

News and Views.

HEARTY congratulations are extended to Prof. W. Mitchinson Hicks, who celebrated his eightieth birthday on Tuesday last, Sept. 23. Born at Launceston, he was educated at a private school in Devonport, proceeding thence to St. John's College, Cambridge, being placed seventh wrangler in 1873. Prof. Hicks was principal of and professor of physics in the University of Sheffield from 1883 until 1905. At the Ipswich meeting of the British Association in 1895 he was president of Section A (Mathematics and Physics). The Royal Society awarded him a Royal medal in 1912, during the presidency of Sir Archibald Geikie, for his researches in mathematical physics, and especially for his investigations on the theory of spectroscopy. Among researches specially associated with his name may be mentioned those on hydrodynamics, and particularly on vortex motion, published in the *Philosophical Transactions*. Prof. Hicks was elected a fellow of the Royal Society in 1885, and has served on the council on several occasions.

FRIDAY next, Oct. 3, will be the hundredth anniversary of the birth of Albert Günther, one of the most distinguished naturalists in England in the second half of last century and for twenty years keeper of the Department of Zoology in the British Museum. To mark the centenary, his son, Dr. R. T. Gunther, of Oxford, has prepared a bibliography of his father's writings, which has been published as a supplementary number of the *Annals and Magazine of Natural History* (August). A brief biographical sketch is prefixed, followed by a tabular analysis showing the wide zoological and geographical range of the subjects dealt with. Apart from the personal interest, the list of books and papers will be of great use to zoological bibliographers, since it catalogues not only the works well known to all students of the groups dealt with, but also numerous short notes in such periodicals as the *Field* which are sometimes difficult to trace. The first paper on the list is an article on animal poisons, published in 1853. The last item is the "Appendix to the History of the Collections in the Natural History Departments of the British Museum", issued in 1912, giving the general history of the Department of Zoology from 1856, the year before Günther entered the Museum, to 1895, when he retired on reaching the age limit. His death on Feb. 1, 1914, spared him the sorrow of witnessing the conflict between his native land and that of his adoption. It is to be hoped that Dr. R. T. Gunther may find occasion to expand his sketch of the life of one to whom more than to any other single individual is due the present position of the zoological departments of the British Museum.

A JOINT discussion on the relation between past pluvial and glacial periods was held between the Sections of Geology, Geography, and Anthropology at the recent Bristol meeting of the British Association, with Prof. H. J. Fleure in the chair. Prof. J. W. Gregory, who was probably the first observer to correlate equatorial pluvial with European glacial periods, devoted

his remarks in the discussion to the emphasising of difficulties in taking correlations beyond the broadest outlines. Misses Gardner and Caton Thompson from work in the Fayum, Mr. Leakey from work in Kenya, and Mr. Armstrong from work in Rhodesia, all stated that they had been led to the conclusion that there were in the Pleistocene two pluvial maxima separated by a period of relative aridity. Dr. Sandford (from Egypt) had not been able to find evidence of a mid-Pleistocene arid period. European workers indicated that there was a tendency to look upon the Mindel ice age as a major phenomenon and upon the Riss and Würm phases as episodes of a second major glaciation. Prof. Sölch (Heidelberg) said that he thought Central European opinion was trending towards the idea of the subdivision of the Pleistocene ice age mentioned above, and urged British workers to bear in mind that orographical changes (an uplift of perhaps 500 metres) were among the phenomena of the later Pleistocene ice age. He gave as the general opinion of Central European glaciologists the view that the Hötting breccia belonged to the Mindel-Riss interglacial period. Dr. C. E. P. Brooks gave Dr. G. C. Simpson's view of the succession of conditions in the ice age, and then stated some of his reasons for not accepting the idea of a long arctic interglacial in the middle of the ice age. He showed that a weakening of the monsoon, and consequent aridity, would be the inevitable result of heavy glaciation on the Central Asiatic Highlands. Prof. Barbour showed that in China in the Pleistocene a pluvial period separated two more or less arid periods characterised by loess. Mr. L. A. Cammiade's observations in South India agreed with those of Prof. Barbour in China.

THE National Radio Exhibition which was held at Olympia on Sept. 19-27 was nearly twice as large as that held last year. The radio industry is apparently one of the few industries which are practically unaffected by the world trade depression. There are no unemployed on the register of skilled workmen in the radio trades and they are steadily absorbing unskilled labour. Since Madame Melba broadcast from Chelmsford about ten years ago, the progress made in perfecting the transmitting and receiving sets has been extraordinarily rapid. This is due to the fact that from the start it was recognised that progress could only be made when based on scientific principles deduced from careful physical researches. The tendency towards a standardisation of types was very apparent in this exhibition. The prices varied from about £30 for a good 'all-electric' set down to about 30s. for a serviceable radio set. In the making of 'all-electric' sets the manufacturers have proceeded on very similar lines of development. Good Continental reception necessitates a four-valve set, arranged preferably with a small outdoor aerial. Ability to receive at least twenty stations can be guaranteed. The lowering of the royalty charged for valves has led to the use of a greater number of them. The European stations have wave frequencies varying between 155 and 1400 kilocycles per second, and the

'all-electric' sets as a rule can be adjusted so as to receive any within this range. But few of them can be adjusted for the short-wave emissions, varying from 3748 (Rome, Prato Smeraldo) to 18,821 (Java, Bandoeng). This is no real drawback to dwellers in Europe. The British Broadcasting Corporation has put forward a scheme for an Empire broadcasting service. This will be discussed at the forthcoming Imperial Conference. It will be of interest to learn whether any of the Dominions wishes to join in this scheme.

THE summer meeting of the Newcomen Society took place at Liverpool on Sept. 15-17, thus enabling members to visit the exhibition in St. George's Hall, and the exhibition and pageant in Wavertree Play-ground in connexion with the centenary celebrations of the Liverpool and Manchester Railway. One day, however, was devoted to visits to certain small factories at Prescott where tools are still made by hand, and to Rainhill, the site of the famous locomotive trials of 1829. Though marine chronometers are made by various London firms, much of the mechanism is made in a small workshop in Prescott by two workmen who have inherited a business a hundred years old and possess the requisite skill and experience. In other shops were seen hand file cutting, hand broach making, and the manufacture by hand of high-class pliers and wirecutters. In file making, the steel blank in the soft state is held down on a lead block by two straps pulled down tight by the foot of the file cutter. The tools necessary are the chisel and hammer, both of special shape so as to render the action of the cutter natural. Skill is easily and quickly acquired and the teeth on a file seven or eight inches long can be cut in less than ten minutes. It is the burr raised by one cut which forms the guide to the tool for the next cut and enables the work to be done so quickly and accurately. In broach making similar dexterity was shown. The broaches being made varied in size from fine needles to lead pencils, but all were tapered and five-sided. The broach was held in a pair of pliers and laid in a groove in a bone block while being filed, and the accuracy with which the pliers were turned a fifth of a circle at each stroke of the file was not the least surprising part of the work. In the making of pliers and cutters, there were operations of an equally interesting character, and it was not a little remarkable to find these hand industries still able to hold their own in the days of mass production.

ON Sunday, Sept. 21, M. Laurent-Eynac, the French Minister for Air, unveiled a statue to Clement Ader, one of the pioneers of flight, at Muret in the Haute Garonne. Ader's experiments were carried out in the nineties of last century. Through the writings of Mouillard he studied the flight of birds in Algeria, and in 1890 built an aeroplane of bat-like form and fitted with a steam engine, which on Oct. 9, 1890, is said to have flown a distance of 150 feet. He then built a larger machine on the same lines, to which he gave the name the 'Avion', which was tried in the presence of the French military authorities, but without success, in October 1897. Ader's experiments in France, it will be seen, were contemporary with those

of Lilienthal in Germany, of Pilcher and Maxim in England, and of Chanute and Langley in the United States.

THE relics of Andrée's expedition of 1897 which were found last August on White Island (or Giles Land) by a Norwegian expedition have arrived in Norway on their way to Sweden. The *Times* has published a preliminary report of the Swedish experts who have examined the remains and diaries. There were three men in the balloon when it left Danes Island, Spitsbergen: S. A. Andrée, N. Strindberg, and K. Frankel. The bodies and diaries of all have been found. The balloon came down on the ice on July 14, 1897, three days after leaving and the day after the last message was sent by carrier pigeon. This was in about lat. 83° N., long. 30° E. Instead of striking south for Spitsbergen, the men appear to have sledged eastward. They got into eddies in the drifting pack-ice and had great difficulty in making progress. By Aug. 10 they were in lat. 81° 55' N., long. 29° E. At times the drift was even north-west. Eventually they were carried on the only part of White Island where a landing is possible, the greater part being ice-covered. There they landed on the south-west early in October 1897. Andrée's notes continue until the end of September, and Strindberg's until Oct. 17. A number of instruments, photographs, and scientific observations have also been found.

IN the twenty-fifth report of the Committee on Photographs of Geological Interest, presented at Bristol to Section C of the British Association, 141 new photographs are recorded, bringing the total of the collection to 8287. From the well-known Reader series of negatives 39 are contributed to the present additions. The Isle of Wight landslip of 1928 is illustrated by photographs by Mr. J. F. Jackson. Prof. S. H. Reynolds contributes sets from Torquay, Snowdon, South London, and Portrairie. The submerged forest of Swansea Bay and the raised beach of Hope's Nose, Torquay, are illustrated by Dr. A. E. Trueman and Mr. L. N. Wheaton. River action in South Wales is portrayed by a set from Dr. T. F. Sibly, and Mr. W. F. Chubb has presented a fine view of the Severn Bore. Lundy Island is the subject of a series by Mr. A. O. Rowden. Copies of individual photographs can generally be obtained directly from the photographer concerned, to whom application should be made for further particulars. Addresses are given in the report. The Committee has already published three sets of geological photographs, and these have been widely used in teaching throughout the world. It will therefore be of very special interest to geologists to know that two new sets of 25 photographs each are expected to be available by the end of the present year. For information concerning these new issues application should be made to the honorary secretary of the Committee, Prof. S. H. Reynolds, The University, Bristol.

PROGRESS in the application of scientific methods in the production of raw cotton is well exemplified in the recent issue of the *Empire Cotton Growing Review*

(vol. 8, No. 3), in which questions of breeding, ginning technique and cotton quality, and blackarm disease come under discussion. The chief interest, however, is focused in a résumé of the progress of the cotton industry under successive German and British rule in Tanganyika Territory. Under German administration, experience proved the vital importance of planting on suitable soil and of growing the right kind of cotton, owing to the ravages of diseases and pests on such types as Egyptian and Ceravonica. Lighter soils give better results than the heavier ones, and production is greatly assisted by proper rotation of crops. Under British rule the output has increased rapidly. Production by plantation labour is uneconomic under ordinary conditions, and the policy now is that of definitely encouraging the native smallholder. Under this régime, native production has risen from forty-three per cent in 1922 to from sixty-three to seventy-four per cent of the whole in the succeeding years. It is estimated that during the last nine years more than one million sterling has passed into the hands of the cotton-growing native of the country. Cotton production is much influenced adversely by various factors, of which several may operate at once. Local demand for food crops or other agricultural products, inadequate transport, and unfavourable climatic conditions are but a few of the problems which demand attention, and the solution of which means so much to the economic well-being of the mandated territory.

As a converter of electric energy into heat the electric fire has an efficiency of one hundred per cent. It is desirable to know how much of the energy is converted into radiant heat and how this heat is distributed. In the *Journal of the Institution of Electrical Engineers* for September, Prof. Parker Smith gives the results of experiments on ordinary electric fires which were made to determine their radiant efficiency. This nearly always lies between 55 and 70 per cent, the rest of the heat being carried away by convection. He made tests on five modern types of gas fire and found that the radiant efficiency was from 40 to 50 per cent, the bulk of the remaining heat escaping as flue heat and the rest being carried away by convection air currents. In a room heated by an electric fire, the temperature for comfort of the air should not be less than about 55° F., hence the fire itself needs to produce air convection currents in addition to those produced by objects in the room receiving direct radiant heat. The principal difficulty in connexion with electric heating is the question of ventilation. Means must be provided for admitting fresh air, while the warmed air should escape near the ceiling. Ceiling-panel heating is sometimes employed, but in this case the convection heating is less than with floor and wall panels. If the temperature of the heating elements is raised by over-running, the heat carried away by the convection currents increases more rapidly than the radiation heating. It would seem that ordinary electric fires run at approximately the right temperature, but more attention should be paid to designing proper ventilation for the rooms in which they are placed.

No. 3178, Vol. 126]

For some years the advisability of having an extended high tension system of electric supply has been considered in Northern Ireland and Mr. J. M. Kennedy has been asked to report on the scheme. In the *Electrician* for Sept. 5 a résumé is given of his report and of a supplementary one issued on Aug. 29. The scheme links up the principal centres of population in Londonderry, Tyrone, and Fermanagh with the generating station of the Londonderry corporation. It would also link up with networks projected at Dungannon and in Antrim. The western area has been divided into eight districts and it is proposed to connect them by 33,000-volt lines. The report shows that considerable economies can be effected in this way. The capital cost would be about a million pounds, which is about one-fifth that of the Shannon scheme. Several Irish engineers are agitating that before the final decision of the Northern Government be taken, the possibility of effecting still greater economies by having an all-Ireland electricity programme be considered. We think that it would be for the mutual benefit of the north and the south to have an all-Irish grid. As the power available at the Shannon power station is limited and nothing has yet been done in constructing the northern grid, the time seems opportune for discussing the larger scheme. In a few years' time the water power of the Liffey will probably be harnessed and the falls on the Erne in the north-west of Ireland could be utilised. The water power from the Erne would be particularly helpful to both governments. Mr. Kennedy mentions in his report that it would be a comparatively simple matter to connect the northern system with the Free State grid at Newry. The *Irish Electrician* points out that it would be to the mutual advantage of Dublin and Belfast. An agreement between the two governments would be necessary.

So far back as 1880 Sir William Siemens made experiments on the effect of illuminating plants by electric light. He found that with a few hours' illumination he could make tulip buds blossom, and he suggested that in the future gardeners might become independent of sunlight and regulate the growth of the plants entirely as they wished. In 1920 Jacobsen, a Norwegian engineer, observed that the position of the electric power cables underground could be told at once by the strips of green grass above them. These two fundamental observations form the basis of the procedure in electro-horticulture, which is being carried out in the Experimentalfältet—a little 'science town' near Stockholm. In the *Electrical Times* for Sept. 4, Charlotte Gast gives an account of the satisfactory results already obtained by Sven Oden and Gustaf Lind. The work is mainly to expose different kinds of plants to light coming from incandescent lamps. As in November 1929 Stockholm had only 23 hours of sunshine, the results were sharply defined. The plants subjected to the electric light were much the more flourishing. Conclusions have not yet been obtained as to the best length of time for the exposure. Cucumbers, which ordinarily require five weeks to produce marketable fruit, can be ripened in three weeks with the use for a few hours

daily of artificial light. The experiments made on the heating of the soil by electric cables have given promising results. It has been proved definitely that it does pay to heat the soil in greenhouses for the cultivation of melons and cucumbers. Nine hundred Swedish gardeners and florists are using soil-heating equipment. A usual price in Sweden for a night electric load for gardening is a farthing a unit. If this could be supplied at a cheaper rate, as in Norway, where there is a special commercial night-rate of a tenth of a penny per unit, Swedish growers could force early spring vegetables and compete successfully with market gardeners situated much farther south.

THE partial absorption of X-ray quanta observed photographically by Dr. B. B. Ray, which was the subject of two letters in NATURE of Sept. 13, p. 398, is one of the large group of atomic phenomena which involve quantised transfers of energy. All have three partially distinct aspects—the magnitude of the energy interchange, the probability that it shall occur, and the relation between the initial and final directions of motion of the reacting particles. There is good evidence from Dr. Ray's measurements, as well as from others made with an ionisation chamber by Prof. Bergen Davis and his collaborators, that the energy change in this case is a decrease, or, more rarely, an increase, in the energy of the X-ray quantum, by an amount determined by the X-ray spectra of the atom traversed. In a further letter which we have received from Dr. Ray, which we are unable to find space to print in full, he has pointed out that certain experiments which might be held to disprove the existence of this effect have been performed under conditions which he would expect to yield only a feeble modified radiation. The chief ground for this statement is the important one that the modified quantum is believed by him to proceed almost, if not exactly, in the original direction of the unmodified quantum, a hypothesis which, he shows, fits in very reasonably with the observations. No estimate appears to have been made as yet of the probability of transfer of energy in this way, but it is evidently not unduly small, and sufficient data probably exist to permit of a rough calculation. Should the reality of this effect continue to be admitted, as seems likely, it will undoubtedly open up a convenient method for investigating certain types of soft X-rays indirectly, much as the Raman effect is now applied to the study of the infra-red spectrum.

ALTHOUGH it has been said that there are already too many scientific periodicals in existence, we have no hesitation in offering a cordial welcome to *Oceania*, a new publication which is devoted to the study of the native peoples of Australia, New Guinea, and the islands of the Pacific. It is issued on behalf of the Australian National Research Council under the editorship of Prof. A. Radcliffe-Brown as the organ of the Anthropological Research Fund, which was established three years ago by a grant from the Rockefeller Foundation and an amount equal to the grant contributed by Australia. It is not intended that *Oceania* should be a mere record of observation.

Its policy will be based on the view that the study of the culture of a people can be carried out only by specially trained scientific workers in the field, whose object is not only to record facts, but also to discover their interpretation, that is, their meaning and function. Thus, in the first issue, Miss Camilla H. Wedgwood on war in Melanesia, Prof. A. Radcliffe-Brown on social organisation in Australian tribes, Dr. Raymond Firth on a dart contest in Tikopia, and Miss Ursula McConnel on the Wik-Munkan tribe of Cape York Peninsula, each dwells on the functional aspect, in the respective societies, of the facts which they record and analyse. Beside the four papers mentioned, *Oceania* includes in its contents reports of the proceedings of societies, notes and news, and reviews of books dealing with the area covered by the Anthropological Research Fund. As a record of the researches now being undertaken by Australia, largely owing to the initiative and organising ability of Prof. Radcliffe-Brown, *Oceania* will be of enduring value to students of social anthropology.

IN the recently issued year-book for 1929 of the Carnegie Institution of Washington, Dr. Sylvanus G. Morley publishes his usual annual review of the activities of the Institution in excavation among the Maya ruins of Central America. The excavations at Chichen Itzá and Uaxactun continue to constitute the major operations, but this year a medical survey of the modern Maya living in the neighbourhood of these ancient cities was instituted. This survey already shows promise of producing much information of value to the anthropologist. The chief interest of Dr. Morley's report this year, however, does not lie in the account of the excavations and their result. At the close of the report he makes the pregnant suggestion that the time has now come for excavation in Central America to be more highly organised. He points out that there are now four major expeditions regularly in the field: those of the Carnegie Institution, the British Museum, the Field Museum, and that of the Government of Mexico, which is carrying out investigations in the northern Maya area and the southern part of the republic. In addition, universities, museums, and individuals are engaged on the work of excavation and exploration from time to time. He therefore suggests that a committee should be formed composed of representatives of the bodies interested and engaging in this work. The duties of the committee would be to survey the present state of knowledge, to formulate the problems suggested as the result of this survey, and then, in order to avoid overlapping and waste of effort, to allocate the investigation of these problems to the institutions willing and best fitted to take up the work.

A RÉSUMÉ is given in the *Bell Laboratories Record* for August of the scientific experiments which were carried out by that corporation's acoustical research department for the Noise Abatement Commission of New York City. Complaints had been made that the average city-dweller is continually submerged in an ocean of sound made up by the horns of motor cars, squeaking brakes, rumbling trucks, roaring subway

trains, the rapid fire of riveting machines, and the noise of radio loud-speakers. To find out which were the worst offenders, about ten thousand outdoor observations were made from a truck of the Health Department by the Bell engineers. It was found that trucks, motor cars, elevated trains, tramways, and other agencies of transportation were the principal offenders. Next came the noises made during building operations, often of greater intensity but much less widespread in their effects. It is hoped that the measurements made will enable the special committees which have been appointed to reduce the noise evil. It is stated that this appreciably decreases the vitality and efficiency of the citizens of New York. The figures obtained during the survey are of interest. The most intense noises were furnished by building operations. In one case a riveter produced a noise level of 99 above audibility, the arbitrary unit chosen being in decibels. The use of explosives in the subway excavations of the Bronx produced a noise of 98 decibels. The ever-present roar of street traffic, however, was found to vary between 50 and 80 decibels. A subway express passing a local station produces a level of 96 decibels, a steamship whistle slightly less, and elevated trains a level of 90 decibels.

THE Annual Report for 1929-30 of the executive committee of the Central Library for Students marks the close of the Library under the management which has controlled it since its foundation fourteen years ago. A new constitution has been adopted, the Library has become the National Central Library, and future reports will be issued by the new committee. The purpose of the Library is generally to supply, to serious readers, books which they are unable to obtain for themselves or at their local libraries, and that means as a rule the more expensive books, or books dealing with highly specialised subjects, for which there could be no local demand. Unfortunately, the committee points out, lack of funds prevents the purchase of those very books, and borrowing libraries have been protesting that they cannot obtain the books specially wanted. Unfortunately also the unrestricted grant of £5000 a year recommended by the Public Libraries Committee has been reduced by His Majesty's Treasury to a grant of £3000 allocated for three specific purposes, which do not include the purchase of books. During the year the volumes in the Library have increased from 45,177 to 59,606, of which 3506 have been purchased and 10,923 have been presented. Of the utility of the Library there can be no doubt, but the committee is far from satisfied with the service it has been able to give to meet the most pressing needs of readers.

WE have received vol. 2 of the Collected Papers of the Rowett Research Institute, edited by the director, Dr. J. B. Orr. The first volume was published in 1925; the present covers the ensuing five years and includes the majority of the papers published during this period by the workers at the Institute, but excluding those published by members of the staff working in other parts of the Empire. The volume contains seventy-one papers and runs to 588 pages.

No. 3178, Vol. 126]

Broadly speaking, all deal with the subject of animal nutrition, including the food supply and also certain diseases; a few are concerned with the subject of human nutrition. In a prefatory note Dr. Orr mentions that the Duthie Experimental Stock Farm should be completely established during the present year; that the Imperial Bureau of Animal Nutrition has been established in connexion with the Reid Library to serve as a clearing-house for information on nutrition; and that a residence for temporary workers and visitors is to be built in the vicinity of the Institute. The co-operation of the Institute in work in different parts of the Empire is in increasing demand, and is an indication of the growing value of the research work carried out by the members of the staff and their collaborators.

UNDER arrangements made at the beginning of this year, the Sociological Society was united with the newer organisation of Le Play House, to form an Institute of Sociology, pure and applied. The Institute will continue and extend the work for which both the Society and the House have become well known, namely, study and research in sociology and the development of civic and regional surveys. During the present year a number of preliminary and experimental surveys have been conducted at home (for example, Chichester) and abroad, and detailed civic surveys at Chester and Brynmawr have been directed or assisted. Le Play House was founded by Mr. and Mrs. Victor Branford. Both the founders have since died, and their property has been left in trust to further the objects of the Institute and forms the nucleus of an endowment which, it is hoped, will be added to from other sources. The annual conference will be held in the Duveen Gallery at the Imperial Institute on Saturday and Sunday, Nov. 1 and 2. The sessions will take the form of lectures and discussions on sociological and survey topics. The annual exhibition will be open, in the same gallery, on Oct. 20-Nov. 3 inclusive, and will include representative examples of survey materials from various parts of Great Britain.

WE much regret to announce the death, which occurred on Sept. 18, at the age of seventy-eight years, of Prof. H. B. Dixon, C.B.E., F.R.S., honorary professor of chemistry in the University of Manchester.

THE inaugural sessional address of the School of Pharmacy of the Pharmaceutical Society of Great Britain will be delivered this year on Oct. 1, by Dr. Arthur W. Hill, Director of the Royal Botanic Gardens, Kew. The Pereira Medal of the Society will be presented also on this occasion.

A SMALL brochure has been issued by The British Drug Houses, Ltd., London, N.1, describing in handy form the medical products issued by this firm. A brief description of each substance is followed by notes of the indications for its use, of its methods of administration and modes of issue. Among the newer products mentioned, we noted carotene, which has been shown to act as a potent source of vitamin-A in animal experiments; digitalis leaf tablets, physiologically standardised to contain a definite fraction of an inter-

national unit; and sodium morrhuate, which is now being used for the injection treatment of varicose veins. A therapeutic index of diseases is also included. We have also received from the same firm a leaflet describing the applications and uses of the acriflavine group of antiseptics; illustrative cases are quoted and a selected bibliography is appended. These antiseptics have a wide use in the treatment of wounds and a great variety of septic conditions.

"METHODS and Problems of Medical Education", 17th Series, has been issued by the Rockefeller Foundation, N.Y. This volume deals with departments and institutes of anatomy, histology, and embryology in all parts of the world, including Lima, Batavia, and Manila. It is profusely illustrated with plans and views, and gives details of the accommodation, staffing, courses of instruction and research work, and budgets of a number of the leading schools of the world.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—An organising secretary of the Land Utilisation Survey of Britain—Dr. L. Dudley Stamp, c/o The London School of Economics, Houghton Street, W.C.2 (Sept. 29). An engineer in the Offices of the Divisional Road Engineers

—Establishment Officer, Ministry of Transport, Whitehall Gardens, S.W.1 (Oct. 1). A graduate assistant in electrical engineering at the Wolverhampton and Staffordshire Technical College—Clerk to the Governors, Education Office, North St., Wolverhampton (Oct. 4). A lecturer in experimental psychology at the Otago University, Dunedin—High Commissioner for New Zealand, 415 Strand, W.C.2 (Oct. 10). Assistant executive engineers for the Indian Service of Engineers, and assistant executive engineers for the Indian Railway Service of Engineers—The Secretary, Services and General Department, India Office, Whitehall, S.W.1 (Oct. 31). A teacher in mechanical power plants equipment for evening classes at the Central Polytechnic, Croydon—Education Officer, Education Office, Katharine St., Croydon. A temporary full-time lecturer in mechanical engineering at the Municipal Technical School (The Gamble Institute), St. Helens—Secretary for Education, Education Office, St. Helens. An evening lecturer in geography at the West Ham Municipal College—The Principal, West Ham Municipal College, Romford Road, Stratford, E.15. Assistant engineers for the Public Works Department of the Federated Malay States—The Crown Agents for the Colonies (quoting M/1990), 4 Millbank, S.W.1.

Our Astronomical Column.

Pluto.—The first observation of Pluto after its conjunction with the sun was obtained by Prof. M. Wolf at Königstuhl on Aug. 29 (on two plates taken with the reflector); the approximate position is R.A. 7^h 27^m 9^s, N. Decl. 21° 54', which is in accord with the ephemeris in *Lick Bulletin*, No. 427. The period adopted in that *Bulletin* is 249.1661 years. Many other computers have found similar periods, so that the orbit is now known within narrow limits. The *Bulletin* gives approximate ephemerides for every year back to 1890, in the hope that further images may be found. Prof. Wolf has found an image that may be Pluto on a plate exposed on 1914 Jan. 23^d 7^h 33^m 0^s Königstuhl M.T.; R.A. (1914.0) 5^h 57^m 54^s.93^s, N. Decl. (1914.0) 17° 37' 23.0"; the *Lick* ephemeris, reduced to the same equinox, gives 5^h 58^m 1^s, 17° 38'. As some approximations were used in preparing the ephemeris for past years, the discordance is not excessive.

Prof. T. Banachiewicz gives a full description in *Cracow Circ.* No. 26 (see also *U.A.I. Circ.* No. 296) of the work carried out at Cracow on the orbit of Pluto. It will be remembered that the ephemerides calculated there led to the detection of an image of Pluto on an Uccle plate of Jan. 27, 1927; that in turn led to the detection of the images of 1919 (Mt. Wilson) and 1921 and 1927 (Yerkes). Individual observations of Pluto in 1930 give residuals that occasionally attain 3". These residuals explain the very erroneous orbits that were first published. Prof. Banachiewicz shows that by using a large number of observations made in 1930 an orbit can be deduced that is similar to those that were obtained with the aid of the observations made in 1919, etc.

The following additional observations have been received from Prof. Wolf: they are for 1930.0.

1930 Aug. 30 ^d 2 ^h 36 ^m 5 ^s U.T.	R.A. 7 ^h 27 ^m 57 ^s .97 ^s	N. Decl. 21° 53' 55.9"
Sept. 5 2 35.0	7 28 26.38	21 53 16.7

The star places are from the Abbazia Catalogue.

No. 3178, VOL. 126]

Orbits of Binary Stars.—*Bull.* No. 195 of the Astronomical Institute of the Netherlands contains several determinations of orbits by G. P. Kuiper. The orbit of the close pair β 232 is now determined for the first time. Since its discovery in 1876, 240° of the orbit has been described. The period found is 91.2 years, periastron 1914.9, a 0.368", e 0.326. Using Eddington's mass-luminosity curve, the masses are 0.95 and 0.91 of the sun, the absolute magnitudes 4.5 and 4.7, parallax 0.0148".

Θ 277 is a pair with equal magnitudes in which there is liability of confusing the two components when they emerge from periastron; Jackson and van den Bos adopted different identifications and found periods of 95.2 and 51.6 years respectively. The ten years that have since elapsed decide against the short period. Mr. Kuiper finds the period 122.6 years, periastron 1883.4, a 0.472", e 0.170; the hypothetical mass of each star is 1.13 sun, absolute magnitude of each 3.97, parallax 0.0146".

Θ 282 is in the Hyades, and the brighter star is a spectroscopic binary; Prof. Hussey gave the period of the visual pair as ninety-eight years, using observations up to 1900; subsequent observations show that this is too short, and the new period is 487 years. The parallax appears to be close to 0.02", and the sum of the three masses is between two and three times that of the sun.

The fourth system studied is a fivefold one. It is shown that the double star Σ 1999 is probably in physical connexion with the triple system ξ Scorpii, from which it is distant 281"; the common parallax is estimated as 0.04"; the masses of the components of the triple system are given as 1.50, 1.39, and 0.95 of the sun; those of the binary are stated to be equal to each other, but their values are not given; the two systems are about 7000 astronomical units apart in the direction normal to the line of sight. The shift of the second system relatively to the first is only 0.25" in sixty-four years, whereas the proper motion of ξ Scorpii in that period is 4.7".