

of Physiology in Boston in 1929. He valued his connexion with Great Britain, and his friends will miss his frequent and cheerful greetings.

Sereni took the degree of M.D. in 1922 with honours. While still a student he had been awarded three scholarships for research work which he performed in the laboratory of human physiology in Rome. After graduation, he obtained, in competition, a studentship from the Ministry of Education to work in Italy and abroad. This was how he came to London, though he supported himself here, frugally enough, for a longer period than the studentship allowed, by working early and late, assisting a medical friend, so leaving the days free for the laboratory. In 1923, he was appointed assistant in the Department of General Physiology in the University of Rome, and in 1925 *libero docente*. From 1925 he gave, every year, in the University of Naples, a course of lectures on physiology for students of medicine and science. In 1926 he was appointed to the position which he held when he died. Before entering the University, Sereni had volunteered, at the age of seventeen years, for military service, serving as a lieutenant and gaining the Croce di Guerra.

Sereni's researches extend over various fields of physiology. His most important work deals with anaphylaxis, which he studied from a general biological point of view on men, on various animals, and particularly on tissue cultures. He worked more recently on the humoral and nervous co-ordination in cephalopods and on the behaviour of unstriated muscle.

A. V. H.

MR. J. G. MILLAIS.

MR. J. G. MILLAIS, who died on Mar. 24, the sixty-sixth anniversary of his birthday, was a man of many interests and talents. A traveller and a sportsman, who followed big game on the continent of Europe, in Africa, and in North America, an artist and a naturalist, who could write discursively about the ways of wild life or particularly upon specific themes, he unified all these interests in authorship. The variety of subjects of his published works is great, as the standard of his descriptions and accuracy is high, yet devotion to sport lay behind most of his writings.

Millais' travel books are always interesting and contain many acute natural history observations. His monographs, essential to the British naturalist, show a wonderful range of information. "The Natural History of British Surface Feeding Ducks" (1902) was rounded off by two volumes on "British Diving Ducks" (1913), and in the interval he wrote "The Natural History of British Game Birds" (1909). Amongst mammals, he opened with a standard work on "British Deer and their Horns" (1897) and proceeded to the most important of all his books, "The Mammals of Great Britain and Ireland", published between 1904 and 1906. The three enormous volumes of this monograph, awkward to handle because of their bulk and weight, contain the best complete account of their subject we possess. Latterly, Millais' interests concentrated upon the flower garden, and amongst his last publications are "Rhododendrons and their Hybrids", a series of three volumes running from 1917 to 1923, and "Magnolias" (1927).

Millais inherited artistic ability from his father, Sir John Millais, and illustrated in full or contributed to the illustration of his own books, but his finished drawings are inclined to be rather stiff and hard in tone, and lack the freedom of line and spontaneity which characterise the pencil sketches he often reproduced.

J. R.

WE regret to announce the following deaths:

Dr. J. Anderson, formerly fellow of the London School of Tropical Medicine, later professor of medicine in the University of Hong-kong and recently director of the division of medicine in the Henry Lister Institute at Shanghai, aged fifty-two years.

Prof. R. K. Butchart, professor of mathematics in Raffles College, Singapore, and formerly professor of physics in Wilson College, Bombay, on Mar. 30.

Prof. W. C. M'Intosh, F.R.S., emeritus professor of natural history in the University of St. Andrews, distinguished by his work in marine biology, especially the systematic study of British marine annelids, on April 1, aged ninety-four years.

Senator R. Nasini, professor of chemistry in the University of Pisa, on Mar. 29, aged seventy-five years.

Prof. Hugh Ryan, professor of chemistry in the University College of Dublin and Chief State Chemist to the Irish Free State, on Mar. 27, aged fifty-seven years.

News and Views.

THE report of the Court of Inquiry into the loss of the airship *R101* over Beauvais on Oct. 5, 1930, has just been issued (Cmd. 3825. London: H.M. Stationery Office. 2s. 6d. net). It admits that an exact explanation of the immediate happenings leading to the disaster can never be given, owing to the lack of evidence, but by examining various hypotheses the Court has come to the unanimous conclusion that the one presented is the most plausible. This is, that there was a rapid loss of gas from one of the main forward gas bags, added to a heaviness from a gradual leakage of gas due to attrition of the bags, probably greater than was suspected. A heavy down air-current forced the nose down, and at the same time

may have either caused or accelerated an existing tear in the outer envelope. The rush of air through this, again, may have either initiated or extended a split in the inner bag. It is known that the wind was variable enough to have buffeted the nose of the ship up and down, and the height coxswain, only just on duty and fresh to the 'feel' of the elevators, had possibly over-corrected an upward deflection when the downward one caught him. He then lost height to a dangerous extent while swinging the elevators to the other extreme position, but eventually succeeded in correcting the ship's altitude. The further loss of height following this appears to have been intentional in an endeavour to make a

slow landing when it was realised that a crash was inevitable.

THE other part of the report on the loss of *R101* is devoted to discussing the responsibility for the undertaking of the flight to India at that early stage in the ship's development. It is quite clear that although there were an exceptional number of novelties in design, there is no evidence of the failure of any of these having been either the cause of, or even contributory to, the disaster. On the other hand, the programme of flying trials as originally drawn up by the experts at Cardington had been curtailed. Since the addition of the extra bays, the ship had never flown in anything but exceptionally fine weather, and had never carried out speed trials. The airworthiness certificate, without which the flight could not have been undertaken, was apparently issued by the Air Ministry before the report by the Airworthiness of Airships panel, upon which it should have been based, was even written. It is abundantly clear that considerations of policy were allowed to overrule all others in deciding that the flight should take place when it did, although the blame lies with the system of controlling such work, rather than upon any particular individual.

ON Mar. 31, at 11.2 A.M. (5.2 P.M. G.M.T.), Managua, the capital of Nicaragua, was almost completely destroyed by a violent earthquake, many of the walls left standing after the shock and the fires that followed being thrown down by strong after-shocks on Mar. 31 at 9.15 P.M. and April 1 at 5.15 A.M. The principal shock lasted only a few seconds. Estimates of the number of persons killed range from 500 to 2000, out of a population of about 50,000. Though great earthquakes are rather frequent in the Central American republics, it is in Guatemala and Salvador that they are most serious. During the eighteenth and nineteenth centuries, out of 30 very destructive earthquakes, 14 occurred in Salvador, 10 in Guatemala, 4 in Costa Rica, 1 in Honduras, and 1 in Nicaragua. According to Montessus, who has made a detailed study of Central American earthquakes, the most important seismic centres in Nicaragua are those of Leon and Granada, which are respectively 54 miles north and 26 miles south-east of Managua. One of the few minor centres in the country lies close to Managua. The most interesting features of the recent earthquake are its brief duration, the comparative smallness of its area of damage, and its occurrence in an almost dormant seismic zone.

A GREAT advance has recently been made in the technique of radio-telephony which promises some surprising developments in the near future. The International Telephone and Telegraph Laboratories have shown that it is possible to utilise Hertzian waves, the frequency of which is more than a hundred times greater than the most rapid at present in use. The new method utilises wave-lengths of between 10 cm. and 100 cm. in length instead of the present 'short waves' which lie between 10 metres and 100 metres. The properties of the new 'micro-rays' are approximately the same as those of light rays.

They can be reflected and refracted by devices of an optical nature and travel in straight lines. The curvature of the earth and the altitude of the sending and receiving stations are the determining factors for the distance of transmission. It is necessary that the two stations should be visible from one another. Hence high sites will be the most desirable in the neighbourhood of populous centres. There appears, however, to be no limit to the number of relay stations that can be used. A demonstration of the new system was given on Mar. 31 between officials and engineers on the cliffs at St. Margaret's Bay, near Dover, and Blanc Nez, in France. The speech vibrations were applied to a micro-radion tube in which oscillations of 1,600,000 kilocycles per second (about 17 cm.) were generated. The modulated waves were sent in a straight line by a parabolic reflector 10 feet in diameter to a similar reflector in France, where they were concentrated on the receiver. The demonstration was entirely successful and proved the practical character of the micro-ray method. The method provides a wave band nine times the width of that previously available. In addition, as the waves travel in straight lines and their distance range is restricted, a large number of stations can operate on the same wave-length and the present congestion of the ether will be relieved.

THE International Telephone and Telegraph Laboratories have also to be congratulated on a notable achievement in the field of facsimile telegraphy. By the new method, pages of type, handwriting, line drawings, and plans can be transmitted at the rate of two sheets a minute. In the case of typewritten sheets containing five hundred words, this corresponds to a speed of 60,000 words an hour. In the picture telegraphy at present in use between the Post Office and several continental cities, about twenty minutes is required for the transmission of a single picture. As in the case of other picture telegraphic systems, a device is used in the new method to scan the message in a series of fine parallel lines with a point of intense light. The light reflected from each elementary area of the sheet is collected and led to a photoelectric cell. This cell delivers to an amplifier a signal corresponding in amplitude to the tone value of the picture element, pure white giving a large signal and pure black a zero signal. At the receiving station a similar device is used, the message being replaced by a strip of photographic paper which is moved continuously forward with a speed equal to that of the message at the transmitting end. The beam of light is now obtained by an argon lamp which acts as a light valve. The motors operating the scanning heads are controlled by means of tuning-forks. A full description of the method is given in the *Electrician* for April 3. The method is particularly useful for telegraphing languages like Chinese, which have to be rewritten in some alphabetic language before being sent by the Morse code in ordinary telegraphy.

THE Marconi Company has received orders for the erection of a chain of wireless transmitting and receiving stations through the heart of Africa. The stations

have been ordered by the Administrations of Uganda, Kenya Colony, Tanganyika, Northern Rhodesia, Southern Rhodesia, and the Union of South Africa, and they will be used both for the operation of the new Cape to Cairo air route and, in many cases, for general communication. The apparatus to be installed will be for transmission and reception on medium and short wave-lengths. When these stations are completed the trans-African aviation service will be the most highly organised long-distance air route in the world, and at the same time internal and external communications will be greatly facilitated throughout the continent. The sites for the stations are to be in the proximity of Kampala (Uganda); Nairobi (Kenya Colony); Moshi, Dodoma, and Mbeya (Tanganyika); Mpika and Broken Hill (Northern Rhodesia); Salisbury and Bulawayo (Southern Rhodesia); Germiston, Victoria West, and Cape Town (Union of South Africa). The wave-lengths used for wireless communication between the aircraft and these stations will be 900 metres, and inter-aerodrome communication will take place on short waves. For general communications, special wave-lengths have been allotted to the stations at Mpika, Broken Hill, Bulawayo, Salisbury, Germiston, and Victoria West, which will be used for this purpose.

In a dispatch from the Peking correspondent of the *Times* which appeared in the issue of Mar. 30, attention is directed to the manner in which, it is alleged, a Society for the Protection of Ancient Relics, formed some two or three years ago in Peking, is interpreting its functions. The scope of the society is wide, for it covers objects ranging from works of art to fossils. It is semi-official and has the approval of the Nanking Government. Its methods are said to be the subject of much criticism. Apparently the latest object of its attack is Sir Aurel Stein, whose expulsion from Chinese Turkestan, where he is now engaged in exploration, is said to be demanded on the grounds that while he was raising funds in the United States he spoke slightly of the new China, and that his funds are too large for his purpose, which must have an ulterior and, it is presumed, political object. It will be remembered that Dr. Roy Chapman Andrews experienced obstruction on the return of the Fourth Central Asiatic Expedition from Mongolia, and in the following year the expedition had to be abandoned owing to the delay over the negotiations about the conditions on which the expedition would be allowed to proceed and the Chinese personnel to be attached to it. It is said to have been alleged at the time that Dr. Andrews's expedition was no more than a cover for a search for oil. It is scarcely necessary for us to defend Sir Aurel Stein from these charges, nor the further charge that it was his intention to smuggle out of Chinese Turkestan any antiquities that he might find. The declaration made by him before he entered the country, and forwarded to the authorities by the British Ambassador in Peking, is a sufficient guarantee of good faith, were one needed. Nor is it necessary to enter into the charge against the American expedition, even if there were any evidence before us.

THERE can be no question, however, that the ill-advised publicity given to the character of the material found by the American Central Asiatic Expedition—the dinosaurs' eggs—and the equally injudiciously advertised attempts to raise funds by their sale, aroused the suspicions of the Chinese and impressed upon the less well-informed that something of enormous value was being taken out of the country. It was in precisely similar circumstances that the recent legislation relating to antiquities in Egypt was passed. If the Peking Society is animated, not by a hatred of the 'foreign devil', but by a genuine desire to preserve China's antiquities for China, this is a perfectly legitimate aspiration, recognised as the right of nearly every civilised country, even England—or at least it will be in some degree when the new Ancient Monuments legislation is in force. If this desire is not genuine, as the *Times* correspondent suggests, then an attempt should be made to arrange a *modus vivendi*. It is admitted that, in addition to official personages, the society consists largely of the officials of universities, museums, libraries, research institutes, and the like. A great deal of archæological work has already been carried out in China by Europeans, and we have it on the authority of Prof. Elliot Smith in regard to the latest and greatest discovery of all, the Peking skull, that individual Chinese drawn from the classes which compose the society have co-operated wholeheartedly in organising the work of the geological survey which led up to the discovery of the skull, in the actual discovery, and in the work of preparation in the laboratory with Dr. Andersson, Dr. Davidson Black, Prof. Elliot Smith himself, and others of non-Chinese nationality, who have assisted them from time to time.

MR. BERTRAM THOMAS has been awarded the Founder's Medal of the Royal Geographical Society and also the Burton Memorial Medal of the Royal Asiatic Society, in recognition of his work of exploration in the Great Sandy Desert of Arabia. It is also announced that Mr. Thomas has accepted the invitation to deliver the triennial Burton Memorial Lecture before the Royal Asiatic Society on his return to England. At the close of the War, Mr. Thomas was a political officer in Mesopotamia and his knowledge of the country and his understanding of tribal Arab character proved of signal service to the administration under Sir Arnold Wilson in the troubled years which followed. After serving in the same capacity in Transjordan, he was selected to be the Financial Adviser and Vizier of the Sultan of Muscat and Oman, being the first Englishman to hold such an office, virtually that of Prime Minister. Both in the course of his official duties and in his leisure, Mr. Thomas has explored some thousand miles of the Oman coast in his patrol boat, while his relations with the turbulent tribes of the littoral have enabled him to penetrate country unknown to Europeans, adding considerably to our geographical, ethnological, and linguistic knowledge of Arabia. An account of his last journey appeared in the *Times* only a week or two ago. His first two journeys in Arabia, of which the scientific results were published in the *Geographical Journal*, the *Journal of the*

Royal Anthropological Institute, and other periodicals, have been pronounced by competent authority to be the most important and extensive piece of geographical exploration carried out since the War.

THE various organisations connected with research in the textile industries have now reached the stage where much of their work is suitable for direct application to the immediate problems of the industry itself. The recent Report of the Council of the Wool Industries Research Association (formerly known as the British Research Association for the Woollen and Worsted Industries) gives a concise summary of the application of the work of that Association to woollen and worsted spinning and to dyeing and finishing processes. The Association has, during the past year, continued fundamental research on biological, chemical, and physical problems. It has also devoted much time to the examination of the inherent characteristics of the wool fibre, its response to processing, and the possibilities of its utilisation in directions which are as yet undeveloped. The report records that in the course of electrical investigations, methods have been devised for the prevention of electrification during the processing of wool, and that the use of wool as an electrical insulator has now become an accomplished fact. It further adds that not inconsiderable quantities of worsted yarn have recently left Bradford to be employed for electrical insulation purposes in cable manufacture. There is much scope for this research association, and if its new method of financial support by means of a voluntary levy on the industry becomes really successful, its utility to the wool textile industry should be considerably enhanced.

THE *Journal* of the National Institute of Industrial Psychology, Vol. 5, No. 5, contains an account of "The Organisation of Works Transport", an investigation carried out by Messrs. L. I. Hunt, W. H. O'N. Manning, and G. H. Miles. The problem confronting the investigators was one of hand-trucking in a machine-producing works housed in an antiquated building. The whole transport system was carefully studied. The fluctuating demands of 38 departments and the irregular flow of production along 231 connecting routes were considered. Sources of delay were noted, and a comprehensive scheme of reorganisation initiated; this comprised the classifying of routes, and their co-ordination under a central transport office. A system of circuits, combining all routes, except those with the heaviest loads, enabled a scheduled service to the departments to be maintained. Very definite results followed the introduction of the scheme. The economy of labour amounted to 60 per cent, one man handling 50 instead of 20 loads; labour costs were reduced by 40 per cent, yet labourers' earnings rose; and an efficient, flexible transport system replaced the old cumbersome one. This experiment has been industrially successful; but its scientific value is considerably reduced by the number of variables that have been introduced. The arrangement for a bonus payable on individual output and working-time follows on in the Taylor-Gilbreth tradi-

tion and perpetuates the same fallacy. In spite of this, however, many interesting points emerge; and Mr. Hunt's exposition is admirably concise and lucid.

MR. S. MORRIS BOWER, of Langley Terrace, Oakes, Huddersfield, is asking for help in extending a statistical inquiry into the frequency of thunderstorms in the British Isles in winter, which was originated by Mr. C. J. P. Cave in 1916 and was concluded in March 1929, to a similar inquiry for the six months April to September. What is required is a note of the place, date, and time of occurrence of thunder, lightning, or hail, with the direction in which the lightning was seen. Additional details, such as the time of commencement of very heavy rain or hail, should such occur, and of the direction of movement of any well-developed storm, would be welcome. Thunderstorms sometimes move across the country along a definite 'front': that is to say, if crosses are marked upon a map showing where storms occurred at a particular hour, these form a nearly continuous chain; when similar information is shown for a later hour, a similar chain of crosses is normally shown, but displaced from the position that the first chain occupied. Phenomena of this kind are readily studied by professional meteorologists at the Meteorological Office with the aid of synoptic weather charts. But it is only on a small number of days in the year that anything of this kind is to be found on the synoptic charts. Numerous storms, more or less isolated, often occur both in winter and summer. They may travel or remain nearly stationary throughout their life history; in the latter case especially they often lie too far from any official reporting station for their occurrence to be noted officially. It is especially in regard to this class of storm that an organised inquiry is of value, and until such an inquiry has provided a reasonably complete statement of the facts, there is little prospect of being able to give a satisfactory general account of the thunderstorms of the British Isles.

THE arrangements for the British Chemical Plant Exhibition to be held on July 13-18 at the Central Hall, Westminster, in conjunction with the jubilee celebrations of the Society of Chemical Industry, regarding which a preliminary announcement was made in *NATURE* of Jan. 17, are making rapid progress. About forty firms have already booked space, and since these include most of the important firms in the British chemical plant industry, the success of the exhibition is assured. - The exhibits will cover the whole range of the industry. The arrangements which the Chemical Engineering Group of the Society of Chemical Industry is making for the Section showing, on a co-operative basis, the work of the various research associations and of the Department of Scientific and Industrial Research are also well advanced. The scheme is being supported by the Department, which will be represented by the National Physical Laboratory, the Chemical Research Laboratory, the Fuel Research Board, the Forest Products Research Laboratory, and the Building Research Board. The research associations dealing with the following industries will co-operate: boots, shoes, and allied trades; cast iron;

leather; linen; non-ferrous metals; paint, colour, and varnish; rubber; wool. There will be three main groups, dealing respectively with (1) materials used in chemical engineering, such as metals, fabrics, etc.; (2) chemical plant and associated equipment, including that employed on fuel; and (3) testing apparatus and standardisation.

So long as mountain peaks remain unscaled by man there will be found hardy adventurers to attempt them, for the glory of achievement as well as for the valuable scientific data which well-organised expeditions afford. In 1924 there was the last Everest expedition, which ended so tragically with the death of Mr. G. L. Mallory and Mr. A. C. Irvine. Last year saw the attempt on Kanchenjunga led by Dr. Dyhrenfurth, when the climbers reached Jonsong Peak (24,344 ft.). Now we have a British expedition, consisting of Mr. F. S. Smythe (leader), Capt. E. St. J. Birnie, Dr. R. Greene, Mr. R. L. Holdsworth, and Mr. E. E. Shipton, which will attempt Mount Kamet (25,447 ft.). According to the *Times* of April 4, the party left Venice on that day for India. Mount Kamet is in the Gharwal District of the United Provinces and is in the Zaskar Range, a northern branch from the main Himalayan chain. The approach to Mount Kamet will take the expedition across the watershed separating the principal sources of the Ganges, to the glaciers above Gangotri, which is to the east of the main peak, and it is expected to obtain valuable topographical, physiological, botanical, and other data and useful climbing experience. There have been several attempts on Mount Kamet in the past, the last being in 1920, so the present expedition should have the advantage of knowledge of local conditions.

THE great heights of many of the blocks of buildings recently erected in America and picturesquely called skyscrapers has led to the development of high-speed lifts. In the *Westinghouse International* for the first quarter of 1931, a description of Carew's Tower, Cincinnati's largest structure, is given. It combines a 48-story office building, a 28-story hotel, a 25-story garage, and many retail shops. Three floors in the office building are reserved exclusively for doctors and dentists. Forty-one lifts are required, including six of the fastest in the world, to make life in this self-contained city possible. The express lifts move at a speed of 900 feet per minute, which is a little greater than ten miles per hour. The speed of the local lifts is 700 feet per minute. The hotel contains a thousand rooms and is served by nine lifts, six passenger and three service. There are three large motor-car lifts serving the parking garage. Their speed is altered by varying the applied voltage, thus eliminating mechanical gear. They can make a flight up the 25 floors in about half a minute. The stores use lifts moving at 450 feet per minute. At still slower speeds, dumbwaiters, sidewalk lifts, a 12.5-ton hydraulic lift, and an observatory-tower lift operate. At speeds of 500 feet and above it is practically impossible to read the numbers on the various floors. Lifts for speeds up to 1200 feet per minute are being designed, and

at present there seems nothing to stop still higher buildings and still faster lifts from being constructed. A description of the lifts used to carry the students from one lecture room to another in the University of Pittsburgh, which is 40 stories high, is also given.

SEVERAL special problems have arisen in connexion with the supply of direct current to traction systems. Two solutions are in use and they are advancing in widely diverging directions. In America, the method of converting alternating current into direct current in the automatic substations is to use machinery of the rotating converter type. In Europe the use of mercury arc rectifiers is rapidly extending. In a paper read to the Institution of Electrical Engineers on Mar. 12, by J. W. Rissik and H. Rissik, the special requirements of traction operation were outlined and the present state of development of the ironclad rectifier for traction use, as reflected in its applications in converting substations on the Continent, was described. Since the War, the use of rectifiers in Germany has extended very rapidly. The whole of the Berlin city and suburban railway system is supplied by rectifiers in 47 substations, 31 being controlled from a distance. The German federal railways have adopted the rectifier as the standard equipment for traction substations. The development of rectifiers in America has been comparatively slow; the rectifiers manufactured there are generally designed in accordance with the latest European practice. In Great Britain the increased demand has stimulated manufacturers to compete with foreign firms by improving their designs. The authors believe that in the scheme of general railway electrification which will eventually be carried out in Great Britain, rectifiers will be used, if not exclusively, then very largely. They think that in the next decade Great Britain will be placed in a position comparable with that which now obtains in Germany.

WRITING on "Chemistry as a Career", in the *Alumnus Chronicle* of the University of St. Andrews, Prof. John Read remarks on the current tendency in certain secondary or public schools to carry specialisation too far with apt pupils. This tendency appears to be largely a response to the requirements of some of the universities in their entrance scholarship examinations. Hence many such pupils acquire little or no knowledge of biology, whilst others are deficient in English, modern languages, mathematics, and other fundamental subjects. Prof. Read wisely advocates that a pupil should be restrained from inordinate specialisation, until he has secured the necessary basis of a well-proportioned general education, and he supports the adoption of a broader test of intelligence and merit than that now imposed on scholarship candidates. In the same article, Prof. Read explains the complex nature of the chemical profession and surveys the prospects which confront entrants. He points out that chemistry provides a multitude of diverse professions, rather than a single homogeneous profession, and that in doing so it provides scope for all sorts and conditions of chemists. Just as it is difficult to legislate effectively for the com-

plex racial association of the British Empire, so the complex corporation of chemists is unable to safeguard the interests of the profession in a generally acceptable manner. Whilst specialisation at an early stage is undesirable, it is nevertheless essential later, and it is evident that at present there is no over-production of chemical specialists of first-class ability. On the other hand, it is difficult to find openings in chemical industry for men of second-class attainments or for women chemists possessing the highest qualifications. Prof. Read pays a deserved tribute to the late Lord Melchett's policy in advancing the career of industrial science; in a scientifically organised chemical corporation with trained chemists in the highest administrative positions and on the board of control, the chemist is no longer the factory 'maid of all work'. Expansion of schools of organic research in the British universities in response to demands formulated under the shelter of the Dyestuffs Act has also opened attractive and useful scientific careers.

THE biological interests of the Galapagos Islands are so many that it is strange that no thorough exploration of their inhabitants had been carried out since Charles Darwin made them famous, until the islands were visited by the expedition, planned by L. M. Loomis, formerly director of the California Academy of Sciences, which remained in the field for more than seventeen months during 1905-6. An account of the work of the expedition, by Joseph R. Slevin, now appears as one of the *Occasional Papers* of the California Academy of Sciences, under the title "Log of the Schooner *Academy*". It is an interesting story. The study of the land tortoises, of which 266 specimens were collected, showed that, contrary to belief, they still inhabited all the islands in the archipelago from which they were formerly known (except Charles Island), and that they even existed on islands where they were never before observed. But many minor biological points attracted the attention of the explorers. The tameness of birds and lizards was remarkable: both would come to pick up crumbs dropped beside the observer; both, alas! were rewarded by being killed with a switch. The lack of sensitiveness possessed by lower animals was well shown when, on a lizard's tail being severed by a knife, the animal did not move until, seeing the wriggling severed portion, it turned about and grabbed it as if it were a foreign object. Land iguanas were common on Narborough Island and occurred over the whole area, even to the rim of the crater at an altitude of 5000 feet; and the wild goats on Hood Island, feral descendants of domestic stock, quenched their thirst by drinking sea water on the beach.

AT the meeting of the London Mathematical Society on Thursday, May 14, at Burlington House at 5 P.M., Prof. J. E. Lennard-Jones will deliver a lecture on "Quantum Mechanics of Atoms and Molecules". Members of other scientific societies who may be interested are invited to attend.

HIS MAJESTY THE KING has been pleased to approve the award of the Royal Medals of the Royal Geo-

graphical Society as follows: *Founder's Medal* to Mr. Bertram S. Thomas, for his geographical work in Arabia and successful crossing of the Ruba el Khali; *Patron's Medal* to Rear-Admiral Richard E. Byrd, U.S.N., for his expedition to the Antarctic, and his flights over both north and south poles.

THE first of a series of demonstrations of horticultural machinery is announced in the Mar. 26 issue of the Ministry of Agriculture's weekly publications. The trials took place recently at Pinhoe, Devon, on a mixed fruit plantation kept in a high state of cultivation. The implements used were the Simar Rototiller Nos. 3 and 5 and the 'Monotrack' motor cultivator, the Planet Junior (garden tractor), the Gravely motor cultivator, and the Auto-Culto motor cultivators, two types of the latter machine being used, one fitted with tines and the other with a 'one-way' plough. All implements, except the Simar 5 and the Auto-Culto motor with plough, carried out cultivation between strawberry rows, the distance between the rows being about 2 ft. 6 in. Later in the day all implements except the Auto-Culto plough worked among raspberry canes, the width cultivated being about the same (2 ft. 6 in.). The Auto-Culto ploughed on land from which broccoli crop had been taken. The demonstration, which was very well attended and carried out under favourable weather and soil conditions, proved entirely successful, all implements working successfully.

THE subject selected by the Exhibition Committee for this year's exhibition at the Royal Institute of British Architects is "The Architecture of Modern Transport". It will consist of photographs, drawings, and models of architectural and decorative subjects connected with modern transport, and is intended to illustrate the latest developments both in Europe and America. The types of work will include railway stations, signal-boxes, various types of railway coaches, docks, harbour works, canal power stations and locks, liners and yachts, bus and coach stations, garages and filling stations, trams, buses, charabancs and private cars, bridges and viaducts, pylons, traffic control stations, hangars and aerodromes, aeroplanes and airships, lifts and moving stairways. The exhibition will be formally opened by Mr. H. G. Wells on April 21, at 3 P.M., and it will remain open until May 22. Admission will be free.

ANOTHER of the well-known and valuable catalogues (No. 443) of Messrs. Bernard Quaritch, Ltd., 11 Grafton Street, W.1, has reached us. It gives the titles of, and in many instances useful bibliographic notes upon, upwards of 1500 works on botany, agriculture, forestry, fruit-culture, gardens and gardening, herbals, early medicine and surgery, tobacco, etc., and should be obtained by collectors.

MESSRS. Dulau and Co., Ltd., 32 Old Bond Street, W.1, have just issued Catalogue No. 183 of some 695 second-hand books on gardening and botany, including materia medica, pharmacy, perfumery and scent, from the libraries of the late Mr. E. M. Holmes, curator of the Museum of the Pharmaceutical Society, and the

late Mr. W. Davis, collector for Messrs. Veitch. The same firm has also circulated a short handy list of useful books on gardening. Both catalogues may be had free of charge on application.

A CLASSIFIED list of second-hand instruments has recently been published by Messrs. C. Baker, 244 High Holborn, London, W.C.1. The list is divided into ten sections, comprising microscopes and cognate apparatus, surveying instruments, astronomical instruments, spectroscopes; projection apparatus, including lanterns, slides, and projection microscopes; field-glasses, chronometers, anemometers, thermometers, barometers, balances, hydrometers; various kinds of physical apparatus, such as polariscopes, voltmeters, and galvanometers; and photographic apparatus. Apparatus can also be had on approval or on hire.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A sugarcane mycologist and a research assistant, each at the Agricultural Research Institute, Pusa, India, for research into mosaic and other diseases of sugar-cane

—The High Commissioner for India (General Department), India House, Aldwych, W.C.2 (April 20). A lecturer in geography at the Portsmouth Municipal College—The Secretary, Offices for Higher Education, Municipal College, Portsmouth (April 25). A lecturer in metallurgy at the Bradford Technical College—The Principal, Technical College, Bradford (April 30). A lecturer in philosophy at Armstrong College, Newcastle-upon-Tyne—The Registrar, Armstrong College, Newcastle-upon-Tyne (May 2). A draughtsman under the Ministry of Agriculture and Fisheries—The Secretary, Civil Service Commission, Burlington Gardens, W.1 (May 7). A chief research worker in the Nutrition Research Laboratories of the Indian Research Fund Association—The Secretary, Indian Research Fund Association, Simla, India (June 1). Teachers of woodwork under the Kent Education Committee—The Director of Education, Springfield, Maidstone. A handieraft teacher (wood and metal work) under the Norfolk Education Committee—The Secretary, County Education Office, Stracey Road, Norwich.

Our Astronomical Column.

Comets.—Prof. G. van Biesbroeck records, in *Pop. Astr.* for March, a remarkable increase of light in comet Schwassmann-Wachmann (1), which passed perihelion nearly six years ago, and is now more than seven units from the sun. In the middle of January, its magnitude was $17\frac{1}{2}$, but on Feb. 11 it had risen to $12\frac{1}{2}$, thus showing a hundred-fold increase in the light. There was a somewhat similar, but less intense, outburst in December 1929, the magnitude then rising from 17 to $13\frac{1}{2}$. Both the outbursts were short-lived, the additional light fading after a few days. It would seem that the cause of the outbursts must be sought in the comet's nucleus, rather than in the sun; but its nature remains a mystery. A somewhat parallel case was presented by the two successive outbursts of light of Holmes's comet, at its first apparition in 1892. That comet was, however, much nearer to the sun, less than three units.

Prof. van Biesbroeck continued his observations of three other comets during February. Stearn's comet has now been observed for four years, and is distant from the sun $11\frac{1}{2}$ units, establishing a record in that respect. Beyer's comet is still of magnitude $14\frac{1}{2}$, and promises to be visible for several months more. Comet Tempel (2) has been observed for six months, but is now lost in the sun's rays.

Prof. Nakamura gives some more details, in *Kwasan Bulletin* 192, of the object that he discovered last November: it was called comet 1930 *g*, but it may be a minor planet; it looked quite sharp on some days, but on others had a nebulous appearance. Positions are given for Nov. 16, 17, and 18; plates were exposed on it until Nov. 28, but it faded rapidly, and no images have yet been detected after Nov. 18.

The search for Encke's comet has been fruitless; it must now be left to southern observers to pick it up after perihelion passage, which occurs on June 3. It will be too near the sun until then to make detection possible.

Distances of the Cepheid Variables.—Very wide use has been made of the principle, first discovered by Prof. H. Shapley and his assistants, that the period of variation of a Cepheid gives a measure of its absolute magnitude, and consequently of its distance. The

distances of the globular clusters and of the spiral nebulae are chiefly based on this method. The graduation of the scale of absolute magnitudes involves the finding of the distances of the nearer Cepheids; this is a difficult matter, as they are too distant to obtain accurate trigonometrical parallaxes. Estimates were made from their proper motions, but as these are small, it was known that the adopted values are subject to correction. *Ast. Jour.*, No. 951, contains a new discussion of their distances by B. P. Gerasimovic. He redetermines the proper motions with the aid of recent catalogues, and also makes some use of the radial velocities, using the radial motion due to galactic rotation in the same manner that Dr. J. S. Plaskett has done for the *B* and *O* stars. He finds that for stars with period 4-days, Shapley's absolute magnitudes need to be increased (that is, made fainter) by 0.9 magnitude, while for 8-day and 16-day periods the increases are 0.8 and 1.2 magnitudes. He adopts 1.0 magnitude in the mean as the average increase needed for the Shapley absolute magnitudes. This implies that distances found from the Shapley curve need to be reduced in the ratio 0.631 to 1, or about 5 to 8. R. E. Wilson had suggested 0.7 to 1, which is in fair accord; but the much more drastic reduction of Shapley's distances in the ratio of 0.13 to 1, suggested by Curtis, Kapteyn, and van Rhijn about ten years ago, is shown to be improbable.

Pluto.—A further article on Pluto by Prof. H. N. Russell appears both in the February number of the *Scientific American* and the February number of the *Journal of the Royal Astronomical Society of Canada*. It describes the barycentric orbit, deduced by Nicholson and Mayall as a simple method of allowing for the greater part of the action of the other planets upon it. Their period is 247.69 years, which is so close to $1\frac{1}{2}$ times Neptune's period that it will need an interval of some 40,000 years to elapse before Pluto and Neptune are at their minimum distance from each other. The work of Nicholson and Mayall indicates that Pluto's mass is probably comparable with that of the earth. Prof. Russell notes that if Pluto's albedo is the same as that of the lunar maria, its diameter would be about equal to that of the earth.