

work of Michelson is the application of his interferometer to determine if possible the motion of the earth through the ether. The speed expected was of the order one-ten-thousandth of the velocity of light; but since the journey of the light in the instrument is a to-and-fro journey—one half-beam going as nearly as possible with and against the hypothetical stream of ether, while the other half-beam goes at right angles to that direction—the amount to be measured was not one-ten-thousandth but the square of that quantity; that is to say, the observer had to measure one part in a hundred million—no easy matter. The interferometer was mounted on a stone slab floating in mercury, and the whole observation conducted with great care.

The result was zero; and that zero was used afterwards as the corner-stone of the great and beautiful edifice of relativity."

WE regret to announce the following deaths:

Mr. St. George Littledale, who was awarded the Patron's Medal of the Royal Geographical Society in 1896 for three important journeys in the Pamirs and central Asia, on April 16, aged seventy-nine years.

Sir Charles Lucas, lately chairman of the Royal Empire Society (formerly the Royal Colonial Institute), distinguished as a historian of British colonial development, on May 7, aged seventy-seven years.

Mr. Emil Torday, a distinguished authority on the anthropology of Africa, on May 9, aged fifty-six years.

News and Views.

THE question of the introduction of twenty-four hour reckoning for railway time-tables has recently been discussed in Parliament. The subject is a well-worn one. It is nearly half a century since the late Sir William Christie made efforts in this direction. He suggested that, if it were done, astronomers might meet the public by reckoning astronomical time from midnight, a change that was actually made in 1925. A few years ago a committee appointed by the Council of the Royal Astronomical Society interviewed the railway authorities, endeavouring to persuade them to adopt the 24-hour system in time-tables, pointing out that the method was already in use in many countries. The companies, however, refused to make the change unless clear evidence was submitted to them that the public desired it. It is, however, fairly obvious that the public is inarticulate in matters of this kind. There was little enthusiasm for the summer-time scheme until it came about as a war-time economy; but once it was tried, it was welcomed with enthusiasm by all except a small minority. If the 24-hour scheme were adopted there would be no need to have new clock dials; the addition of 12 hours is an easy mental operation: moreover, the use of the new time for time-tables and public announcements would entail no obligation to use it in private life.

FOR some little time the attention of the public has been specially directed to eastern affairs in such a way as to emphasise the need for appreciation of the distinctive features in Oriental culture as a basis of understanding. More recently, however, the success of the exhibition of Persian art has given undue stress to the æsthetic side, which scarcely comes within the scope of NATURE. It is for this reason that we have refrained from comment on the various suggestions for the foundation of a museum for Oriental or Asiatic art which have appeared in the correspondence columns of the daily press. A proposal of a more comprehensive and scientific character is now put forward by the Royal Anthropological Institute. At a recent meeting of the Institute's Joint Committee on Teaching and Research, which includes representatives from all the universities and institutions interested in anthropological and archæological studies, it was strongly urged that a central institute is needed to

serve and guide the study of Indian and Oriental cultures as an expression of the thought and life of the people; and that such an institute should include, as recommended by the Royal Commission on the National Collections, provision for the study and exhibition of the national collections from the scientific and technological as well as from the æsthetic point of view. It was added that provision should be made in the Institute for the endowment of advanced teaching and research, and that its constitution should be on a federal basis, to permit the closest co-operation with existing institutions devoted to such studies.

THE bearing of the last suggestion is elaborated in a memorandum by Prof. J. L. Myres which was circulated to the Committee and is published in *Man* for April. It is there pointed out that the provision of a chair of Indian cultural studies, which has been suggested, is scarcely practicable, in view of the wide range of studies to be covered; while a series of chairs "in some British University" would not necessarily stand in the desired relation to the national collections. On the other hand, there are in other university cities, as well as in London, long-established and well-supported centres of Oriental study, such as the Indian Institute at Oxford. This institute, as founded by Monier-Williams, did indeed, on a small scale, anticipate the combination of library, museum, and provision for teaching and research such as is now contemplated and could alone cover adequately the study of art and technology, illustrate the thought and social structure of the people, and in the literature provide the interpretation of their culture. A national institution of the type suggested might then be linked federally to all existing establishments by the structure of its directorate and the composition of its staff.

THE Patent Office has recently made changes in the method of publishing its abridgments of specifications which should be noted by all who have to search through British patent literature. Hitherto, the weekly official journal has always contained, in numerical sequence, the week's series of abridgments, the whole from year to year forming a complete numerical set for immediate reference purposes. In addition, the abridgments allotted to each of the 271 classes into which the subject matter of inventions

is divided by the Patent Office have been collected together in five-year periods and issued in class volumes with name and subject indexes. Under the new arrangement, which came into force this year with specification No. 340,001, the publication of the abridgments in the official journal has been discontinued, and they will now be issued only in separate weekly instalments divided into 40 groups, each of which comprises a carefully selected number of the old subject classes; when the whole series includes 20,000 abridgments (that is, roughly, every year), the abridgments of each group will be issued in volume form with their appropriate name and subject indexes. The official journal contains each week a numerical list of the accepted specifications showing the groups in which the respective abridgments will appear.

It is too early to say whether the change which has been made in the method of publication of patent specifications will be appreciated by searchers. The old arrangement provided a very ready reference to individual cases and a useful continuous record for libraries and others who had no space for the series of full specifications. But, on the other hand, it was not particularly handy for a current subject search, and the old volumes of class abridgments lost a good deal of their usefulness by appearing so late. The new group volumes will be considerably larger than the old ones, but the sheets will appear within a few weeks of the acceptance of the specifications and should thus prove of greater value for current search purposes (especially if the 'opposition' period is extended as is suggested by the recent Departmental Committee), and their separate subject indexes will replace the present annual consolidated subject index. The annual accumulation of the group allotment lists which are printed in the journal each week will continue the numerical sequence of the earlier series of abridgments.

THE annual report of the Council of the Institution of Professional Civil Servants again records a large increase in the membership of the Institution, which during 1930 rose from 6560 to 8452. It is noteworthy that, quite apart from 'observer' and 'technical assistant' staffs, the latter figure includes 1243 members of full scientific status employed in the various scientific branches of the Civil Service. The outstanding feature of the year's activities was the submission to the Royal Commission on the Civil Service, which is now sitting, of a comprehensive statement of evidence embodying the Institution's case for a far-reaching reorganisation of the scientific and technical services of the State. It was urged that the existing multiplicity of professional, scientific, and technical grades should be rationalised and replaced by a simplified graded technical service. As regards the relationships between administrative and technical staffs, it was proposed (1) that the respective functions of the technical and the non-technical officers of the service should be redistributed in a manner which would give the expert wider powers of administration in his own

department and enlarge the limits of his authority in regard to expenditure and the handling of staff; and (2) that arrangements should be made to ensure that the parliamentary head of a department is always fully aware of the views of his technical advisers. In cases where the board system is not in operation, right of access to the Minister on all important questions involving technical considerations should be unconditionally vested in the heads of professional, scientific, or technical hierarchies. In a friendly reference to the work of the Association of Scientific Workers, the Council expresses the hope that all eligible members of the Institution will become members of the Association, which, it states, is "the only body actively bringing the claims of the scientist to the notice of the public". Emphasis is laid on the essential unity of the scientific and technical services of the State.

THE measurement of noise was the subject of the discourse given at the Royal Institution on May 8, by Dr. G. W. C. Kaye, superintendent of the Physics Department, National Physical Laboratory. The 'yardstick' or 'degree' by which we measure noise is the decibel, a simple power-ratio or logarithmic unit (*NATURE*, Jan. 10, p. 75). Although the measurement of noise is of considerable complexity, being bound up in part with physiology and psychology, the physics of acoustical measurement has made great strides both in facility and exactitude. This is largely owing to the development of electrical methods based on the invention of the electronic valve. By such means, noises can be analysed into spectra showing their frequency components, and their loudness can be measured physically by the microphone. A convenient 'noise thermometer' ranges from 0 to 100 decibels, an upper level which is unlikely to be exceeded in everyday experience. Conversational level is at about the half-way point, 50 db. The value for a quiet suburban street is 30 db., for a tube-train 80 db. Loudness levels of everyday noises have been determined by the National Physical Laboratory and by the Bell Telephone Laboratories and others in the United States. New York traffic noises, both in the street and in the Underground, appear to be about 10 decibels louder than in London. A modern car is quieter than a horse-vehicle on a paved street. Among the loudest things one is likely to encounter are the noises of rivetting, pneumatic road drilling, steamship sirens, and printing-presses; but the arch offender of all is the aeroplane engine at close quarters (110 db.). The noise in the cabins of aeroplanes in flight ranges between 80 db. and 110 db., according to the type of machine. There are, however, good prospects that the noise in aeroplane cabins will presently be substantially reduced (possibly to that of a railway train) by using propellers with lower tip speeds, providing more effective silencers on the exhausts, reducing engine clatter by enclosing the engines, and constructing cabins of double walls containing a suitable filler. The question of protection from noise is being investigated at the National Physical Laboratory, and new sound-laboratories are to be erected in the near future.

IN *Engineering* for April 24, a description is given of a clock that apparently can go on continuously until any part wears out. It was made by T. Dieden, of Carlsund, Sweden, and has already been going for fourteen years. Although a self-winding clock, it is a very near approach to perpetual motion. In its main features it is very similar to an ordinary clock, having a driving weight, a train of wheels driving the hands, and a torsion pendulum consisting of a heavy metal disc suspended by a thin steel ribbon. The unique feature of the clock lies in the method employed for winding up the driving weight. The power is obtained by the ordinary variations of the atmospheric pressure and temperature. The case of the clock contains seven closed elastic metallic boxes of the type used in an aneroid barometer. The lower box is attached to the case, but the column of boxes is otherwise free. The total expansion or contraction of all the boxes due to changes in the temperature or pressure is communicated to the top box. This is connected to two pawls working in opposite directions. When the column of boxes either increases or diminishes in height, the spindle carrying the ratchet wheels always rotates in the same direction and the driving weight is wound up. Fixed pawls prevent the ratchet wheels from running back. When the weight reaches its topmost position they are thrown out of action. With its weight fully wound up, the clock can run for eighteen months without stopping, and it would be exceedingly unlikely for the temperature and pressure to remain constant over such a long interval. The pendulum has a period of $7\frac{1}{2}$ seconds, so that the length of the equivalent simple pendulum is about 185 ft.

THE Annual Report of the Zoological Society of London records a successful year: the number of fellows has increased (from 8344 last year to 8430), the subscriptions of fellows have increased; the number of visitors to the garden in Regent's Park has increased, very considerably exceeding the two million mark; gate money has increased, and with it all the expenditure for the year has fallen, so that a favourable balance of £1479 is carried forward. The health of the stock has been satisfactory, and the death-rate is still moving, although almost imperceptibly, in the right direction. Its decline should be hastened by the formation of an isolation ward, where epidemic diseases may be checked at the outset. Chance injuries and accidents account for most of the deaths, 230, or 18.9 per cent. Then follow diseases of the respiratory system, which, even when tuberculous and mycotic infections are excluded, account for 177 deaths, or 14.6 per cent; diseases of the digestive system follow with 166, or 13.7 per cent. In addition to the isolation hospital, there have been created several new buildings, of which the parrot house and bird-diving house, in the old refreshment-room building, and the butterfly cage appeal most to the inhabitants and to visitors.

PERHAPS readers will turn most eagerly to discover how the zoological park at Whipsnade is progressing. Much has been accomplished since the last Report of the Zoological Society. Hall Farm has been trans-

formed into a restaurant, and the old fellows' pavilion has been transported from Regent's Park to the Downs. More than three miles of internal roads have been made; four chalk-pits, ultimately to become carnivore dens, have been excavated for road metal; much planting has been done, and already enclosures and paddocks are well stocked with a considerable variety of the larger birds and mammals. As has already been announced, Whipsnade Zoological Park will be opened to the public on Saturday, May 23, the previous day being set aside as a private day for fellows of the Society and official guests. Capt. W. P. B. Beal, late Principal Veterinary Officer of the Gold Coast, has been appointed Superintendent of the Park for one year.

At a special meeting of the Council of the Ray Society on April 30, the following resolution was adopted: "The Council of the Ray Society desire to place on record the profound grief felt by them on hearing of the death of their President, Professor W. C. M'Intosh, F.R.S., on April 1st last. Professor M'Intosh had belonged to the Society since 1863 and had been President since 1913. He had not only shown his practical interest in its success by his exceptionally long period of membership, but he had given the most devoted service to the Society by his frequent journeys from St. Andrews to London, in order to attend the meetings of the Council, at which he nearly always presided. The Council direct that this record of their appreciation of the value of their late President's work be sent to Dr. R. T. Gunther, his nearest surviving relative, with the expression of their sincerest sympathy." Sir Sidney F. Harmer, the treasurer of the Society, was elected president *ad interim* in succession to the late Prof. M'Intosh.

RECENT Norwegian work in the Antarctic region has resulted in several new discoveries of coast-line. Several years ago, Mr. L. Christensen detailed one of his ships, the *Norvegia*, for exploratory purposes. New land was discovered to the west of Enderby Land, called Queen Maud Land, and to the north-east of Coats Land, called Princess Martha Land. News now comes of further discoveries in the southern summer that has just ended. The *Times* recently recorded the discovery by Capt. Riiser Larsen, flying from the *Norvegia*, of a further stretch of coast-line between the two already mentioned. This is Ragnhild's Land and extends from lat. $68^{\circ} 40' S.$, long. $33^{\circ} 30' E.$, to lat. $70^{\circ} 30' S.$, long. $24^{\circ} 15' E.$ The *Geographical Journal* for April contains news from Mr. Christensen of the sighting of more land, this time apparently to the east of Enderby Land and MacRobertson Land which Sir Douglas Mawson discovered. The new coast-line lies in lat. $68^{\circ} S.$ and extends from long. $65^{\circ} E.$ to $71^{\circ} E.$ Thus there appears to be a considerable bight in the coast of Antarctica between MacRobertson and Wilhelm Lands. The *Norvegia* concluded the season's work by circumnavigating Antarctica and confirming the non-existence of various doubtful islands.

THE production of books seems to maintain its very high standard, especially in Great Britain and the United States, in spite of trade depression. This is due probably to the large number who are

now taking advantage of the opportunities offered for advanced education; for, in spite of the great number of publications in fiction (by far the greatest of all), children's books, religion, biography and travel, and other books of a general character, which reach the same percentage in Great Britain and the United States, a good proportion of books is in the specific sciences. With the great advances made in aeronautics, there is a corresponding increase in the number of British publications, which, according to the *Publisher and Bookseller*, reached the total, in 1930, of 133. Only 26 books on wireless appeared in 1930; topography and folk-lore show a total of 205, while botany, horticulture, and agriculture stand at 176, anthropology 35, chemistry and physics 116, astronomy and meteorology 50, engineering sciences 115, geology 53, mathematics 37, medicine 456, zoology 163, and psychology 64. The total number of British books published in 1930 was 15,494, of which 3638 were new editions. It is gratifying to the man of science to note that the 209 limited editions still remain in the letters groups, there being practically no such publications in science. According to the list of publications in the United States in 1930, which appears in the *Publisher's Weekly*, the number of American books produced last year reached 10,027, of which 1893 were new editions. These figures are much below the corresponding figures for Great Britain.

IN the first of a new series of *Tyneside Papers*, issued by the Tyneside Council of Social Service, the trend of population in that area is compared with the results of an earlier survey published in March 1926. It was then pointed out that population was growing more rapidly than industry was expanding, and that a new equilibrium would be brought about slowly through (1) a further decline in the birth-rate, (2) further migration, (3) a partial recovery in the old staple industries, and (4) the expansion of minor industries and the starting of new industries. So far, the staple industries have not recovered, and, apart from the electrical industry, there has been little expansion of other industries. The situation, however, has entirely changed in regard to the birth-rate and migration. The average yearly natural increase in population for the years 1926-29 was only two-thirds of what it was in the earlier period 1921-26. In the second period, the annual outward balance of migration from Tyneside was about six times as much as that in the first period, and, if this exodus should continue, it would do much to reduce unemployment. Many would naturally wish that the situation could be readjusted by revival of local industries rather than by loss of population, and the question suggests itself whether some of the industries presumably absorbing the inflowing population in the south could not be established on Tyneside.

THE thirty-sixth annual congress of the South-Eastern Union of Scientific Societies will be held at Winchester on June 10-13, under the presidency of Sir J. Arthur Thomson. The presidential address on "Some Natural History Problems of the Countryside", will be delivered in the Guildhall on June 10. The various sections will open their sessions on the

following days. Mr. James Groves, president of the Botanical Section, will discuss ancient and modern stoneworts, in his presidential address. In the Archæological Section, the president, Dr. W. E. St. L. Finny, will take as his subject the kings of Wessex, from Egbert to Athelstan. The president of the Geological Section is Prof. H. L. Hawkins, who will discuss the nature, deposition, and palæontological implications of the Chalk. Mr. J. F. Marshall, as president of the Zoological Section, will describe some stereoscopic photomicrographs of fossil insects to be exhibited by him in the Congress museum. Archæological surveys will form the topic of the presidential address of Mr. H. J. E. Peake, before the Regional Survey Section. Several useful and interesting excursions have been arranged in connexion with the Congress. On June 13, the preservation of the countryside and the various parliamentary bills concerned with it will be discussed, Sir Lawrence Chubb and Sir Edgar Bonham Carter taking part in the discussion.

MESSRS. Adam Hilger, Ltd., the well-known optical instrument manufacturers, have issued a pamphlet giving a general account of the products and aims of the firm and outlining the scope of its activities. The high quality of the Hilger products is generally recognised, and the pamphlet reveals that the total value of the instruments exported by the firm during the last five years is three times that of the instruments supplied to the home market. The selected list of purchasers given at the end includes institutions from all parts of the civilised world. There is probably justification for the surmise that "most of the research of the world in certain fields of prime importance in modern physics is being done with Hilger instruments". Particular attention is given in the pamphlet to the industrial applications of scientific manufactures, and there is an account of work of this kind connected with the metallurgical and chemical industries, mineralogical survey and the utilisation of ores, engineering design, the colour industries (paints, textiles, artificial silk, etc.), the manufacture of glassware, and the manufacture of optical instruments (cameras, microscopes, telescopes, binoculars, etc.). The publication is an interesting one, and the only point which calls for criticism is the retention of the accents and the capital initial letter in the word 'angstrom' used as a unit of wave-length. It is time that the name of this unit took its place with 'ampere', 'henry', 'ohm', and many others of similar origin, as a common noun.

THE first of this year's Royal Society conversaciones will be held in the Society's rooms at Burlington House on Wednesday, May 20, at 8.30 P.M.

SIR JAMES FRAZER, the distinguished anthropologist and author of "The Golden Bough", has been elected an Honorary Master of the Bench of the Middle Temple.

SIR ARTHUR KEITH, Hunterian professor and Curator of the Royal College of Surgeons, has been elected a foreign member of the American Philosophical Society, Philadelphia.

THE following appointments in the Colonial Agricultural Service have recently been made by the Secretary of State for the Colonies:—Mr. B. J. Weston, to be horticulturist, Cyprus; Mr. J. S. Norman, to be field instructor, Federated Malay States.

THE sixteenth of the public lectures on "Physics in Industry" arranged by the Institute of Physics will be delivered on May 19 at 4.30 p.m., at the Institution of Electrical Engineers, by Mr. Alan E. L. Chorlton, who will take as his subject "Physics in Relation to the Development of the Internal Combustion Engine".

IN NATURE for May 9, p. 714, it is stated with reference to the Lancashire earth-shake of May 3 that tremors were not registered at the Liverpool Observatory and Tidal Institute. Mr. H. J. Bigelstone, principal assistant at the Observatory, informs us that this is incorrect. Tremors were recorded on the Milne-Shaw seismograph there, commencing at 9 h. 23 m. 0 s. and lasting 40 sec. The maximum amplitude recorded was 1.5 mm.

It is reported in *Science* that Dr. Werner Heisenberg, professor of theoretical physics at the University of Leipzig, has been awarded the Barnard Medal of Columbia University. Every five years the National Academy of Sciences recommends to the trustees of Columbia University a nominee for the Barnard Medal "for discoveries in physical or astronomical science or novel application of science to purposes beneficial to the human race". The previous recipients of the medal have been Lord Rutherford, 1909; Sir William Bragg, 1914; Prof. A. Einstein, 1921; and Prof. Niels Bohr, 1925.

THE Council of the Royal Society of Edinburgh has awarded the Makdougall-Brisbane Prize, for the period 1926-30, to Dr. Nellie B. Eales, Zoology Department, University of Reading, for her papers "On the Anatomy of a Foetal African Elephant" published in the *Transactions* of the Society. The Bruce-Preller Lecture, to be delivered on July 6 by Prof. Horace Lamb, will be devoted to a commemoration of the centenary of the birth of James Clerk Maxwell. On June 15, Prof. A. H. R. Buller, professor of botany in the University of Manitoba, will address the Society on "Recent Advances in our Knowledge of the Higher Fungi".

THE International Institute of African Languages and Cultures has issued invitations to a congress to be held in Paris on Oct. 16-19, when the Exposition Coloniale-Internationale will still be open. The Congress will deal with important linguistic and anthropological problems of the Africa of to-day. Prof. Antoine Meillet, president of the Institut d'Ethnologie, will act as president of the Congress, and Prof. Henri Labouret as vice-president. The Congress will be opened by Maréchal Lyautey, and Lord Lugard will speak on the aims of the Institute. The meetings will be held at Vincennes. An interesting feature of the programme is a lecture by Dr. Chauvet on African music, which will be illustrated by songs and dances by African performers. Visits to the appropriate museums and collections are being arranged.

THE Gold Medal of the Institution of Mining and Metallurgy has been awarded to Dr. Charles Camsell, deputy Minister of Mines and Industries of the Dominion of Canada, "in recognition of his untiring zeal and great ability in promoting the development of the natural resources of the Dominion and in furthering the general interests of the mineral industry". The following awards have also been made: The Consolidated Gold Fields of South Africa, Ltd., Gold Medal to Mr. C. W. B. Jeppe, for his researches on mine ventilation at great depths, and for his paper on "Ventilation at the Crown Mines, Witwatersrand"; the Consolidated Gold Fields Premium of forty guineas to Mr. F. G. Lawford, for his "Notes on Some Stopping Problems in Mexico"; and the William Frecheville Student's Prize of ten guineas to Mr. W. H. Wilson, for his paper on "Bottom Slicing applied to Mining a large Irregular Replacement Deposit in Limestone".

IN a 4-page pamphlet, Mr. P. J. Harwood, of "Corona", Ovingdean, Brighton, puts forward a theory of the Michelson and Morley experiment based on his definition of motion as "a process of extending a body in a particular direction" which "confers . . . super-extension on the body" and it acquires "a length longer than its static length". According to Mr. Harwood, the increase of thickness of the mirrors in the line of motion compensates for the increase of the path of the light in that line. He does not mention the increase of length of the support of the mirrors in the line of motion, which his theory of motion requires, and his readers are left in the dark as to why the super-extension is limited to the mirrors. We have been unable to verify the author's statement that Sir James Jeans "says that the sun, instead of sending us light waves, sends us nothing more substantial than mathematical equations".

MESSRS. Bowes and Bowes, Cambridge, in catalogue No. 457 offer upwards of 400 books in new condition at greatly reduced prices. The list is one of general interest, but in it are several works of a scientific character, particularly in the departments of archaeology, travel, and natural history.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—An organiser of agricultural education under the Middlesex County Council—The Secretary, Middlesex Education Committee, 10 Great George Street, S.W.1. An assistant in the department of radium therapy and research of the Middlesex Hospital—The Secretary-Superintendent, Middlesex Hospital, W.1 (May 20). A resident lecturer in mathematics, with physics, at the Borough Road Training College, Isleworth—The Principal, Borough Road Training College, Isleworth (May 23). A head of the department of continuative education of Loughborough College—The Registrar, Loughborough College, Leicestershire (May 23). An assistant lecturer in economics at University College of the South-West of England—The Registrar, University College of the South-West of England, Exeter (May 25). A graduate teacher of electrical engineering subjects for the Junior and Technical Day School and Evening Classes of the Wandsworth

Technical Institute—The Secretary, Technical Institute, Wandsworth, S.W.18 (May 30). An assistant lecturer in chemistry at Brighton Technical College—The Secretary, Brighton Technical College, 54 Old Steine, Brighton (May 30). An assistant in textile research, for research work relating to the knitting industry, in the department of textiles of University College, Nottingham—The Registrar, University College, Nottingham (June 1). An inspector of explosives under the Home Office—The Private Secretary, Home Office, Whitehall, S.W.1 (June 5). An assistant lecturer in physics in the University of Manchester—The Registrar, University, Manchester (June 6). A lecturer in metallurgy, an assistant lecturer in civil engineering, an assistant lecturer in electrical en-

gineering, and an assistant lecturer in mathematics, each in the faculty of engineering of the University of Bristol—The Secretary and Acting Registrar, University, Bristol (June 9). A lecturer in agricultural chemistry and physics at Swanley Horticultural College for Women—The Principal, Swanley Horticultural College for Women, Swanley, Kent (July 6). A science mistress for physiology at the Bedford Physical Training College—Miss Stansfeld, Bedford Physical Training College, 37 Lansdowne Road, Bedford. Two assistant organisers for help in the development of the Young Farmers' Club movement in the north and west of England respectively—The National Association of Young Farmers' Clubs, 26 Bedford Square, W.C.1.

Our Astronomical Column.

Pluto.—*Popular Astronomy* for April contains Prof. V. M. Slipher's report on the Lowell Observatory, in which there are some more details about Pluto. It was not until Feb. 18, 1930, that Mr. Tombaugh discovered the images on plates taken on Jan. 23 and 29, and afterwards that on the plate of Jan. 21. It was examined visually with the 24-inch refractor. "No certain evidence of disk could be made out, although on a few occasions its image seemed not quite like those of equally faint stars." "Later tests . . . indicated that with Pluto's faintness his disk, if as much as 0.6", could escape detection under good observing conditions." This would imply a diameter of 11,000 miles. It was found that Pluto was brighter visually than photographically, so a yellowish colour was inferred.

The report also states that "the search of the ecliptic with the efficient 13-inch telescope is being continued by Mr. Tombaugh. A band of considerably greater width is being carried round the sky, and the reach in magnitude of stars included has been increased."

Rech. Instit. Circ. 425 contains the following observations of Pluto made at Simeis by S. Beljajsky:

1931.	U.T.	R.A. 1931.0.	N.Decl. 1931.0.
Mar. 22	18 ^m 22.8 ^m	7 ^h 21 ^m 9.91 ^s	22° 20' 39.4"
„ 23	18 12.0	7 21 8.99	22 20 45.6

The magnitude was 14.5. Prof. M. Wolf gave it as 14 on Feb. 8.

The above *Circular* also contains the following revised orbit of 1931 *FE*, which is the interesting minor planet discovered by Drs. Schwassmann and Wachmann in March. It is by A. Kahrstedt.

Epoch	1931 April 7.0 U.T.
M	31.20°
ω	129.62
Ω	1.20
i	24.26
$\log q$	0.2439
Period	3.713 years.

The perihelion distance is 1.754, the eccentricity 0.2687.

Spectroscopic Parallaxes of B-type Stars.—The Commonwealth Solar Observatory at Canberra has recently published *Memoir* No. 2, containing an investigation of southern B-type stars by B. W. Rimmer for determining spectroscopic parallaxes. The method used by Rimmer is essentially the same as that of Edwards, who amplified an earlier method of Adams and Joy. It consists in (a) accurately classifying the spectral types of the stars on the basis of the

Harvard classification but with additional sub-types interpolated, and (b) dividing each sub-type into groups according to the sharpness of the spectral lines. Both type and line sharpness are correlated with absolute magnitude, and the final results give reasonably good values of the parallaxes. Struve has recently shown such methods to have a sound physical basis; also his parallaxes (derived from interstellar calcium lines) show a good correlation with the results obtained by them, though indicating that the dispersion of absolute magnitudes is probably too restricted. Rimmer's method differs from that of Edwards in the formation of two extra groups, for bright line stars and peculiar stars; also, the instrument used gives spectra double the length of those obtained at the Norman Lockyer Observatory, Sidmouth, by Edwards. For those stars, however, which are common to the two observers (170 in number) the parallaxes are in fairly good agreement. A full discussion is given both of the instrumental equipment and the method used in deducing parallaxes. The final results for 350 stars form a useful addition to our knowledge of stellar distances; being in numerous instances the only available source of information for southern B-type stars. This is the first volume of a purely astronomical character to be issued from Canberra, and it will be welcomed by astronomers.

The Eighth Satellite of Jupiter.—*Yale Astron. Transactions*, vol. 6, part 4, contains a new theory of this satellite by Prof. E. W. Brown. As is well known, the theory of this satellite is extremely difficult, owing to its great inclination and eccentricity and the very large solar perturbations. Prof. Brown has diminished these difficulties by the use of a doubly periodic intermediate orbit: the two periods are that of the elliptic terms and that of the Variation. The work was carried out before the recent recovery of the satellite, so the constants were derived from the observations of the first six or seven years. The ratio of the mean motions (Sun to J. VIII) is -0.171171 , giving 741.613 days for the sidereal period; the mean inclination, $31^\circ 13'$. The eccentricity is at present taken as exactly 0.4. The mean motion of the perijove is $-0.00163 n$, where n is the mean motion of J. VIII. The perijove therefore takes more than 1200 years to make one revolution. The fact of the motion being in the reverse direction to the satellite was unexpected; it arises from the second order terms exceeding those of the first order. The mean motion of the node is $-0.02193 n$, hence the node goes round in about ninety years. The coefficients of the inequalities are given in the article.