plentiful and easy to obtain, but good men are more in request than ever. It also appears as if men who are really worth having, and therefore usually in a position to choose, prefer to work in universities and other learned institutions which are independent or semi-independent of Government control, or engage in business on their own account, rather than in Government Departments, as in the former they have more scope and freedom of action and have not to waste time by furnishing multitudes of returns and continually explaining and demonstrating the necessity for their existence. Seeing that the value of the Department to the country depends in the first instance entirely upon the quality of its professional and administrative officers, this is a very serious matter. Efforts are being made to overcome the difficulty of obtaining professional and technical officers by giving scholarships to likely young men to study at institutions abroad, at which they can get the best training obtainable in their particular subjects. The course of study is usually a four years' one, and a number of scholars have already returned and been drafted into the Department. It is considered that this is one of the best methods of obtaining officers for the Department, but it may not entirely suffice, and from time to time officers will have to be appointed from wherever they are obtainable, as at present.

SOCIETIES AND ACADEMIES.

LONDON.

Linnean Society, June 3.—Prof. E. B. Poulton, president, in the chair.—The Misses Katherine Foot and E. C. Strobell: The results of crossing two Hemipterous species, with reference to the inheritance of two exclusively male characters. This may be considered as a continuation of the paper published in the Society's Journal (zoology), xxxii. (1914), pp. 337-373, on crossing *Euschistus variolarius* with *E. servus*, and the inheritance of a spot on the genital segment, which was an exclusively male character in the former species. The newly-discovered male character now investigated is the length of the intromittent organ, and is tabulated in the paper. The results of the crossing were not in accordance with Mendelian ratios as regards F₁ individuals. The authors further show that male characters can be transmitted without the Y chromosome. H. W. Monckton: Note on the plant-association at the foot of the Boium Glacier, Norway. The Boium is one of the larger glaciers which descends from the great Jostedal snow-field. It flows down into a head-valley of the Fjaerlandsfjord, and the foot of the ice is 492 feet above the sea. The latitude is between 61° and 62°, that is a little north of the Shetlands. At the foot of the ice there is the usual desolate space with fresh moraine, and plants are gradually finding their way on to this ground. In places where the ice has advanced a little, plants may be found growing and flowering close to the glacier itself. Among the plants thus creeping on to the moraine were noticed a combination of mountain and

valley forms: of mountain plants there were:—*Salix herbacea*, L., *Saxifraga stellaris*, L., and *Phyllodoce caerulea*, L.; and of forms of general distribution which one does not usually associate with glaciers there were *Alchemilla alpina*, L., *Trientalis europaea*, L., *Pirola minor*, L., *Pinguicula vulgaris*, L., *Phegopteris Dryopteris* L., *Lotus corniculatus*, L., *Sagina procumbens*, L., and a species of *Epilobium*.—Dr. Otto Stapf: The Dragon Tree of Tenerife. The author showed various illustrations of the celebrated tree at Orotava, and especially a drawing by Don Augustin Monteverde, dating from the earlier months of 1819, before the tree was partially destroyed by a gale on July 21, in that year. This drawing is the property of Dr. Perez, of Orotava, who had sent it to Kew for comparison with other illustrations. Dr. Stapf discussed the known history of the dragon tree of the Canaries and notices of it from early writers, referring *inter alia* to the resinous product known as "Dragon's Blood," formerly used as a pigment and in medicine, but now almost restricted to colouring varnishes.

Zoological Society, June 8.—Dr. S. F. Harmer, vice-president, in the chair.—G. JENNISON: The "nest" made by a chimpanzee in the Belle Vue Zoological Gardens, Manchester.—R. I. Pocock: The feet, scent-glands, and other external characters of the Paradoxurine Viverrids, belonging to the genera *Paradoxurus*, *Arctogalidia*, *Arctictis*, and *Nandinia*. It is shown how these may be distinguished collectively from the Viverrine genera (*Genetta*, *Viverra*, etc.), and also how they may be differentiated from each other in the characters discussed.—Dr. A. Smith Woodward: The skull of an extinct mammal related to *Æluropus*, obtained from a cave at the ruby mines, Mogok, Upper Burma. The skull is described as the type of a new genus and species.—Miss K. M. Parker: The early development of the heart and anterior vessels in marsupials, with special reference to *Perameles*.—Lieut. R. Broom: Certain Triassic Stegocephalians. Restorations are given of the skulls of *Brachyops laticeps*, Owen, and *Bothriceps australis*, Huxley, which are regarded as forming, with *Batrachosuchus browni*, Broom, a distinct family, *Brachyopidae*. *Bothriceps huxleyi*, Lydekker, is shown to differ from *Bothriceps australis* in the structure of the occiput, and in having numerous small teeth on the parasphenoid, pterygoids, and prevomers, and thus to belong to a very distinct new genus.

Geological Society, June 9.—Dr. A. Smith Woodward, president, in the chair.—R. H. Rastall and W. H. Wilcockson: The accessory minerals of the granitic rocks of the English Lake District. The rocks described are the granites of Skiddaw, Shap, and Eskdale, the microgranite of Threlkeld, and the granophyre of Buttermere and Ennerdale. The material was pounded in a mortar, washed and panned, and the concentrate separated in bromoform after the removal of the magnetic portion. The results showed a variation of accessory minerals between the different intrusions, but a similarity between parts of the same intrusion, although the minerals of apophyses are not always the same as those of the main mass. One remarkable result obtained is the rarity of magnetite and the prevalence of pyrrhotite, which was present in every sample examined. Attention was directed to the characteristics of the zircon-crystals, which lent no support to the occurrence of definite types in granite and gneissose rocks respectively. In parts of both the Skiddaw granite and the Threlkeld microgranite, anatase and brookite were found in abundance. Epidote is the characteristic mineral of the Ennerdale granophyre, while garnet is abundant at Threlkeld and Eskdale. The Eskdale granite also contains much tourmaline. The Shap granite is characterised by

apatite and sphene. Descriptions of accessory minerals founded only on examination of rock-slices are inadequate and misleading.—F. P. Mennell: The rocks of the Lyd Valley, above Lydford (Dartmoor). A small area on the north-east of Dartmoor is chiefly considered, though some of the conclusions are applicable to nearly all that part of the moor which lies north of the portion mapped by the Geological Survey. In the neighbourhood of Lydford the alteration of the Carboniferous rocks within the metamorphic aureole surrounding the granite is described, and it is shown that they are consistently cordierite- and biotite-bearing. North of the altered limestone the type of alteration is different, and leads to the inference that the beds are distinct. The change is of more than local significance, as from this point all round the north of the moor there is no bed of any thickness containing cordierite, while chiastolite, white mica, and andalusite proper, are characteristic. Coarse andalusite-rock and altered shale, with remarkable skeleton-crystals of chiastolite, are described from the Nodden quarries, together with other types of hornfels. The beds occupying the northern part of the contact-zone belong to a definite series. There is evidence that the cover of the granite mass has a dome-like character, and that the same stratigraphical horizon is in contact with the granite all the way from Sourton to Drewsteignton. The granite of Brator is described. It is a biotite-bearing rock containing a little microcline, as well as orthoclase and oligoclase. It is rich in cordierite, recrystallised from sedimentary material absorbed into the magma.

Physical Society, June 11.—Dr. A. Russell, vice-president, in the chair.—E. A. Griffiths and E. Griffiths: The coefficient of expansion of sodium. The thermal expansion and increase in volume on liquefaction of sodium were determined by a method based on the following principle:—The difference in expansion of a volume of sodium and an equal volume of glass (or quartz) was measured by differential weighing under oil at various temperatures. A volume of about 250 c.c. of sodium was suspended from one arm of a short beam balance and a weighed glass bulb of equal displacement from the other arm. Sodium expands uniformly with the temperature up to its melting point. The value 0.000226 was deduced for the coefficient of expansion. In changing from the solid to the liquid state, an increase of 2.57 per cent. occurs in the volume.—T. Smith: Notes on the calculation of thin objectives. Lens systems which are symmetrical about an axis have in general six degrees of freedom for first-order aberrations. Thin systems have only three degrees of freedom, and in consequence of the limited range of glasses only two degrees of freedom are practically available. In achromatic combinations of two lenses these two degrees of freedom are controlled by the general shape as distinct from the total power of each lens. In general when two given conditions are satisfied the curvatures of the inner surfaces are not equal, so that a cemented combination of two lenses is not possible. Owing to the increased light transmitting powers it is often necessary to have only two glass air surfaces, and thus more than two component lenses are necessary. The effect of bending any thin system as a whole by increasing the curvature of each surface by the same amount is investigated, and it is shown that with two given kinds of glass a triple cemented lens can be formed satisfying two arbitrary aberration conditions. Illustrations are given of astronomical objectives of both double uncemented and triple cemented forms, and the glasses are determined for which a doublet can be cemented.—T. Smith: Tracing rays through an optical system. Trigonometrical formulæ have been used for tracing rays not lying entirely in one plane through optical

systems, as these can readily be arranged in a form suitable for logarithmic calculation. When a calculating machine is available such computations can be carried out more expeditiously by using algebraic formulæ; in form these correspond with the expressions for paraxial rays, and a comparison of the numerical result is likely to suggest what alterations should be made when a general ray does not behave as desired. If the two points in which a general ray meets an axial plane are defined as conjugate points, all pairs of conjugate points on a ray are connected by the same relations as hold for object and image points for paraxial rays, and the theory for paraxial rays can be extended to rays in general by placing a suitable interpretation on magnification, etc. The definition of conjugate points can be extended to include rays lying in axial planes, in which case the one point marks the intersection of the ray with the radial focal line formed by rays passing through its conjugate.—**H. R. Nettleton**: The accuracy of the lens and drop method of measuring refractive index. A simple arrangement for comparing on an optical bench the refractive indices of liquids for monochromatic light by the lens and drop method is described. The accuracy and sensibility of the method are discussed. Attention is directed to the 'accuracy' obtainable in measuring a small radius of curvature of a lens face in terms of the well-known refractive index of water, and in measuring the refractive index of the glass of a lens.

Royal Meteorological Society, June 16.—**Prof. H. H. Turner**: Discontinuities in meteorological phenomena. Meteorological history is divided into "chapters" averaging $6\frac{1}{2}$ years long, with abrupt changes (or "discontinuities," as the author calls them) between. The dates of change are apparently settled by the movement of the earth's axis. They oscillate about mean positions in a cycle of 40.5 years, which appears in Brückner's collected "cold winters" for 800 years; in Nile flood records for 1000 years; and in measures of Californian tree rings for 520 years. The chapters are alternately hot and cold, wet and dry, as shown by rainfall and temperature records at Greenwich, Padua, and Adelaide.—**C. Harding**: Battle weather in western Europe, nine months, August, 1914, to April, 1915. The author briefly described the weather conditions bordering on the battle area of the western front. At the commencement of the war generally bright and dry weather prevailed, with occasional short spells of rain, but from mid-October to the end of February rainy and rough weather continued with but little cessation. Taking widely distributed stations over the British Isles, it was shown that the rainfall for the nine months in the north and west was below the average, but in the south and south-east it greatly exceeded the normal. With the western Continental stations the rainfall for the same period was everywhere excessive. The author says:—"It is not suggested that in the recent wet weather the rainy conditions have been generated by gun-firing, but it seems quite possible that at times, when the conditions are favourable to rain, the rains have been augmented or accelerated by the concussion initiated over the battle-grounds."

DUBLIN.

Royal Irish Academy, June 14.—**Sir John Ross** of Bladensburg, vice-president, in the chair.—**H. Ryan** and **Miss P. O'Neill**: Studies in the diflavone group. II.—Derivatives of diflavanone. By the action of benzaldehyde on diacetoresorcinol four isomeric substances were obtained. Three of these were cis-trans stereoisomeric dihydroxydichalkones, and the fourth was a structural isomeride of the others. α -Dihydroxydichalkone in the presence

of alcoholic hydrochloric acid condensed with benzaldehyde, anisaldehyde, and piperonal, to yield dibenzylidene, dianisylidene, and dipiperonylidene derivatives of diflavanone. It was also found that dibenzylidenediflavanone can be obtained directly from diacetoresorcinol by condensation with excess of benzaldehyde in the presence of alcoholic hydrochloric acid, and in the same way the authors obtained dipiperonylidenedimethylenedioxydiflavanone. The latter method was also found well suited for the preparation of analogous monoflavanone derivatives, and was applied to the preparation of the flavindogenides derived from gallacetophenonedimethylether on the one hand, and benzaldehyde, anisaldehyde and piperonal on the other.

PARIS.

Academy of Sciences, June 7.—**M. Ed. Perrier** in the chair.—**A. Lacroix**: Some remarkable contact metamorphic phenomena of Madagascar granite. A description of a new type of amphibole, termed imerinite, intermediate between the richterites and glaucophanes; petrographic examination proved the presence of monazite as well as other minerals. As the presence of the monazite appeared singular, several grams were isolated and analysed and proved to contain 1.05 per cent. of thoria, ceria, 39.51 per cent. oxides of lanthanum and didymium, 27.80 per cent. The thorium is unusually low.—**G. Bigourdan**: Equatorial observations of comets, minor planets, etc., made between 1880 and 1904.—**Jules Amar**: Functional re-education. A description of a new arthro-dynamometer for measuring the values of the angular displacements of the limbs and absolute forces exerted by groups of muscles in the case of invalids recovering from wounds.—**M. Agnus**: The echo of the ball and shell. An explanation of the double detonation heard on the discharge of a rifle or gun.—**Stanislas Meunier**: The structure of the Kodai Canal meteorite (India); an example of cataclasis in meteoric irons.—**P. Maze**: The rôle of chlorophyll. The author regards the pigments in the higher plants as possessing a purely physical function, and considers the direct controlling action of chlorophyll on the assimilation of carbon dioxide as doubtful.—**Em. Bourquelot** and **A. Aubry**: A comparative study of the influence of acetic acid on the synthesising and hydrolysing properties of α -glucosidase (glucosidase from low yeast, air dried). This ferment is very sensitive to the poisonous action of acids. It is destroyed in liquids containing very small proportions of acetic acid, and the fact that the two properties of synthesis and hydrolysis disappear simultaneously under the influence of these quantities demonstrates that both properties belong to one and the same enzyme.

June 14.—**M. Ed. Perrier** in the chair.—**J. Boussinesq**: The approximate calculation of the effect of climate on the velocity of increase of temperature with depth in the soil.—**C. Guichard**: The W congruences which belong to a complex of the second order. Case where the equation in S has a triple root.—**Pierre Delbet**: Pyoculture. Pus from a wound is suggested as the culture medium *in vitro*. It is concluded that if the general and local conditions are such that the patient cannot make headway against the micro-organisms, then the latter will multiply rapidly in the pus secreted. If, on the contrary, the conditions are favourable, then the pus will be a less suitable medium of growth than the ordinary media. These hypotheses have been confirmed experimentally, and details of the method of applying them in practice are given.—**Ernest Lebon**: A new table of divisors of numbers.—**E. Bompiani**: The linear element of hyper-surfaces.—**Arnaud Denjoy**: Derived numbers.—**Thadée Peczaliski**: Researches on thermal conductivity. A description of a new arrangement for the determination of the

thermal conductivity of lead.—**B. Bogitch**: The superficial deformations of steels tempered at moderate temperatures. A study of the corrugations produced on a surface of polished steel on cooling down suddenly from temperatures of 225° to 400° C.—**Louis Gentil**: The Middle and Upper Cretacian in western Haut Atlas, Morocco.—**D. Eginitis**: Recent earthquakes at Leucade and Ithaca.—**H. Colin**: The distribution of invertine in the tissues of the beetroot at different periods in its growth.—**F. Bordas**: The sanitation of the camps and battlefields. Residual heavy tar oil, freed from naphthalene and phenol, mixed with sodium resinate, forms a stable emulsion with water. This mixture is suggested as specially suitable for preventive treatment against flies.—**J. Bergonié**: The vibrations caused by an electromagnet worked with alternating current in non-magnetic bodies.—**Th. Guilloz**: The electric needle for the detection of projectiles in the human body.

BOOKS RECEIVED.

First Course in Chemistry. By W. McPherson and W. E. Henderson. Pp. x+416. (Boston and London: Ginn and Co.) 5s. 6d.
 Geographic Influences in Old Testament Masterpieces. By Prof. L. H. Wild. Pp. xiii+182. (Boston and London: Ginn and Co.) 4s. 6d.
 Reports from the Laboratory of the Royal College of Physicians, Edinburgh. Vol. xiii. Edited by Dr. J. J. G. Brown and Dr. J. Ritchie. (Edinburgh: Oliver and Boyd.)
 Whitby Wild Flowers. By B. Reynolds. Pp. 60. (Whitby: Horne and Sons.) 1s.
 Educative Geography. By J. L. Haddon. Pp. 76. (London: G. W. Bacon and Co., Ltd.) 1s. net.
 Memoirs of the Indian Meteorological Department. Vol. xxi. Part x. Correlation in Seasonal Variations of Weather. iv., Sunspots and Rainfall. By Dr. G. T. Walker. Pp. 17-59. (Simla: Government Central Branch Press.) 1.8 rupees.
 A Critical Revision of the Genus Eucalyptus. By J. H. Maiden. Vol. iii. Part 2. Pp. 23-44+4 plates. (Sydney: W. A. Gullick.) 2s. 6d.
 Field Book of American Trees and Shrubs. By F. S. Mathews. Pp. xvii+465. (New York and London: G. P. Putnam's Sons.) 7s. 6d. net.
 Genetic Theory of Reality. By Dr. J. M. Baldwin. Pp. xvii+335. (New York and London: G. P. Putnam's sons.) 7s. 6d. net.
 The Chemist's Year Book. Edited by F. W. Atack. 2 vols. Pp. 914. (London and Manchester: Sherratt and Hughes.) 10s. 6d. net.
 The Investigation of Mind in Animals. By E. M. Smith. Pp. xi+194. (Cambridge: At the University Press.) 3s. net.
 St. Bartholomew's Hospital in Peace and War. By Dr. N. Moore. Pp. iv+56. (Cambridge: At the University Press.) 2s. net.
 A Report on Researches on Sprue in Ceylon, 1912-14. Pp. x+155. (Cambridge: At the University Press.) 7s. 6d. net.
 A Map of the Western War Area. From the Seine to the Rhine, and from the Swiss Frontier to the Rhine Delta. With Contour Lines and Layered Colouring. Style B. Mounted in Sections, without Names. (Oxford: University Press.) 12s. 6d. net.
 Our British Snails. By Rev. Canon J. W. Horsley. Pp. 69. (London: S.P.C.K.) 1s. net.
 The Beothucks or Red Indians: the Aboriginal Inhabitants of Newfoundland. By J. P. Howley. Pp. xx+348+plates xxxvii. (Cambridge: At the University Press.) 21s. net.
 The Evolution of the Potter's Art. By T. Sheppard. Pp. xx. (London: A. Brown and Sons, Ltd.)

NO. 2382, VOL. 95]

DIARY OF SOCIETIES.

FRIDAY, JUNE 25.
PHYSICAL SOCIETY, at 5.—A Theory of the Electrical Resistance of Metals: Sir J. J. Thomson.—An Unbroken Alternating Current for Cable Telegraphy: Lt.-Col. Squier.
MONDAY, JUNE 28.
ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—The Map of Europe and the Near East, compiled by the Society for the General Staff: A. R. Hinks.
FRIDAY, JULY 2.
GEOLOGISTS' ASSOCIATION, at 8.—A Provisional Hypothesis to Explain the Occurrence of the Various Types of Fossil Man: Prof. A. Keith.
SATURDAY, JULY 3.
ARISTOTELIAN SOCIETY, BRITISH PSYCHOLOGICAL SOCIETY, and the MIND ASSOCIATION, at 6.—Joint meeting. Mr. Bertrand Russell's Theory of Judgment: Prof. G. F. Stout.
MONDAY, JULY 5.
ARISTOTELIAN SOCIETY, BRITISH PSYCHOLOGICAL SOCIETY, and the MIND ASSOCIATION, at 4.—Joint meeting. The Import of Propositions: Miss Constance Jones, Dr. Bernard Bosanquet, and Dr. F. C. S. Schiller.

CONTENTS.

	PAGE
Chemistry of Petroleum. By J. B. C.	447
Significance of Sexual Reproduction in Plants.	447
Case-Hardening. By Prof. H. C. H. Carpenter	448
Our Bookshelf	449
Letters to the Editor:—	
The Mobilisation of Science.—Sir T. K. Rose	450
The Magnetic Storm and Solar Disturbance of June 17, 1915.—Rev. A. L. Cortie, S.J.	450
Man's True Thermal Environment.—G. W. Grabham	451
A Continuous Spectrum in the Ultra-Violet.—Prof. James Barnes	451
The Names of Physical Units.—Albert Campbell	451
Training for Scientific Research.—Dr. T. S. Patterson	452
Extinguishing Fires.—C. Carus-Wilson	452
The Synthetic Production of Nitric Acid	452
The Royal Dublin Society. (<i>Illustrated.</i>)	454
Dr. J. W. Jenkinson	456
Notes	457
Our Astronomical Column:—	
Comet Notes	462
Orbits of Eclipsing Binaries	462
The Variation of Latitude during 1914'0-1915'0	462
The Society for Practical Astronomy	462
Aiming with the Rifle. (<i>Illustrated.</i>) By Edwin Edser	462
The South-Eastern Union of Scientific Societies	465
Osmotic Pressure and the Properties of Solutions.	
By T. M. L.	466
Electrons and Heat. By Prof. O. W. Richardson, F.R.S.	467
University and Educational Intelligence	470
Societies and Academies	471
Books Received	474
Diary of Societies	474

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