

this college remains still flourishing and still fulfilling an essential function amongst the educational institutions of the country.

It is possible to discern roughly three recent periods in the historical development of the teaching and study of pure and applied science in Great Britain. First, the half-century preceding 1914, when progress was comparatively slow owing to the apathy of the general public towards all branches of exact knowledge. During this period our former teachers played a prominent part both as teachers and as propagandists, but progress in our scientific industries was impeded, not only by general and official ignorance, but also by stern competition from the Continent. The second period is one of transition; it embraces the last four years, and is now rapidly coming to an end. In the autumn of 1914 practically all branches of technical production in this country were on the verge of breakdown owing to the sharp arrest of imports of numberless chemical and engineering products, many of them of small financial importance, but all of them essential to our technical production. The whole nation realised, suddenly but tardily, that the neglect of applied science had brought it to the brink of ruin. The last four years of transition have been a period of unprecedented technical activity in Great Britain; during this time we have had to learn how to manufacture multitudes of scientific products which we were previously content to purchase ready-made from abroad, and the whole country has become one vast chemical and engineering workshop. When the history of this time of stress comes to be written it will be made clear that the rapidity and success with which this country has organised its scientific industries and brought them to a production of essentials far exceeding that of Central Europe are entirely miraculous.

The third period, the period of reconstruction, lies in the immediate future, and we see every sign that it will be accompanied by unexampled developments on both the chemical and engineering sides of technical science. During the past four years a vast provision of chemical and engineering equipment has been accumulated; our country has regained control of all the sources existing in the Empire of raw materials which had been previously exploited by Germany, and our people have been learning that this war was rendered possible only by British neglect of applied science, and particularly of chemical technology. Within this period the country has become an enormous producer of such necessary materials as oleum—fuming sulphuric acid—and nitric acid; these are the prime essentials of a flourishing chemical industry. It has also undertaken with success the manufacture of large numbers of fine chemicals, such as coal-tar dyes and pharmaceutical products. The country now produces materials like tungsten and similar metals essential to the manufacture of hardened steels of different kinds for use in cutting-tools, armour-plate, and the like. The installation of works processes for these has been effected hurriedly, and years of careful technical investigation will be needed in order to improve methods and establish processes upon an economical basis. Inasmuch as success in applied science is possible only through the intensive cultivation of pure science, it is to be foreseen that before us lies a period of great scientific and technical activity in Great Britain.

The importance of all this lies in the fact that the future is in your hands. Streatfeild, Castell-Evans, Meldola, Thompson, and Ayrton, who have passed away, and other veterans happily still with us, like Perry and Armstrong, did their best work in the first of our three periods; the men of my generation are

expending their energies in the present transitional period. It is upon the students now at college that the main burden of the coming reconstructional work will fall. If you carry out your work with the success achieved by Streatfeild and his colleagues in the performance of their duties, if you approach your future work in the spirit with which my contemporaries have attacked theirs, we need have no doubt that this Empire of ours will continue to influence the world for good long after you and I are dead and forgotten.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—The installation of the new Chancellor, Lord Robert Cecil, is to take place on November 12 in the Town Hall. The occasion is to be marked by the conferment of honorary degrees on the French and Italian Ambassadors, Sir George Buchanan, Mr. Austen Chamberlain, Mrs. Fawcett, Sir Maurice Hankey, Lord Moulton, and Lord Phillimore. The following representatives of other universities are also to be present at the ceremony:—Sir Alfred Dale (Vice-Chancellor of Liverpool), Sir Gregory Foster (Provost of University College, London), Prof. Gillespie (Pro-Vice-Chancellor of Leeds), Dr. Alex. Hill (Principal of University College, Southampton), Sir Isambard Owen (Vice-Chancellor of Bristol), and Prof. Ripper (Vice-Chancellor of Sheffield).

LONDON.—The following have been elected deans of faculties for the period 1918-20:—*Medicine*: Sir Bertrand E. Dawson (London Hospital Medical College); *Science*: Prof. A. N. Whitehead (Imperial College, Royal College of Science); *Engineering*: Prof. H. C. H. Carpenter (Imperial College, Royal School of Mines); and *Economics*: The Hon. W. P. Reeves (London School of Economics).

THE nineteenth annual general meeting of the Association of Public School Science Masters will be held on Tuesday, December 31, and Wednesday, January 1, and will be opened with an address by the president, Sir Ronald Ross. The subjects to be discussed are:—The importance of restricting specialisation in university scholarship examinations and giving weight to general education; the modernisation of the teaching of biology; the position of systematic biology and kindred subjects in a school course; science in the general education of boys; the teaching of elementary science by the form master; the difficulty of securing diligence and accuracy in teaching general science to small boys; and courses in general science for Sixth Forms, both classical and non-classical.

TEACHERS of geography will be interested in an account by Miss Christina Krysto entitled "Bringing the World to our Foreign-language Soldiers," published in the August issue of the *National Geographic Magazine*, which describes the methods of teaching at Camp Kearny, California. Ordinary handbooks were found useless for the purpose of teaching the facts of the geography of Europe to Mexican and other foreign recruits. The first step was a series of conversations intended to lead the pupils to the understanding of new facts. These were supplemented by geographical charts with photographs. The comparison of the distinction between the results gained in the case of Italians and Mexicans is full of interest, and will supply useful suggestions for the teaching of geography after the conclusion of the war.

THE current calendar of the Merchant Venturers' Technical College, in which the faculty of engineering of the University of Bristol is provided and maintained, gives particulars of the exemptions accorded to graduates of the University and students of the faculty by various examining bodies and learned societies. The Institution of Civil Engineers recognises the B.Sc. degree with honours in civil or mechanical engineering as exempting from examination for associate membership if a regular course of study, occupying not less than three academic years, has been pursued in the University. The institution also recognises the pass degree as exempting similarly if, in addition to the other conditions, the entrance examination to the engineering course in the University has been passed in the subjects prescribed by the institution. These degrees are also similarly recognised as qualifications for appointments as assistant engineers in the Public Works Departments of India and Egypt. The possession of the B.Sc. degree in civil or mechanical engineering is allowed to count as one year towards the three years' practical training required by candidates for the appointment of Assistant Civil Engineer in the Works Department of the Admiralty. The B.Sc. degree in mechanical engineering exempts from the associate membership examination of the Institution of Mechanical Engineers, and the degree in electrical engineering exempts from examination for the associate membership of the Institution of Electrical Engineers. Finally, the B.Sc. degree, or success in the intermediate examination for that degree, is accepted in lieu of the Army entrance examination.

CERTAIN representative science teachers and others interested in natural science in Yorkshire have decided to form an association with the object of encouraging a broad outlook on scientific problems, and of providing a means whereby they may be kept in touch with modern scientific views. The hearty support given to this proposal from many quarters justifies the view that such a natural science association would be welcome in Yorkshire, and a provisional committee has been appointed to undertake its organisation. Its aims have been formulated as follows:—(1) To afford opportunity for intercourse and co-operation amongst those interested in natural science (chemistry, physics, botany, zoology, and other natural sciences); (2) to discuss the teaching of science in all its bearings; (3) to discuss modern developments in science, and the applications of science in industry; (4) to arrange for visits to places of scientific interest; and (5) to afford a medium for the formulation of collective opinion upon matters affecting the place of science in the life of the community. Membership will be open to all who are interested in the objects of the association, and it is proposed that the subscription shall be 5s. per annum. The inaugural general meeting will take place on Saturday, November 23, at 3 p.m., in the University of Leeds, when the president-elect, Prof. W. Bateson, will deliver an address on "Science and Nationality." All who are interested in the movement are cordially invited to be present. Any further information may be obtained from the chairman of the provisional committee, Dr. Harold Wager, the University, Leeds, or from the hon. secretaries, Mr. F. Fairbrother, the Grammar School, Leeds, and Miss R. F. Shove, the University, Leeds.

M. PAUL OTLET has an interesting article on "Le traitement de la littérature scientifique" in the *Revue générale des Sciences* for September 15-30. His claim is that Governments should give more attention to the various methods by which the results of scientific investigation can be made widely known.

Among such methods he includes the publication of periodicals, abstracts, annual reports, bibliographies, dictionaries, and text-books. As an example to be followed he quotes the International Institute of Agriculture at Rome. This institute, founded in 1905 by international co-operation, has already an income of 900,000 francs, possesses a library of 70,000 volumes and pamphlets, and receives annually 2600 reviews and journals sent to Rome from the fifty-six co-operating countries. The institute issues three monthly bulletins, two annual volumes of statistics, three other publications appearing once or twice a year, a bibliography of agronomy, and many special monographs. M. Otlet looks forward to the foundation of a similar institute for science, supported by all the Governments of the world, or, at all events, by the Allied Governments. The International Catalogue of Scientific Literature would be a part of this institute, which would also publish abstracts of all scientific papers and periodical *résumés* of work in special branches of science, possess a library to which all scientific periodicals should be sent as they appear, and make arrangements for lending books and papers to subscribers. Finally, M. Otlet asks for an international or inter-Allied investigation into the whole domain of science (pure, applied, economic, and social), including the direction of original research, its application to industries, records of results, scientific literature of all kinds, the teaching of science, and the diffusion of scientific knowledge. The investigation would be followed by a congress with power to make the necessary agreements between the co-operating Governments, and to bring existing associations, institutions, and private undertakings into the general scheme. By such unification of the scientific activities of the world it is hoped to accelerate the progress of science and of its applications.

SOCIETIES AND ACADEMIES.

LONDON.

Zoological Society, October 22.—Dr. A. Smith Woodward, vice-president, in the chair.—Sir E. G. Loder, Bart.: Notes on the beavers at Leonardslee, 1916-18. Evidence was given of the hitherto unrecorded fact that beavers may breed twice in a season.—G. A. Boulenger: Madagascar frogs of the genus *Mantidactylus*, Blgr.—Prof. H. M. Lefroy: The Wheat Commission on Wheat Weevil in Australia.

MANCHESTER.

Literary and Philosophical Society, October 15.—Mr. W. Thomson, president, in the chair.—J. W. Jackson: Discovery of quartz-pebble beds in the Carboniferous Limestone of Caldron Low, Staffs. These pebble-beds form the dip slope of the Low on its N.N.W. side, overlooking Caldron village. At the latter place a large series of fossils, reminiscent of the "Brachiopod beds" of Castleton, etc., has been obtained by Mr. W. E. Alkins. The beds here apparently follow the pebble-beds in true sequence. The two pebble-beds differ greatly in composition, that of Caldron Low being made up almost entirely of rounded pebbles of vein-stone-quartz with fragments of chert, while that of Castleton consists of Carboniferous Limestone pebbles.

SHEFFIELD.

Society of Glass Technology, October 23.—Dr. M. W. Travers in the chair.—Prof. J. W. Cobb: Refractory materials and the glass industry. Prof. Cobb emphasised the fact that, although temperatures in glass manufacture were by no means abnormally high, yet the nature of the chemical reactions taking place was