

variation in years of many sun-spots. As regards disturbance, in some years there seems a clear connection with sun-spots, in others little, if any. This is what we might expect to happen if the 27-day periods in the two elements in one year tended to be in phase, and in another year did not. But the 27-day period may be prominent in magnetic phenomena in years when there are almost no sun-spots. Also the 27-day period is exhibited by magnetic calms as well as by magnetic storms, and no one has suggested that limited solar areas can exercise a calming influence on terrestrial magnetism.

On the question naturally of most interest to my audience, whether terrestrial magnetism has any direct bearing on the problems of electrical engineering, a few words must suffice. If wireless phenomena are affected, as has been suggested, by the greater or less conductivity of the upper atmosphere, one would expect them to have certain features in common with magnetic phenomena. In particular, the 11-year period and the 27-day period might be expected to disclose themselves. If these periods affect wireless to anything like the same extent as they do terrestrial magnetism, there should be no great difficulty in establishing the fact, if systematic observations were directed to that end. Another possibility is that means may be developed for utilising some of the power that now goes to magnetic storms. This would naturally be most feasible in high latitudes where aurora and magnetic disturbance are most in evidence.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

WE learn from the *British Medical Journal* that Prof. Charles Richet, of the University of Paris, has been awarded the State prize for poetry. The subject was "The Glory of Pasteur."

EXAMINATIONS in biological chemistry, bacteriology, fermentation and enzyme action, and in chemical technology will be held in connection with the Institute of Chemistry in October next. The lists of candidates will close on September 12.

DR. A. LAUDER, of the Edinburgh and East of Scotland College of Agriculture, has been elected honorary secretary of the Edinburgh and East of Scotland section of the Society of Chemical Industry, in succession to Dr. J. P. Longstaff, now general secretary of the society in London.

MISS S. E. S. MAIR and Mrs. A. M. Chalmers Watson, on behalf of women medical graduates, students, and their friends, have offered to pay to the Edinburgh University Court within a year the sum of 4000*l.* to defray the cost of undertakings intended to facilitate the medical education of women.

THE following Edgar Allen entrance scholarships are being offered by the University of Sheffield:—Two open to men and women, and two restricted to the "sons of workmen earning daily or weekly wages and foremen of workmen and managers." Each scholarship is of the annual value of 100*l.*, and is tenable for three years.

THE part of the forthcoming calendar for 1916-17 of University College, London, dealing with the faculty of engineering has been published in advance as a booklet. This faculty, including the departments of civil, mechanical, electrical, and municipal engineering, is intended to provide for students wishing to devote themselves to engineering as a systematic training in the application of scientific principles to industrial purposes. The courses of work are suited to the requirements of students who intend to enter for

appointments in the Indian Public Works Department, Engineering Department of the General Post Office, Department of the Director of Engineering and Architectural Works in the Admiralty, Patent Office, and other similar services. Facilities are provided also in the engineering departments for post-graduate and research work in all subjects of engineering. The more important engineering institutions grant various exemptions to holders of the different certificates awarded by the college. All communications from intending students should be addressed to the Provost.

THE calendar for the session 1916-17 of the North of Scotland College of Agriculture is now available. The classes of the college are held in the buildings of the University of Aberdeen, except those in agricultural engineering, which are held at Robert Gordon's Technical College. The college farm at Craibstone, about five miles from Aberdeen, includes experimental plots, an experimental and demonstration garden, and a horticultural department. Field experiments and demonstrations are carried out on ordinary farm crops. Feeding and other experiments upon stock are conducted, and there are extensive woods, including both conifers and hardwood trees, on the estate, which are being utilised for the purposes of the forestry department. It is proposed to institute a school of rural domestic economy for girls. There is a large mansion-house on the Craibstone estate which will be equipped as a residence in which classes will be carried on. It is proposed to provide courses of instruction suitable for those who intend to spend their lives on farms and crofts. For the instruction of classes in nature-study and school gardening, two acres of ground at Kepplestone, Rubislaw, have been laid out as a demonstration garden.

THE valuable series of papers on the better co-ordination of science and industry read during the last six months before the American Chemical Society was followed by the appointment of a committee, who have now presented a report based on the examination of the subject from three different points of view, viz. those of the university, of the industries, and of the consulting chemists. The report is classified under findings, conclusions, and a single recommendation to the effect that a permanent central committee should be created and appointed by representatives of the universities and the industries to study opportunities and make public recommendations. The distinction is drawn between industrial problems which are common to specific industries, so that research on them can be carried out in universities and published, and those problems which cannot properly be published, and are, therefore, not adapted to university treatment. On the other hand, the industries are asked to make known to the universities problems which are not of sufficient importance to the industry to undertake their solution directly so that the universities can use them as live material on which the students can be trained. The recognition by the university that the industry alone is in a position to state its problems, and by the industry that it should be prepared to give the necessary financial assistance to the university to investigate these, is an important step towards the desired co-ordinated effort. It is pointed out that no matter how efficiently the university may train its men, the industries that take up such men must be prepared to expend much time, effort, and money in training them for the specific work before them, but it is agreed that co-operation between the university and the works as to the requirements of the latter in the fundamentals of instruction seems possible, feasible and mutually profitable. The findings deal with certain controversial points in the education

of the technical chemist. For example, the part-time system whereby the summer vacation is spent in the industry is condemned; the value of industrial fellowships is regarded as diminishing as the liberty to publish is restricted. The report is eminently practical, and it will well repay serious consideration in this country.

SOCIETIES AND ACADEMIES.

MANCHESTER.

Literary and Philosophical Society, May 30.—Prof. W. W. Haldane Gee, vice-president, in the chair.—Dr. W. H. R. Rivers: Irrigation and the cultivation of taro. In the New Hebrides and New Caledonia irrigation is only used for the cultivation of *Colocasia antiquorum*, the taro of the Polynesians. This intimate connection between irrigation and taro, which is found in other parts of Oceania, suggests that if irrigation belongs to the megalithic culture (W. J. Perry, Manchester Memoirs, vol. lx., part i.), taro must have had a similar history. The distribution of the plant supports this suggestion, showing a close correspondence with that of the megalithic culture when its tropical and semi-tropical habits are taken into account. It occurs in Oceania, the Malay Archipelago, India and eastern Asia, Arabia, Egypt, East and West Africa, the Canary Islands, Algeria, southern Italy, Spain and Portugal, as well as tropical America. Since the original habitat of the plant is southern Asia, its use as a food was probably acquired by the megalithic people in India and taken by them both to the east and west. Although the general distribution of taro in southern Melanesia corresponds with that of the megalithic influence, a difficulty is raised by the island of Malekula, in the New Hebrides. So far as we know, irrigation does not occur in this island, although megalithic influence is present in a very definite form. To account for the absence of irrigation in this island it is shown that modes of disposal of the dead point to two megalithic intrusions into Oceania, and the high degree of development of irrigation in such outlying islands and districts as New Caledonia, Anateum, and north-western Santo in Melanesia, and the Marquesa and Paumotu Islands in Polynesia, suggests that this practice belonged to the earlier of the two movements. There is reason to believe that this movement had relatively little influence in Malekula.—Prof. G. Elliot Smith: The arrival of *Homo sapiens* in Europe. At a time when little was known of early man and his works beyond the stone implements which he fashioned, Sir John Lubbock (afterwards Lord Avebury) suggested the use of the terms Palæolithic and Neolithic to distinguish respectively between the earlier part of the Stone age, when crudely worked implements were made, and the later period, when more carefully finished workmanship was shown. In spite of the fact that subsequent investigation revealed a high degree of skill in the craftsmanship of the Upper Palæolithic period, which in many respects shows a very much closer affinity to the Neolithic than to the Lower Palæolithic period, Lubbock's terminology has become so firmly established that it has continued to determine the primary subdivision into epochs of the early history of man. Recent research has brought to light a vast amount of new information relating to the achievements of Upper Palæolithic man, and has conclusively shown that human culture and artistic expression had already attained the distinctive characters which mark them as the efforts of men like ourselves. This view has been amply confirmed by the general recognition of the

fact that, after the disappearance of Neanderthal man at the end of the Mousterian period, the new race of men that supplanted them in Europe and introduced the Aurignacian culture conform in all essential respects to our own specific type, *Homo sapiens*. Thus the facts of physical structure, no less than the artistic abilities and the craftsmanship, of the men of the Upper Palæolithic proclaim their affinity with ourselves. The earlier types of mankind which invaded Europe and left their remains near Piltown, Heidelberg, and in the various Mousterian stations belong to divergent species, and perhaps genera, which can be grouped together as belonging to a Palæanthropic age, which gave place (at the end of the Mousterian epoch in Europe) to a Neanthropic age, when men of the modern type, with higher skill and definite powers of artistic expression, made their appearance and supplanted their predecessors. So long as primary importance continues to be assigned to the terms Palæolithic and Neolithic, the perspective of anthropology will be distorted. Though the facts enumerated in this communication are widely recognised, it is found that the writers who frankly admit them lapse from time to time into the mode of thought necessarily involved in the use of the terms Palæolithic and Neolithic. If modern ideas are to find their just and unbiassed expression some such new terminology as is suggested here becomes necessary.

PARIS.

Academy of Sciences, July 31.—M. Ed. Perrier in the chair.—At the preceding meeting of the Academy the president, in announcing the death of Sir William Ramsay, gave an account of his work in chemistry.—J. Bergonié and C. E. Guillaume: Surgical instruments adapted to the field of the electro-vibrator. Ordinary surgical instruments utilised in the field of the electro-vibrator are, like the projectile sought for, submitted to an intense oscillatory movement, a matter of difficulty for the surgeon. To reduce this vibration to negligible proportions, it is necessary that the instruments should be constructed of a metal non-magnetic and of high resistivity. The iron-nickel alloys, containing between 22 per cent. and 30 per cent. of nickel, fulfil these conditions, but offer difficulties in manufacture. Another group of alloys suitable for this purpose contains 90 per cent. nickel, the remaining 10 per cent. consisting of chromium, manganese, and a little copper. Such an alloy, under the name of baros, has been used for some years for weights of precision, and fulfils all the conditions of the present problem; it works like mild steel, is practically unoxidisable, and is free from action in the field of the electro-vibrator.—R. Garnier: Study of the general integral of equation (VI.) of M. Painlevé in the neighbourhood of its transcendental singularities.—H. Arctowski: The influence of Venus on the mean heliographic latitude of the sunspots. The earliest communication on this subject was due to Warren de La Rue, Stewart, and Löwy in 1867, and F. J. M. Stratton has recently taken up the same question. The author does not think the results of Stratton's calculations can be considered as conclusive, and has made a fresh series of calculations based on the Greenwich heliographic observations. It is difficult to decide from the curves whether the action of Venus is direct or the inverse.—A. Colani: The oxalates of uranyl and potassium.—C. Zenghelis: The composition and use of Greek fire.—F. Diénert and L. Gizolme: The influence of the algæ on submerged sand filters on the purification of water. The purifying power of these filters is a function of the development and vitality of the algæ, and can be