

we went to the National Museum ; he was very proud of his post as honorary professor of archaeology there, and pointed out Maya sculptures which were wrongly labelled as Zapotec. A few years later, after visiting the ruins of Palenque with the Mexican Government expedition, and remarking that it took us three days to reach them from Frontera at the mouth of the Usamacinta River, he smiled and said it had taken him nearly three months !

Throughout all his Central American travels, Maudslay seems to have been endowed with extraordinary patience and perseverance, and this, together with his charm of manner and personality, enabled him to overcome all obstacles, whether of local politics, native prejudice, lack of guides, transport or labour. Maudslay always gained his point and got his way. To the young archaeologist he was always ready with help, advice, or encouragement, especially in the study of Maya glyphs, and it is difficult to speak in measured terms of his loss to the Mexican and Mayan student of archaeology. Those whose privilege it was to be numbered amongst his personal friends will perhaps best remember him for his kind and gracious disposition, his keen and sparkling eye, and his blameless life. He was the type of the true English gentleman and traveller. We shall not look upon his like again.

J. C. C.

MR. DAVID T. JONES, C.B.E., chairman of the Fishery Board for Scotland, who died in Edinburgh on Feb. 4, in his sixty-fifth year, began his official career as a junior clerk in the Fishery Board in 1887. He was promoted after five years' service to be chief clerk, and in 1909 to be secretary to the Board. During the War, he served as Paymaster Lieut.-Commander, R.N.R., prepared a census of fishermen, and organised a fleet of fishing vessels for various patrolling and defensive purposes. His special knowledge of fishermen and

fishing interests, extended by this war service, was of great value in his subsequent administrative work. In 1920 he was appointed chairman of the Board. He was especially interested in the fisheries problems of the North Sea, and was one of the British representatives on the International Council for the Investigation of the Sea. His strong support of the Scottish Fishery Board's scientific investigations is evidenced by the expansion of the laboratory facilities for this work under Dr. Alexander Bowman in Aberdeen. Mr. Jones was of cheerful temperament, and was a very genial friend who will be missed in many circles, especially in Edinburgh.

MR. THOMAS HEBDEN, of Keighley, who died on Jan. 3, at the age of eighty-one years, was one of the Yorkshire naturalists who, in the intervals of a business life, devoted himself to a particular branch of botany. He was a correspondent with many of the leading lichenologists of his day, and this correspondence was maintained almost up to the day of his death and is reflected by the numerous references to Hebdon in lichenological literature. His correspondence with Nylander added several species of *Verrucaria* to the British flora, these being published under the joint names of Shackleton and Hebdon in the *Naturalist* of 1892. His herbarium and scientific books have been bequeathed to the museum of his own town.

WE regret to announce the following deaths :

Dr. Alfred Holt, one of the joint honorary secretaries of the British Association at its meeting in Liverpool in 1923 and founder of the firm of Holt, Thompson and Co., Ltd., manufacturers of fine chemicals, on Feb. 15.

Prof. F. J. Pritchard, plant physiologist of the U.S. Bureau of Plant Industry, who specialised in breeding disease-resisting varieties of tomatoes, on Jan. 13, aged fifty-six years.

News and Views.

THE president of the Russian Academy of Sciences, Dr. A. P. Karpinsky, the distinguished geologist, is leaving his post at the Academy. This decision is the outcome of his unsuccessful protests against the recent forced decision of the Academy to deprive of its membership four academicians, including such historians as S. F. Platonov and E. V. Tarle, whose scientific views have been pronounced by the authorities to be incompatible with their presence in the Academy of a communistic State. It is noteworthy that at the same meeting of the Academy several foreign scientific workers were elected as foreign members. It appears clear, in the circumstances, that the acceptance of membership of the Academy of U.S.S.R. must involve silent agreement with the basic principle underlying the attitude of the Soviet authorities towards science. According to this principle, science is regarded as merely a means to the successful accomplishment of the Five Years' Plan, and scientific workers themselves are forbidden to express, or even to hold, independent scientific views.

NEW ZEALAND has its Scenery Preservation Act, now almost twenty-three years old ; and still we wait to see what a British Government Commission will say about the desirability of doing something for British scenery. In New Zealand the Act has worked well, as is shown by the Annual Report for 1930, a blue-book of 30 pages, with many photographs and a map in colour, issued by the Department of Lands and Survey. During the year, proclamations were made setting land apart for scenic or historic reserves to the extent of 6982 acres, and these areas now bring the number of scenic reserves in the Dominion up to 851, with a total area of 511,792 acres. The value of the reserves to the artist and traveller, as well as to the naturalist, is indicated in an appendix by Dr. L. Cockayne and Dr. E. Teichelmann, describing the Glacial Scenic Reserves of Westland. Apart from the annual interest on the capital expended in purchasing the reserves, the accounts show that they are run for about £1276 a year, and this is offset by rents, etc.,

amounting to £757. The annual interest on the invested capital is a more serious drain, amounting to £8979, for with the year's purchases the capital itself stands at just over £200,000.

ANYTHING that will lead to uniformity in the mode of reference to periodicals is to be welcomed ; and even more important than uniformity is intelligibility. An " International Code of Abbreviations for Titles of Periodicals ", just issued by the International Institute of Intellectual Co-operation (" Physician, heal thyself ! "), has both merits. Most wisely it is based on the rules and principles adopted by the compilers of " World List of Scientific Periodicals (1900-1921) ", and differs little from them. Those rules were not easily accessible, even though the British Association Committee on Zoological Bibliography reprinted them (Leeds, 1927) and circulated them to zoological periodicals. The present statement, in French and English, is more clearly drawn up, and is obtainable from the Institute for 2-50 fr. Intelligibility must be judged, not by the reader thoroughly familiar with the periodical in question, but by the worker in another branch. Excessive contraction is therefore to be avoided : it should be possible for the educated non-specialist to reconstruct the abbreviated word. Judged thus, some of the contractions proposed seem to " curtail the already curtailed cur ". We jib at " Tms " for the *Times*, " Chi " might mean Chile as well as Chicago, and who will guess " L.B." ? Diacritical marks should be avoided for the sake of the printers, and so we approve of " Khb " instead of the perhaps more intelligible " Kjøb " ; but we object to " Ž " for " Žurnal ". We could say more, but we prefer to commend this attempt to editors and authors.

CEREBRO-SPINAL or 'spotted' fever has been somewhat prevalent this year, and the outbreak is the subject of a circular recently issued by the Ministry of Health. This disease occurs, to some extent, every year ; but in certain years the incidence may be considerably above the average. After the War, when it was prevalent, the number of cases declined to 301 in 1923, since when there has been an upward trend, with 666 cases in 1930 in England and Wales. This year 230 cases among civilians have been notified, about half of which have proved fatal. The cases have been scattered and distributed in 36 counties, with some concentration in the West Riding of Yorkshire. The disease is especially liable to attack children and young persons, and during periods of prevalence the responsible micro-organism (the meningococcus) is to be found in the nose and throat of a number of persons who are and remain well. Such healthy carriers are probably of more importance than the cases themselves in spreading the disease. One factor known to favour local outbreaks is overcrowding in barracks, institutions, and schools. Plenty of space should be provided in dormitories, with thorough ventilation.

UNIVERSITIES in their relationship to national and international movements are discussed in *Bulletin No. 7, 1930*, pp. 43, of the Paris office of the Carnegie

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Foundation for International Peace. It contains two papers by Prof. d'Irsay, of Johns Hopkins University, and Prof. Bloch, of the Sorbonne, entitled respectively " Histoire Internationale des Universités ", and " La Cité Universitaire de Paris ". Prof. d'Irsay concludes his historical survey with a generalisation contrasting the spirit in which their teaching work is conducted by universities with that of their scientific research : the former inevitably nationalistic and tending to become monotonous and reactionary ; the latter, which is slowly but surely becoming their dominant note, genuinely international and all the more important in virtue of the fact that scientific research is the only real force uniting the world. Prof. Bloch's paper gives an account of the aims, organisation, and present position of the Cité Universitaire, inaugurated in 1924, when buildings providing for the accommodation of 300 French students were begun. Since then hostels have been erected on the Cité estate for Canadian, Belgian, Argentine, Japanese, American, and Indo-Chinese students ; and others are in course of construction for British, Swedish, Dutch, Spanish, Armenian, Danish, Greek, Cuban, Monacan, and French provincial students. By 1933 the total number of rooms will be 2500. In order to promote friendly intercourse between the students of different nationalities, a " Maison Commune ", for which Mr. J. D. Rockefeller has constituted a foundation of 90 million francs, will provide communal refectories, lounges, music-room, library, gymnasium, etc., and a medical service.

ON Feb. 25, Mr. W. G. W. Mitchell gave a lecture on " Developments in Television " before the Royal Society of Arts. He pointed out that early experimenters in the field of television were handicapped through not having suitable photoelectric cells for converting changes of light and shade into corresponding electrical impulses, and also through the modern valve amplifier then being unknown. But the past five years have shown that a primitive form of television is physically possible. The fundamental difficulties were considered in detail. As examples of the trend of development, Mr. Mitchell dealt with the recent demonstration of two-way television in America, the various attempts made to produce a large screen picture suitable for viewing by large audiences, and the attempts that had been made to overcome purely mechanical methods by using electrical ones. The American Telephone and Telegraph Co., which was responsible for the two-way television system, was primarily seeking information as to the value of the addition of sight to sound in personal conversations over the telephone. The extra apparatus for providing vision is bulky and the operating costs are heavy ; but work is in progress to reduce these defects. Speaking of large screens, Mr. Mitchell referred to a recent demonstration by J. L. Baird of an arc lamp the intensity of which was modulated directly by a vision signal. Very good brilliancy was obtained on a screen 7 ft. by 3 ft. at 10 ft. distance by optical projection. Purely electrical methods of television, such as the cathode ray method, will be more widely used as soon as the high voltages required for operating can be reduced. Mr. Mitchell thinks, however, that

the next development will be in the direction of zone methods used in conjunction with wired transmitting circuits. Using these methods, it should be possible within a year or two to have a picture of the size and brilliancy of the cinema screen picture of to-day.

THE presidential address of Dr. W. H. Eccles to the Institute of Physics, delivered last May (see NATURE, June 14, p. 894), has recently been published. He took as his subject the influence of physical research on the development of wireless communication. From the historical point of view the address is of great value, as no one has studied more closely the development of this industry, and in addition no one else has been in personal contact with so many of the pioneers. He points out that in the near future the knowledge, which has been laboriously accumulated, of the effect of atmospheric conditions on radio communication, will be utilised and that further rapid developments will take place. Radio has advanced practically by leaps and bounds. Some of these leaps—for example, the maturing of the triode valve—have led to the scrapping of equipment before it has earned the cost of its engineering development. Industrialists naturally fear these revolutionary improvements, due often to physical research. At present there is much discussion in engineering circles on rationalisation, the main object of which is to reduce the costs of production and eliminate waste in basic industries. Standardisation is a useful help in this direction, and so also is the modernisation of plant and products by the introduction of the latest methods and inventions. The standardisation that asks all manufacturers of certain articles to work to agreed specifications concerns engineers only; but that which calls a halt to the introduction of innovations affects physicists also. This latter form of standardisation is in conflict with the principle of modernisation. Physicists are often looked on askance by engineers, as their revolutionary ideas necessitate changes in manufacture. As, however, they live in the laboratories whence spring the discoveries which may overturn the established order, they are admirably qualified to forecast probable developments, which will enable engineers to decide when to standardise and when to modernise.

THE January number of the *Brown Boveri Review* gives an interesting record of the progress that is being made abroad in the design of electrical machinery. It shows clearly that in electrical traction the advances being made are in the direction of single-phase and direct current working. The Simplon Tunnel, for example, has been operated for nearly twenty-four years by means of three-phase current. Since 1920 it has been operated by seven locomotives, which handled without difficulty the greatly increased passenger and goods traffic after the War. At the beginning of last year, three-phase operation was replaced by single-phase operation, the double type of current collector employed eliminating many difficulties. Devices are now employed which enable the locomotives to run at four economical speeds. The Italian State Railways are electrifying a number of their sections with high-pressure direct current

at 3000 volts. The electric power is conveyed to the substations at 60,000 volts three-phase, and is then converted into direct current power at 3000 volts by 2000-kilowatt mercury arc rectifiers. The design of these rectifiers is being continually improved and their size is rapidly increasing. The latest design is a high-power rectifier with eighteen anodes capable of supplying a direct current of 12,500 amperes. Successful investigations as to the possibility of reversing the action of these rectifiers have been made. It is now possible to supply electrical energy from a direct current network to a three-phase network. The frequency of the supply is the same as that of the three-phase generators, or it can be adjusted to any desired value from the direct current side. It can be used for transferring energy from an alternating current system working at one frequency, to another working at a different frequency.

THERE seems to be a need for standardising the airway beacons that are used for guiding aeroplanes at night. In a paper in the *Illuminating Engineer* for February, H. N. Green states the requirements that a good beacon has to fulfil, and draws instructive curves to illustrate the light distribution from beacons of various candle powers. A beacon has to indicate, either by flashing, or by its colour, or by subsidiary lights, its locality on the route on which it lies. When flying at night over inhabited country at a height of 3000 feet, with average visibility a large number of lights can be seen. These lights can be divided into two groups. Local lights such as street lamps and shop windows form the first group. They cease to be visible at a range of from five to six miles. The second class contains the high-powered headlights on motor transport. These sometimes give beams of 50,000 candle power, which are visible at distances up to twenty miles. The presence of these flashes occasionally makes it difficult to identify a white flashing beacon when it is more than five and less than twenty miles away. The true horizon is about seventy miles distant, and if the beacon lies between twenty and seventy miles away it appears as an isolated flashing light and is easily identified. It is suggested that the lower limit for the intensity of a beacon should be 100,000 'beam' candles. The author discusses how the visibility varies with the height of the aeroplane and with the state of the atmosphere. He makes a calculation to show the worst visibility at which flying is possible. Pilots often complain that present-day beacons are conspicuous in clear weather, when they are not much wanted, and disappear in bad weather, when they would be of the greatest help.

AMONG recent donations received by the Zoological Department of the British Museum (Natural History) is a large album containing photographs taken in the Birunga mountain district to the north-east of Lake Kivu, East Central Africa, and dealing with the home of the eastern gorilla (*Gorilla gorilla beringeri*). These photographs were taken and were presented by Mr. Marius Maxwell, author of "Stalking Big Game with

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a Camera". Mr. Maxwell visited the Birunga mountains in the spring of 1925 to study the habits and habitat of the eastern gorilla. The series includes a photograph of a female gorilla startled by the photographer and making off in the foreground, carrying her young one on her back; and one showing the head and shoulders of an old male gorilla peering out from a dense curtain of tropical vegetation. There is also a series of photographs of gorilla beds, or 'nests'; one is constructed in the fork of a tree about 4 feet from the ground, but the older gorillas appear to prefer their beds on the ground itself, probably because they have little fear of leopards. The Trustees have agreed to the purchase of a valuable collection of West African birds made by Mr. G. L. Bates, principally in the highlands of the north-eastern part of Sierra Leone and the adjacent French territory. On the isolated peaks culminating in Mount Nimba were procured stonechats and pipits, the nearest relations of which are in the Cameroon highlands, hundreds of miles to the south. Two specimens and photographs of the 'Coco de Mer' (*Lodoicea Sechellorum* Labill) have been presented to the Department of Botany by Miss Royston of Clophill, Bedfordshire. The fruits are those of a palm which is restricted to the Seychelles, and were found floating in the Indian Ocean long before the tree itself was known. The fruit is one of the largest known; the weight of one of those presented, though the specimen is hollow, is 30 lb. A collection of some 2600 letters, many containing valuable mycological data, addressed to William Phillips, have been presented by Mr. J. Ramsbottom. Phillips was a well-known mycologist of the latter part of the last century, and wrote the "Manual of the British Discomycetes".

PROF. S. HANZLIK has published a useful preliminary report on the unification of rainfall recording in *Bulletin No. 5 of Section d'Hydrologie, Union Géodésique et Géophysique Internationale*, Venice, 1927. Numerous kinds of rain gauges are used in different countries, with reception areas ranging from 64 to 1000 square centimetres. There is equally great variation in the height of the sides of the rain gauge and in other features. Various practices obtain in the measure of snowfall. Self-registering rain gauges differ widely in principle. The amount of rainfall in some countries is recorded on the day it falls: in others on the day it is measured, which is the day following its fall. Generally a "rainy day" is one on which at least 0.01 mm. of rain fell, but in some countries 0.02 or even 0.5 mm. is the minimum. In some statistics the days with certain quantities of rain are distinguished; in others different quantities are chosen. There are also various practices in the recording of frost and other phenomena. The report is based on inquiries addressed to seventy-eight meteorological institutes throughout the world. It is not exhaustive, but yet is of much interest; and if it does nothing to suggest uniformity, it shows at least the wide diversity of methods employed in various countries. Without some measure of uniformity, the comparison and discussion of meteorological data are made unnecessarily difficult.

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THE Ordnance Survey has published a map of seventeenth century England and Wales as the second of the series of period maps of which Roman Britain was the first. The basis of this map is a layer coloured, contoured sheet on a scale of one to a million. The main roads are taken from Ogilby's survey of 1672. The principal ports and towns are shown by different symbols which indicate their importance. Other symbols are used for castles, large houses, forts, and camp sites. The chief events of the Civil War, with their dates, are indicated. In many parts of the country the principal economic products are marked. Forests are indicated by names but not symbols. In spite of the large amount of information given, the map is clear and legible and gives no impression of crowding. It is both a useful document and a fine specimen of cartographical skill. A small plan of contemporary London is bound up with the map. Prof. G. M. Trevelyan contributes a short introduction on the general appearance of England in that century, and Dr. J. E. Morris gives an outline of the campaigns of the Civil War. There are also lists of events and prominent persons of the century. Full details of the sources of the map are given. The map alone is published on paper at two and sixpence, or mounted on linen with letterpress at six shillings. The plan of London can be obtained separately at one shilling.

The Reports on the health of the Navy and of the Army for the year 1929 have recently been issued (London: H.M. Stationery Office. Price 2s. 6d. and 3s. net, respectively). In the Navy, the ratio of the incidence of disease was 482.03 per 1000 of the strength, being an increase of 36.04 over 1928 and of 14.91 in comparison with the five years' average. There was some increase in venereal diseases, with 6361 cases, and in malaria; and a number of cases of influenza occurred. On the other hand, there were only three cases of typhoid fever and two of paratyphoid fever, a remarkable record in a force of 86,240 men. The total number of deaths was 254, of which 101 were due to injury. In the Army, likewise, there has been some increase in the incidence of disease, the admission ratio having risen from 426.2 in 1928 to 468.5 in 1929 per 1000 of the strength. This increase was, however, mainly due to an epidemic of influenza in the home commands, during the early months of the year. Several diseases show a slight increase in the admission ratio compared with 1928, and the death and invaliding ratios also show slight increases. Tonsilitis, which has been increasingly prevalent during recent years, again shows an increase. There were more cases of malaria in India, and one case of this disease arising in England is mentioned. The patient had never been to a malarious country, and had been for more than ten years continuously in Great Britain. The malaria parasite was found in his blood, so that there is no question of the diagnosis. Venereal diseases show a satisfactory decrease.

Fossil shells of ostrich eggs were found by the 1923 expedition of the American Museum of Natural History in the Central Gobi, and now A. Tugarinov

(*Priroda*, 1930, No. 7-8) reports the discovery of fragments of such shells in a number of localities around Troitzkosavsk, in Transbaikalia, which means a considerable northward extension of the area where ostriches occurred. Most of the finds were made in an association with various objects of palaeolithic culture, but in one case, fragments of shells were found away from any traces of human habitation. The association of the shells with palaeolithic camps and the fact that some fragments are perforated indicate that they were used as a material for making utensils. As may be concluded from the size and the structure of the shells, they belonged to a species closely allied to *Struthio camelus*, the living North African ostrich, which differs strongly in these respects from the more southern species. However, it does not appear possible to identify the Transbaikalian species with the North African one. This discovery forms an interesting counterpart to the fact that the environs of Troitzkosavsk harbour fossil remains of an antelope of the genus *Spirocerus*, also allied to some recent African genera.

RECENTLY we referred in these notes to the many problems of bird life in Britain which still await solution. Yet birds are the creatures most observed by the amateur naturalist. It need scarcely be said, therefore, that our knowledge of the habits, life-histories, and reactions of mammals has many blanks, in spite of the fact that few branches of inquiry are of greater interest to the naturalist or of more practical importance to the agriculturist. Moreover, it is just along the lines of observation most open to the field naturalist, such as the relationships of animals to their environment or the fluctuations of their numbers seasonally and annually, that further information is needed. An excellent guide for the worker who desires to make useful contributions to such knowledge is Walter P. Taylor's "Outlines for Studies of Mammalian Life Histories", a 12-page pamphlet recently issued in revised form by the U.S. Department of Agriculture (*Miscell. Pub.*, No. 86, 1930). In the comprehensive scheme of studies outlined there, the author indicates the observations which ought to be made in elucidating the environment and its influence, the life-history, structure and behaviour, and the relationship between the lower mammals and man. The suggestions should stimulate systematised observations in the field.

WE have received a letter from Col. L. A. Waddell in which he takes exception to our notice of his book, "Egyptian Civilization: its Sumerian Origin", in NATURE of Jan. 24. He states that the fact is overlooked that it gives the fully attested inscriptional evidence for the complete identity of the pre-dynastic and dynastic Pharaohs with Sumerian emperors and their dynasties in Mesopotamia, based on the exact agreement which has been worked out for their names, achievements, and order of succession. He adds that so far from his chronology "hanging in the air", he has provided a solid foundation of fact for the first time for a chronology of Egypt, whereas those who follow what our notice termed the "orthodox" system

differ among themselves by some thousands of years in the dates of the early dynasties. While we have pleasure in placing Col. Waddell's protest on record, it is evident that it restates, in brief, the argument of his book, which is dependent upon identifications which, it was made clear, we were not prepared to accept.

GREAT progress has been made in the United States of America in the formation of children's museums. In discussing "Children's Museums in our National Life", at Yale University on Nov. 19, Miss Anna B. Gallup pointed out that such institutions are now flourishing in Detroit, Indianapolis, Boston, Hartford, and Los Angeles, besides the children's museums maintained by Harvard and Yale Universities. In addition to these seven, all established after the organisation of the original example at Brooklyn, others are on the way. In Kansas City a small museum for children is soon to be opened, another is being planned as part of the California Academy of Sciences, and in Pasadena the movement has taken hold. Even in Honolulu a building has been under consideration for the use of children, and a representative has studied the methods of the Brooklyn Children's Museum in order that the most may be made of the educational possibilities of the venture.

THE *Bulletin* of the Michigan College of Mining and Technology for the year 1930-1931, which has recently been issued, contains full schedules of the subjects taught at this seat of learning. Judging by the scope of the work detailed for chemistry, engineering, mining, metallurgy, etc., and from the illustrations scattered through the book, a very thorough education is made possible by the possession of first-class equipment housed in ideal buildings and handled by a very competent staff. That is where these schools of advanced instruction in the United States score over so many British centres of learning of similar standing; lack of adequate equipment or accommodation is bemoaned in almost every university in Great Britain in some faculty or other, but it is seldom that the same cry is heard from the other side. To those interested in schemes of work and curricula, in questions of relative number of hours per subject in a group chosen for a degree course, it is instructive to turn to publications which tell us how other people do things, how qualifications are secured. While headings and schedules can give little idea of the quality of the teaching or of the standard really achieved, short of or compatible with the aims professed, much can be learned from perusal of a pamphlet of this kind, and correct assessment of international educational values is only one of the advantages ensuing therefrom.

A GREAT deal of interesting matter on the methods and practice of boundary determination and demarcation is contained in *Bulletin* 817 of the United States Geological Survey, entitled "Boundaries, Areas, Geographic Centers and Altitudes of the United States and the Several States". The history and the methods of marking the boundaries are given for all the States and for the international frontiers. In several cases a lack of understanding of physical geo-

graphy led to boundary disputes and readjustments, as in the case of the shifting bed of the Rio Grande between Texas and Mexico, or the Alaskan boundary dispute of 1898. The pamphlet contains also a great deal of statistical matter and several maps. Of the latter, the most interesting is a large reproduction of the Mitchell map of British and French dominions in North America in 1755, on a scale of about fifty miles to an inch.

PROF. R. F. GRIGGS, of George Washington University, has recently returned from a botanical expedition to the Katmai volcanic region of Alaska (*Daily Science News Bulletin*, Science Service, Washington, D.C.). About twenty years ago, Katmai practically exploded and devastated a great area of country, which was left covered with volcanic ash. This covering was almost devoid of nitrogen, and Prof. Griggs has paid special attention to the plants which first populated this bare and arid soil. The first plants were liverworts, and although there is little or no nitrogen in the soil, it is, of course, present in the plants themselves. It is not clear at present whether the liverworts have the capacity to take nitrogen from the air themselves, or whether this power is associated with some fungus growing in close association with them. Such close mycorrhiza-like union of a fungus with a liverwort has been described on several occasions. Prof. Griggs proposes to study the question further on this group of plants, in the laboratory.

DR. WILLEM DE SITTER, director of the Observatory at Leyden, has been awarded the Catherine Wolfe Bruce gold medal for 1931 of the Astronomical Society of the Pacific "for distinguished services to Astronomy".

THE special exhibition at the Imperial Institute, South Kensington, of the mineral resources of the Empire, which was noted in NATURE, Feb. 14, p. 248, will remain open until April 30. In connexion with this exhibition, Sir Edwin Pascoe, director of the Geological Survey of India, will give an address on "The Mineral Wealth of India", on Mar. 12, at 5.30 p.m. Tickets for seats may be obtained from the Secretary, Imperial Institute, South Kensington, S.W.7.

THE fifth general meeting of the 'Dechema' (Deutsche Gesellschaft für chemisches Apparatewesen) will be held, with that of the Verein deutscher Chemiker, in Vienna, on May 28 and 29. The subject chosen for the symposium is "The Separation of Solid and Liquid Substances". Offers of contributions should be sent in not later than Mar. 15, to the head office of the 'Dechema', Seelze b. Hanover.

DR. E. R. WEIDLEIN, director of the Mellon Institute of Industrial Research, Pittsburgh, Pa., has announced the appointment of Dr. L. H. Cretcher to an assistant directorship in the Institute. Dr. Cretcher, who, since 1926, has been serving as head of the Institute's Department of Research in Pure Chemistry, will be in charge of a group of industrial fellowships concerned with problems in organo-chemical technology. Dr. Cretcher was formerly a

member of the organo-chemical division of the Rockefeller Institute, and in 1919 took up a research post in the laboratory of the National Aniline and Chemical Company. He is best known for his work on sugar chemistry. He has also contributed to the knowledge of pyrimidine aldehydes, oxidation of tertiary hydrocarbons, glycol ethers and esters, organic boron compounds, barbituric acids, chloro ethers, and equilibria in binary liquids systems.

WE have received from the Association of British Chemical Manufacturers, 166 Piccadilly, London, W.1, a well-bound volume of 405 pages entitled "British Chemicals and their Manufacturers", which is printed in English and five other languages, French, Spanish, Italian, Portuguese, and German. All the entries are classified under products in separate indexes in these languages. There is also a section dealing with products under proprietary and trade names, the nature of the product being stated in the languages mentioned. The volume may be obtained gratis by genuine users of chemicals on application to the Association at the address given above.

A CATALOGUE (No. 15) of upwards of 300 second-hand works on botany, horticulture, zoology, and geology has just been issued by Mr. J. H. Knowles, 92 Solon Road, S.W.2.

THREE short lists (B.7, B.8, and B.9) of second-hand books on, respectively, botany, gardening and agriculture, natural history, and angling, fish, and fishing have just reached us from Messrs. Francis Edwards, Ltd., 83 High Street, Marylebone, W.8.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A junior research assistant in the department of chemical technology of the Imperial College of Science and Technology—The Registrar, Imperial College of Science and Technology, South Kensington, S.W.7 (Mar. 12). A sub-inspector of quarries in the North Midland Division of the Mines Inspectorate of the Mines Department—The Under-Secretary for Mines, Establishment Branch, Mines Department, Dean Stanley Street, S.W.1 (Mar. 16). A chemical assistant to the advisory chemist of the School of Agriculture, Cambridge—The Secretary, School of Agriculture, Cambridge (Mar. 19). Lecturers in, respectively, geography and mathematics and physical training and hygiene, at St. Hild's Training College, Durham—The Principal, St. Hild's Training College, Durham (Mar. 20). A full-time lecturer in civil and mechanical engineering at the Polytechnic, Regent Street—The Director of Education, The Polytechnic, Regent Street, W.1 (Mar. 20). An assistant secretary under the Middlesex Education Committee, having special knowledge of technical education and with experience in courses leading to national certificates in electrical and mechanical engineering and in building construction—The Secretary, Education Offices (H.), 10 Great George Street, S.W.1 (Mar. 21). A professor of economics in the Panjab University—The Secretary, Universities Bureau, 88A Gower Street, W.C.1 (Mar. 28). A director of the Research Institute of the Rubber Research Scheme of Ceylon—

The Chairman of the Board of Management, Rubber Research Scheme, Peradeniya, Ceylon (Mar. 30). A deputy director of the Public Health Laboratories, Cairo—The Under-Secretary of State, Department of Public Health, Cairo (April 14). A demonstrator in physics at Bedford College for Women—The Secretary, Bedford College for Women, Regent's Park, N.W.1 (April 20). A lecturer and adviser in veteri-

nary science in the Harper Adams Agricultural College and National Institute of Poultry Husbandry—The Principal, H.A.A.C., Newport, Shropshire.

ERRATUM.—NATURE, Feb. 21, p. 268, five lines from end of notice of "The Economics of Forestry" by W. E. Hiley: for "British Isles" read "British Empire".

Our Astronomical Column.

Mapping the Larger Magellanic Cloud.—A recent *Daily Science News Bulletin* issued by Science Service, Washington, D.C., gives a summary of a paper by Prof. H. Shapley read before the American Association for the Advancement of Science at the recent Cleveland meeting; he stated that a detailed map of the larger cloud is being prepared; the cloud contains 200,000 giant and supergiant stars, each more than 150 times as bright as the sun, and more than 2000 stars that are each more than 10,000 times as bright as the sun.

Another *Bulletin* gives a new estimate of the distance of the sun from the centre of the galaxy. Dr. Harlow Shapley had found a distance of 15,400 parsecs by taking the mean of two different methods; but, since that was made, Dr. R. J. Trumpler has found evidence of appreciable absorption of light in the galactic plane; Dr. van de Kamp has applied the necessary correction to Dr. Shapley's figures, and finds that the distance is reduced to some 12,000 parsecs, or even less.

The Eighth Satellite of Jupiter.—This tiny body, the magnitude of which is $17\frac{1}{2}$, has been unobserved since June 1923. It was discovered by Mr. Melotte at Greenwich in 1908, and was followed there for many years; but of late years the Thomson Equatorial, which is the only instrument there that is suitable for observing it, has been in use for stellar parallax and other researches. There was danger of its being lost, as the solar perturbations are very large and the computation of them long and tedious. However, Prof. Numerov, of Leningrad, computed them a few months ago, and issued an ephemeris; Prof. G. van Biesbroeck has succeeded in photographing the satellite, and publishes eight positions, obtained from photographs on four nights, in *U.A.I. Circ.* No. 310. The first position is:

R.A. (1930-0). N. Decl.

Dec. 16. 20562 U.T. $7^{\text{h}} 25^{\text{m}}$ $36\cdot46^{\text{s}}$ $22^{\circ} 54' 50\cdot3''$

The observed places are about 8 sec. smaller in R.A. than the predicted ones, and $10'$ north of them. These residuals are satisfactorily small after an interval of nearly eight years. The plates were taken with the 24-inch reflector at Yerkes, with an exposure of 30 minutes.

Variable Stars in the Globular Cluster Messier 3 (Canes Venatici).—*Astr. Nach.*, No. 5747, contains a study of the light variations of 47 stars in this cluster, by Mr. Paul Slavenas. The plates used were 97 in number, and were taken by Dr. J. Schilt in 1926 with the 60-inch reflector at Mt. Wilson. The data for 30 stars were sufficient to deduce accurate periods: these are given to the eighth decimal of a day; the shortest is about $0\cdot288$ day, the longest $0\cdot708$ day. The majority lie close to half a day. It will be remembered that it was from a study of the magnitudes and periods of Cepheids that the distances of globular clusters, the Magellanic Clouds, and the spiral nebulae have been determined.

Reference Stars for the 'Selected Areas.'—The scheme, initiated by the late Prof. Kapteyn, of intensive observations of stars, both bright and faint, in certain areas distributed uniformly over the entire heavens, needs very careful meridian observations of the brighter stars in each area, since these have to serve as reference points for the plate constants, and the proper motions of the faint stars will depend upon them. The Observatory of Leyden has just produced a catalogue of 1172 of these stars in vol. 15, part 3, of its *Annals*. They include all the 'areas' in the northern hemisphere except the polar one. The catalogue bears the names of C. H. Hins and J. J. Raimond, jr., with Prof. de Sitter as director. The observations were made between 1921 and 1929. In 1922 a hand-driven moving-wire micrometer was inserted. As there is no movable declination thread, the declinations were observed at different times from the Right Ascensions, the eye-end of the telescope being turned through a right angle. Most of the stars have been observed at least twice in R.A. and three times in Declination. The positions are reduced to the equinox of 1925.0.

Occultation of Antares.—Kwasan Observatory *Bulletin* No. 189 contains an observation of the occultation of Antares on Jan. 15 by Prof. K. Nakamura with the 30-cm. Cooke refractor. It was cloudy for the disappearance. At the reappearance, the greenish companion emerged first, and the bright star some 4 seconds later. It was seen first as a dim red glare, and took fully a tenth of a second to reach full brightness. This is in good accord with the large diameter of the star, about $0\cdot04''$, found by the Mount Wilson interferometer. The times of emersion in U.T. are:

1931. Jan. 14^d 20^h 2^m 27^s companion.
30·9 Antares.

The first time is noted as probably late.

It is of interest to note that the first observation of the companion was made on the occasion of an occultation. The *Berliner Jahrbuch* of 1822 records that Burg at Vienna observed the small star reappear five or six seconds before the bright one on April 13, 1819. He concluded that Antares is double. Bode, however, discredited this, and added the note, "Antares ist kein Doppelstern". The companion was not seen again until 1844 (by Grant in India) and 1845 (by Mitchel in America). Incidentally the green colour of the companion is shown to be inherent, not a contrast effect, when it reappears before the bright star.

The Cracow Astronomical Handbook for 1931.—This handbook, as usual, is almost entirely taken up with ephemerides of variable stars. There are 391 eclipsing variables for which the dates of minimum are given, and 382 others for which certain elements are given. There are also elements of occultations of stars by the moon for several stations in Poland. There are also useful tables of precession, obliquity of ecliptic, etc. The explanations are given both in Polish and in flexible Latin, which is very easy to read.