

is a definite maximum in the afternoon, with a minimum between 9 and 10 in the morning, typical of inland stations, and a subsidiary maximum of midnight. At Southport, the early morning maximum usually found at coast stations is well marked, while there is a subsidiary maximum in

the late afternoon. As recording rain-gauges are comparatively rare, and as the generalisations set out in the diagram alone involve more than half a million tabulations, it is not surprising that the complete story of the diurnal variation of rainfall has not yet been written.

### Obituary.

PROF. ANTONIO ABETTI.

ON Feb. 20 there passed away at Arcetri, Florence, aged eighty-two years, after a short illness, Prof. Antonio Abetti, the *doyen* of Italian astronomers. Born at Gorizia, in Frioul, in 1846, he took his degree in mathematics at the University of Padua in 1867, and at once entered the astronomical observatory of that city, rendered famous, like that of Pisa and Florence, by Galileo Galilei. As assistant to Prof. Santini, then director, he was one of the Italian astronomical party of 1874 for observing the transit of Venus in India. After Santini's death, he collaborated at Padua with Prof. Lorenzoni and went to Florence in 1893 as director of the Arcetri Observatory, the reorganisation of which, begun by Donati, he completed, raising it, as the Institute of Astrophysics, to one of the most important in Italy. He remounted Amici's famous equatorial and did important work in the study of the minor planets or asteroids, on which he published numerous papers.

On reaching the age limit in 1921, Abetti retired and was succeeded by his son, Prof. Giorgio Abetti, who, trained at Arcetri and under Prof. G. E. Hale at the Mount Wilson Observatory, California, installed at Arcetri the 'Galilei Sun Tower' as an Italian replica of the Mount Wilson Tower. The Arcetri Astrophysical Tower and Institute were

described by the present writer in *Engineering* of April 30, 1926. Prof. Antonio Abetti kept up his interest in the institute until a few days before his death. In 1901 he delivered at the opening of the Royal University of Florence an important inaugural address on "Galileo in Arcetri." His son and successor, Prof. Giorgio Abetti, was a member of the astrophysical section of the De Filippi Expedition, 1913-14, to Trans-Himalaya, the Karakoram, and Chinese Turkestan.

C. DU RICHE PRELLER.

WE regret to announce the following deaths:

Prof. Launcelot Harrison, Challis professor of zoology in the University of Sydney since 1922 and president of the Linnean Society of New South Wales, on Feb. 20.

M. Félix Henneguy, professor of comparative embryology at the Collège de France, Paris, since 1900, and president for five years of the Société de Biologie, aged seventy-seven years.

Dr. J. M. Hulth, principal librarian of the Royal University Library, Upsala, known for his "Bibliographia Linnæana," of which the first volume was published in 1907, on Mar. 29, aged sixty-two years.

Mr. G. P. Miln, for more than forty years honorary secretary of the Chester Society of Natural Science, Literature, and Art, and a trustee of the National Institute of Agricultural Botany, on Feb. 14, aged sixty-six years.

### News and Views.

THE announcement in the House of Lords on Mar. 29 of the names of the committee on motor spirit containing lead tetraethyl will doubtless serve to quiet somewhat the public controversy over the possible dangers of this spirit. The committee includes distinguished representatives from the fields of medicine, physiology, and chemistry, whose names and reputations are such as to carry the greatest possible weight with the public. The report of the committee will be awaited with interest and confidence. The following are the terms of reference: "To inquire into the possible dangers to health resulting from the use of motor spirit containing lead tetraethyl or similar lead-containing compounds, and to report what precautions, if any, are desirable for the protection of the public or of individuals in connection with the use or handling of such motor spirit."

It is a matter of regret that in the discussion of ethyl petrol, both in the Press and in the House of Lords, incorrect and misleading statements have been issued through lack of correct information. Thus such statements that the *use* of the spirit (instead of

sale) is prohibited in New York City and in the Holland Tunnel under the Hudson River are entirely incorrect; while the reference to deaths by poisoning with lead tetraethyl in the United States in 1924 are misleading, since these fatalities occurred in the experimental manufacture of lead tetraethyl and had nothing to do with the use of the substance in motor spirit. On the contrary, there was read in the House of Lords a letter from the Surgeon General of the United States to the British Ministry of Health, stating that "notwithstanding the late publicity given to the investigations and the general use of the substance all over the United States and Canada, no instance of lead poisoning has been reported in the lay or medical press or to any of our Federal or State Authorities." Final decision, of course, rests with the Government committee, but while awaiting its report, it would appear that the above letter should at least lessen the fears of the extreme alarmists.

A COMMITTEE including the names of the leading physiologists of Great Britain, and also two from the United States, has been formed to issue an appeal for funds to commemorate the work of those great

partners in physiology, Bayliss and Starling. This partnership lasted for about thirty years and was fruitful beyond measure for physiology and its applications to medicine; in addition, it has made the name of University College, London, known throughout the world. Their written works are monuments to their industry and learning, but it is felt that a further memorial, in the form of a studentship in physiology, is necessary, and in this form would have been approved by Bayliss and Starling themselves. It is proposed, therefore, to create a Bayliss and Starling studentship at University College, open to any graduate in science or medicine, for a year or more of such training in physiology and biochemistry as would fit him for research. A small part of the funds collected may be devoted to a simple memorial tablet in the entrance hall of the Institute of Physiology at University College. Subscriptions should be sent to Prof. Lovatt Evans, Institute of Physiology, University College, Gower Street, London, W.C.1.

DR. A. W. HILL, Director of the Royal Botanic Gardens, Kew, attended the annual meeting of the New Zealand Institute on Jan. 26 last, when he was elected an honorary member. In replying to the president's welcome, Dr. Hill thanked the Board for the honour conferred upon him, and remarked that he noticed among the roll of names of honorary members that of Mr. E. Meyrick, his old teacher at Marlborough College, who had been instrumental in directing his studies into the channel of nature study, and had been a source of much inspiration to him. He remarked that New Zealand possesses a remarkable flora, and promised that he would do his best while in the Dominion to further the idea of the establishment of a National Botanic Garden. In this direction he thought it might be advisable to have one section in Auckland and another in Dunedin, with a director to link the two together as a national institution, and thus to avoid any possible jealousies as had occurred in other countries. In the course of his tour of New Zealand, Dr. Hill climbed Aleck's Knob, in the glacier region, which has not previously been explored by a botanist. This necessitated a climb of 4200 feet, but the array of alpine plants on the meadow at the top repaid the exertion expended in the climb. The plants there were in striking contrast to anything available to European botanists. All the flowers were pure white. Beside the *Ourisia*, *Ranunculus Lyalli* and *Hebe (Veronica) maerantha*, there were *Lilaepsis* and *Caltha novae-zealandica*, on which Dr. Hill is working in England. The size of these plants on their native heath surprised Dr. Hill, especially the large *Celmisias*, and he was also much interested in the native hybrid plants.

WARM tribute was paid by Dr. Hill to Dr. L. Cockayne, of the State Forest Service of New Zealand, for his work on natural plant hybrids. Dr. Cockayne was awarded the Mueller Medal for research work in New Zealand over a period of twenty-five years, at the meeting of the Australasian Association for the Advancement of Science, held at Hobart (Tasmania)

in January last. The Royal Society of London recently allotted Dr. Cockayne £100 for research work on hybridisation, and on the flora and vegetation of New Zealand. Other scientific workers who have lately visited New Zealand include Dr. J. P. Lhotsky, the Dutch botanist, who toured the country in 1925. It will be remembered that Dr. Lhotsky, at the Leeds meeting of the British Association last year, discussed New Zealand plants and their hybrids. Dr. O. Olsen, of Oslo, has also visited New Zealand recently, and found during his visit of three months a fertile field for botanical, geological, and ornithological study, where 20 per cent. of the geological specimens are unknown to science. Yet another, Dr. G. Einar Du Rietz, of the University of Upsala, toured New Zealand, and was, by courtesy of the Government, afforded an opportunity of making a voyage round the islands (some uninhabited) south of New Zealand by the steamer that makes the rounds supplying lighthouses and replenishing depots for castaways by shipwreck. He expressed the belief that the high-mountain flora of New Zealand is the best subject in the world for study, and that the country is well suited for the establishment of original botanical species.

THE concluding section of "The Oxford English Dictionary" is announced for publication on April 19. It is an event of capital importance for English scholarship and indirectly a matter of moment to all the world. English is the richest language man has ever framed, and the most widely used. The effect of the War has been to extend its vogue, and, as the two great English-speaking communities—the British Empire and the United States—are also the most powerful nations, it is inevitable that the use of English will spread still further in future. Another consideration makes the publication of this work of special importance at the present moment. English is the official language of India and also its accepted medium of higher education. In China, too, English is much the most familiar of European tongues. We may therefore look for a continued extension of some form of English throughout both those countries, which between them contain nearly half the human race; and, if English is to be used, it is essential that it retain some recognisable connexion with correct English as built up and spoken in the land of its birth. This cannot be done by means of English teachers, who are a diminishing quantity in India and still fewer in China. A standard and comprehensive work is therefore of the first importance, from which other and smaller books may be drawn for those who cannot enjoy the monumental original.

FIFTY guineas is a 'long' price, and beyond any but fair-sized town libraries and large schools, yet it is not out of proportion to what has been expended on the production of the work. The Oxford Press alone has spent £300,000, and this takes no account of the unpaid labour on which the book was based. All the collectors of the original references were volunteers, scattered over Great Britain and elsewhere. Work of this sort has been going on for nearly seventy years since the dictionary was first thought of by the

Philological Society. In 1884 the Oxford University Press assumed the responsibility, after Sir John Murray had met the Delegates of the Press in 1878 and become charged with the editorship. It is as much a monument of his zeal, industry, and organising powers as it is of the English language itself. Already supplements are beginning to appear, containing words, many of them dealing with science and technology, which have won the rights of citizenship since the work began. Of these supplements, at least the first will be furnished gratis to purchasers of the whole book.

THE recently issued *Annual Report* of the British Research Association for the Woollen and Worsted Industries provides concrete evidence of the increasing attention which the fundamental scientific principles underlying the wool textile industry are receiving both in Great Britain and overseas. In an article on "Research in the Textile Industry," which appeared in NATURE of Nov. 19 last, attention was directed to the fundamental problem of the textile industry, namely, a complete knowledge of the properties of the wool fibre, and a definite measure of the 'quality' of the fibre. The importance of this matter, not only to Great Britain, but also to wool growers in the dominions overseas, has been recognised and, as a result, the Under-Secretary for the Colonies has approved the recommendation of the Empire Marketing Board that a grant should be made for the prosecution of research on the problems connected with the standardisation of raw wool. This research will be undertaken jointly by the Research Association and by the Animal Breeding Research Department of the University of Edinburgh. Other important activities of the Research Association include the determination of standard tests for fastness of dyestuffs, particularly with a view to the prescription of standard tests for fastness to light, washing, and perspiration. An investigation into the determination of a suitable branding substance for sheep is in progress, but the final results are not yet available. The Association is availing itself on a very considerable scale of the existing research facilities in the universities and similar institutions. A mass attack of this kind on the many problems of the textile industry should ensure real progress in the application of science to that industry.

IN our issue of June 11, 1927, p. 864, reference was made to a small booklet published by Mr. E. A. Chapman, 69 Hayter Road, London, S.W.2, on certain so-called "Mystery Pearl Shells" which were in his possession. Various opinions had been expressed as to the origin of these shells, and Prof. Dakin, who examined them at our request, concluded that they had been cleverly cut from large pearl shells. In any event, however, their history (they came from Ireland) was left unexplained. At the request of Mr. Chapman another booklet has been written, and has been published by him in explanation of the previous one. It bears the title, "A Short History of a Notable Irish Family," and is by P. C. Gallagher (formerly of University College, Dublin).

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The pamphlet, which is very beautifully illustrated, suggests that the shells, which appear to have been heirlooms, were handed down in the O'Donnell family from a certain Hugh Roe O'Donnell, a brilliant figure, chieftain of Tircconnail and King of Donegal in the time of Elizabeth. We are not in a position to comment upon the historical details involving the O'Donnell family, but it is quite conceivable that the shells came originally from a Spanish source, as the booklet suggests, and that they were presented long years ago (possibly by some wrecked member of a Spanish ship) to this Irish family. It seems curious that others are not known to exist, unless these were the only result of some capable carver's whim. If they are shells of some real species, one would expect still more to find specimens in some of the world's museums. The whole matter is surprising.

AUTOMATIC operation of electrical equipment has in several cases made it possible to dispense, at least for a certain period, with human agency entirely. For example, lights on buoys are sometimes operated by a selenium cell, the flow of current through which is regulated by the light falling on it. When darkness comes the alteration in the resistance of the cell, and consequently of the current, switches on the light, and when daylight breaks, switches it off. Similarly, the action of some fire alarms depends on smoke affecting the amount of light falling on the cell. According to a recent *Daily Science News Bulletin*, issued by Science Service of Washington, a somewhat analogous automatic control was used recently to unveil a portrait of George Washington. All that was necessary to perform the operation was to telephone a certain signal. The apparatus used, called a televox, depends upon a device that only responds when a sound of a definite maintained frequency is made. The televox is tuned to a certain note produced either by a tuning-fork or a whistle. When this note is sounded, the movable armature of an electromagnet makes a contact which completes a local circuit. The current in this local circuit may start a motor, turn on or off a light, or do any similar operation. By having several instruments, each with its relay, a complicated mechanical operation can be gone through by sending a series of different notes which may, if desired, be so chosen that they form a tune. Experiments have been made for many years on controlling motor-cars and aeroplanes by radio waves. The televox system, however, is to control by sound.

THE London School of Hygiene and Tropical Medicine has placed an order with Messrs. R. and J. Beck, Ltd., for more than two hundred microscopes for use in the new laboratories now in course of construction in Gower Street. The order has been given on the recommendation of a small committee which has had the matter under consideration for some time, in consultation with the Department of Applied Optics, National Institute for Medical Research. The type of microscope selected embodies certain features that have been evolved to meet the needs of the heads of departments at the School. The base is of rigid construction, with points of support

sufficiently wide spread to ensure stability in any position. The foot is of the type now being produced by Messrs. Beck, combining the advantages of the horse-shoe or Continental model with the so-called English foot. The stage is of the completely built-in mechanical type with travel of  $1\frac{1}{2}$  in. + 1 in., the entire top plate of the stage forming the moving part. On the stage a slide-holder of new design is provided, as suggested by Prof. Topley, in which the slide is firmly held without springs. The fine adjustment is of the double lever pattern, operated by milled heads on either side. The body is 2 in. in diameter and is provided with an adjustable graduated draw-tube. The sub-stage is actuated by rack and pinion, and all sub-stage appliances are carried on Akehurst slides. Thus the interchange of illuminating systems is both easy and accurate. The optical equipment is ample for all bacteriological requirements, and the objectives are to be coloured externally so as to enable them to be recognised at sight. Messrs. Beck have agreed that certain rigid tests shall be applied to the whole equipment before delivery is accepted.

WE have received a copy of the "Descriptive Account and Catalogue of the Home Office Industrial Museum and Exhibits," recently published by H.M. Stationery Office. In the introduction it is explained that the Museum, which is situated in Horseferry Road, Westminster, is intended to serve as a permanent exhibition of methods, arrangements, and appliances for promoting the safety, health, and welfare of industrial workers. The exhibition is the first of its kind in Great Britain, though others exist in Berlin, Munich, Milan, Amsterdam, and other cities abroad. The exhibits may be classified under three main headings. The safety section contains actual machines, plants, and appliances as they would be installed in a factory. Many actual protective devices are shown, but a wider range is exhibited by the aid of models and photographs. In the health section the exhibits include photographs illustrating the prevention of various industrial diseases (lead poisoning, silicosis, dermatitis, etc.), charts indicating the incidence of such diseases, 'cautionary notices' as issued by the Home Office, etc. Two sections are devoted specially to ventilation and lighting—the latter including an excellent series of cabinets illustrating fundamental principles. The welfare section contains rooms fitted up to serve as ambulance rooms, rest rooms, and canteens, and first-aid equipment, protective clothing, etc., are shown. The catalogue contains a detailed account of all exhibits, with illustrations. Various sections, such as machine tools, drilling and milling machines, and machinery used in the textile and printing industries, in bake-houses, etc., are dealt with in turn. Finally, reference may be made to the nature of the building, which in itself serves as a useful exhibit, special attention having been devoted to the ventilation, lighting, and other essentials to health and safety.

THE Easter conference of the Society for Experimental Biology took place at Oxford on Mar. 23 and 24. By kind invitation of Prof. E. S. Goodrich and

Prof. A. G. Tansley, meetings were held in the Zoological and Botanical Laboratories. At the first session, among many interesting papers, Mr. G. R. de Beer gave an account of his experiments on the development of the nervous system in Anura, and a paper by Dr. T. A. Stephenson on the nature of 'physiological' species was followed by a lively discussion. Discussions of considerable interest also took place during the second session, particularly after a paper by Mr. P. A. Buxton on the physical factors which determined the behaviour of the mosquito. In a paper by Captain G. C. C. Damant on the secretion of gases in the bladders of seaweeds, the remarkable fact appeared that nitrogen as well as oxygen was secreted into the bladders under a considerable pressure. The last session was occupied chiefly with discussions of the nature of oxidation in living cells and carbohydrate metabolism in various groups of the animal kingdom. The chairman, Dr. D. Keilin, gave an account of the polyphenol oxidase and cytochrome system in cells.

A USEFUL pamphlet on "Rats and how to kill them" has been compiled by Mr. A. Moore Hogarth (London: John Bale, Sons and Danielsson, Ltd., 6d. net). It reprints the Rats and Mice (Destruction) Act of 1919, and gives full instructions for trapping, poisoning, fumigating, or otherwise destroying rats. These instructions are practical and ought to increase the effectiveness of the anti-rat campaign. But it can scarcely be said that all the author's suggestions are practical: he advocates that rat-catchers should be taught, amongst much else, elementary pathology; that zoological laboratories in the universities should devote part of their time to the economics of the rat; and that elementary school children should be instructed in rat life-history and the "toxicity of the various raticides in common use." He speaks of the barn owl as if it were the only ratter of its kind, of the pine-marten as if he did not know that it was almost extinct, and of the ferret as if it were a wild creature. With more reason he advocates an international codification of rat laws, a synchronised rat campaign in Britain twice a year, and local bye-laws to encourage rat-proofing. He states that the cost of feeding British rats per annum would pay for 1,864,235,290 bottles of Bass—a less offer in kind should attract a record army of Pied Pipers.

SIR JOHN RUSSELL, Director of the Rothamsted Experimental Station, has been elected an honorary member of the New Zealand Institute.

PROF. G. ELLIOT SMITH will deliver the Huxley Memorial Lecture at the Royal College of Science, South Kensington, on Friday, May 4. His subject will be "Conversion in Science."

It is announced in *Science* that the Charles P. Daly Gold Medal of the American Geographical Society of New York has been presented to Prof. Alois Musil, of the Charles' University, Prague, for his explorations in northern Arabia and Mesopotamia and his historical researches relating to this part of the world.

DR. E. F. ARMSTRONG, managing director of the British Dyestuffs Corporation, Ltd.; Dr. J. B. McEwen, Principal of the Royal Academy of Music; and Prof. R. W. Seton-Watson, Masaryk professor of Central European history in the University of London, have been elected members of the Athenæum, under the provisions of Rule II. of the Club, which empowers the annual election by the Committee of a certain number of persons "of distinguished eminence in science, literature, the arts, or for public service."

IN April of last year the eighth annual meeting of the American Geophysical Union was held, like its predecessors, at Washington. The transactions of the Union at this meeting have been issued as a *Bulletin of the National Research Council* (No. 61, pp. 295). The Union met usually in six sections, but one resolution passed in general assembly may be noted: since it appears that, in future, reports of much of the seismological work done in Japan will be published in Japanese only, the National Research Council was requested to provide (1) for the translation into English of such reports as are selected for the purpose by the American Geophysical Union, and (2) that mimeographed copies of the translations be distributed under suitable financial arrangements. The reports and papers dealt with in the sectional meetings include many of great interest. Three general symposia were held, one on climatic control, another

on the sun's ultra-violet light and the ozone content of the earth's atmosphere, and a third on correlations of various radio phenomena with solar and terrestrial magnetic and electric activities.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A secretary of University College Hospital Medical School—The Dean, University College Hospital Medical School, University Street, W.C.1 (April 18). A technical officer at the Royal Aircraft Establishment, South Farnborough, to assist in design and experimental development work in connexion with aerial beacons and aerodrome illumination generally—A.271, The Chief Superintendent, Royal Aircraft Establishment, South Farnborough, Hants (April 21). A professor of mechanical engineering in the Engineering College of the Benares Hindu University—Box P4360, 33 Norfolk Street, Strand, W.C.2 (April 30). An assistant lecturer in physics at the University College of the South-West of England, Exeter—The Registrar. A mathematical master, able to teach elementary physics and chemistry, at the Prince of Wales' Royal Indian Military College, Dehra Dun, U.P., India—The Secretary, Military Department, India Office, S.W.1. A junior assistant chemist under the Directorate of Explosives Research of the Research Department, Woolwich—The Chief Superintendent, Research Department, Woolwich, S.E.18.

### Our Astronomical Column.

SEARCH FOR A PLANET OUTSIDE NEPTUNE.—Ever since the discovery of Neptune by the perturbations that it produced on Uranus, attempts have been made to extend the method to still more remote regions. Prof. W. H. Pickering is one of those who have attacked this problem; in his research he examined the observations of Saturn, Uranus, and Neptune, and noted discordances between prediction and observation. His latest paper on the subject is in *Popular Astronomy* for March. He notes that if Adams and Le Verrier had used Saturn as well as Uranus in their calculations, they would have had material for making a better estimate of the distance and period of the perturbing planet; the reason being that conjunctions of the unknown planet with Saturn occurred every 36 years, so that the observations covered several conjunctions.

Prof. Pickering gives the shape that the curve of residuals should follow about the time of conjunction of each planet with an external perturbing one. He finds some evidence of conjunction of the unknown with Neptune about 1906, with Uranus about 1841, with Saturn about 1850, 1885, 1917. He finally assigns to the unknown the same period as Neptune, 164.8 years, but a more eccentric orbit. He makes aphelion passage about the year 1891, in longitude  $72^\circ$ . The present position of the planet is given as R.A. 8 h. 51 m., N. Decl.  $16\frac{1}{2}^\circ$ ; mass about half that of the earth, magnitude 12. When in opposition it would retrograde at the rate of  $4''$  or  $5''$  per hour, sufficient to show a short trail on photographic plates. Whether the planet is there or not, the investigation seems sufficiently ingenious to be worthy of notice.

SPECTROSCOPIC PARALLAXES OF 125 B-TYPE STARS.—Mr. D. L. Edwards has been engaged for some

years in deducing spectroscopic parallaxes of B-type stars at the Norman Lockyer Observatory. *Mon. Not. R.A.S.* for January contain his fifth paper on the subject. The research is much more difficult than in the case of stars of late type. Two methods are employed: (1) photometric measures of the intensities of certain hydrogen and helium lines by means of a wedge; (2) classification based on spectral type and line character. Standard stars of well-determined parallax were observed in order to check the curves used for converting measures into absolute magnitudes. The magnitudes of the stars in this paper range from 0.6 (Achernar) to 6.9. The absolute magnitudes range from  $-3.4$  ( $\alpha$  Camelopardalis) to  $+0.1$  ( $\nu$  Cassiopeia). The largest parallaxes are Regulus  $0.060''$  and Achernar  $0.040''$ .

MINIMUM OF  $\epsilon$  AURIGÆ.—This star, of spectral type *F5p*, the light of which varies between 3.3 and 4.1, is now approaching minimum, which is predicted to last about 700 days. It is an appropriate time for publishing an elaborate study of its spectrum, which Miss Cecilia H. Payne does in *Harvard Bulletin* 355, basing it on five plates, ranging in date from 1890 until 1927; last year's plate was standardised by comparison with the hydrogen lines in the spectrum of Vega, and it served to calibrate the other four. A list is given of the wave-length, origin, and intensity of about 170 lines. Certain iron lines are found to be suitable for the determination of absolute magnitude. The following absolute magnitudes of stars of this type are given: Procyon 3.1,  $\alpha$  Persei  $-1.3$ ,  $b$  Velorum  $-2.5$ ,  $\iota$  Scorpii  $-2.8$ ,  $\epsilon$  Aurigæ  $-4.0$ . This last star is therefore a supergiant at a distance of more than six hundred light-years. Miss Payne notes that search should be made during minimum for possible spectral changes.