The Emperor William has greatly influenced the rise of the technical universities by his consistent efforts to raise the status of the three (now four) situated in Prussia. He began by suggesting reforms in the secondary-school system, then called the principals of the technical universities into the Prussian Upper House, and finally conferred upon the Prussian technical universities the power of granting the degree of Doctor of Engineering. The rest of the Empire followed his example, and thus the ten technical universities have been finally placed upon exactly the same footing as the older universities.

One reason why technical-school students in Germany possess a better educational equipment for their work than in England is owing to the fact that the lower divisions of the secondary schools are filled by students who wish to obtain the one-year military certificate which requires six years' attendance at a secondary school. The high proportion of fully qualified students at the technical universities is due to the fact that no examinations can be passed or higher State or municipal positions obtained without proof of the completion of a nine years' secondary-school course. Another reason why so many students attend the secondary schools and various universities in Germany is due to the lowness of the fees and the cheapness of living. To these reasons may be added the general German tendency to obtain as high a standard of schooling as possible before entering life.

Young men in Germany subject themselves to a laborious general and technical training, amounting after the preparatory school to from ten to fifteen or sixteen years, because the majority of those who complete their studies are generally sure of finding positions. The State and municipalities require large numbers for their various technical services. This partly explains the interest of the State in the quality of the instruction and the uniformity of the organisation of the technical universities. Most manufacturers give the preference to students with diplomas or degrees from the universities or technical schools. This is a result of the intimate advisory relations between manufacturers and the technical universities. Students are also sure of finding positions in the surrounding foreign countries, where large numbers of German "techniker" are to be found in all branches of industry. A further incentive to a longer course of study is found in the fact that, owing to the system of marriage dowries in Germany, young men with a technical diploma or degree are able to marry as soon as they obtain a position, even with a very small initial salary.

German students receive very little direct pecuniary assistance. Scholarships on the liberal English scale are practically unknown. There are a few modest "stipendia," and very poor students, upon production of the necessary proof, are allowed to study free and refund the amount of their fees later when they are in a position to do so.

Higher education of all types in Germany has been promoted by two further factors. First, by decentralisation so far as the Empire is concerned, as the various States of which the German Confederation is composed act independently in educational matters, and are constantly competing with one another in the development of their educational resources. Secondly, by the fact that almost all higher education is under direct State control, thereby rendering uniformity of organisation and coordination between institutions more easy.

Finally, it should be borne in mind that the German population exceeds the population of the United Kingdom by about eighteen or nineteen millions.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The Rev. E. A. Woodruffe-Peacock will deliver a lecture at the Botany School on Friday, February 18, at 5.0 p.m., on "A Special Method of Recording the Distribution of Plants." The lecture will be open to all interested in the subject.

Prof. W. Bateson, the Hon. N. C. Rothschild, and Mr. H. Scott, Inceptor in Arts, have been nominated to represent the University at the International Congress of Entomology to be held at Brussels in August, 1910.

Sir J. Larmor has been nominated a member of the board of electors to the professorship of chemistry, Sir Robert Ball to that of the Plumian professorship of astronomy, and Dr. Glaisher a member of the same board; Prof. A. Robinson and Prof. A. Keith have been nominated members of the board of electors to the professorship of anatomy, Dr. Darwin to that of the professorship of botany, Prof. W. W. Watts to that of the Woodwardian professorship of geology, Mr. A. Hutchinson to the same board, Prof. H. B. Dixon to that of the Jacksonian professorship of natural and experimental philosophy, Prof. A. R. Cushny to that of the Downing professorship of medicine, Dr. Hugo Müller to that of the professorship of mineralogy, Dr. R. T. Glazebrook to that of the Cavendish professorship of experimental physics, Dr. W. N. Shaw to that of the professorship of mechanism and applied mechanics, Prof. F. Gotch to that of the professorship of physiology, Sir W. W. Cheyne, Bart., and Mr. C. T. Dent to that of the professorship of surgery, Prof. J. Lorrain Smith to that of the professorship of pathology, and Mr. E. Gardner, M.P., to that of the professorship of agriculture.

LONDON.—In memory of the late Dr. Ludwig Mond's scientific eminence and his generous benefaction of 3000*l.* towards the building of the Institute of Physiology at University College, the college committee has resolved to name the biochemistry research department of the institute "The Ludwig Mond Biochemistry Research Laboratory." The committee will shortly proceed to elect a Crewdson-Benington research student. The studentship, of the value of 50*l.*, tenable for one year in the biometric research laboratory of the college, is for the promotion of research in anthropometry and craniology in relation to evolution. Candidates should send their applications, together with any statement of qualifications that they desire to submit, not later than March 1 to the secretary of University College, Gower Street, W.C., who will furnish particulars of the studentship.

The degree of D.Sc. has been granted to Mr. W. B. Tuck, an internal student, of University College, for a thesis entitled "The Constitution of Hydroxyazo-compounds," and other contributions.

A scheme for the constitution of a board of the faculty of medicine has been approved.

Syllabuses have been approved in geology for intermediate and final pass B.A. examinations for external students. Practical work is provided for in both syllabuses; that for the intermediate examination includes the interpretation of weather charts, and at the final examination candidates must give evidence of adequate instruction in the field.

Prof. A. W. Crossley, F.R.S., has been elected dean of the faculty of science in succession to Prof. J. M. Thomson F.R.S., resigned.

Dr. E. C. Seaton and Mr. W. H. Maxwell have been appointed Chadwick lecturers in hygiene and municipal engineering for the current session.

Convocation has approved the proposals for the establishment of a University of London Club.

AT the South-western Polytechnic Institute, Chelsea, on March 11, Sir William H. White, K.C.B., F.R.S., will present prizes and certificates to students of the evening classes and day college.

THE twelfth annual dinner of the Central Technical College Old Students' Association was held on Saturday, February 12, at the Trocadero Restaurant, Mr. H. A. Humphrey being in the chair. Among the guests of the evening were Sir Philip Magnus, M.P., who, in proposing the toast of the association, mentioned the great progress the Central Technical College has made and the invaluable training received there. Prof. W. J. Pope, F.R.S., was elected president for 1910.

AN interesting address to the junior members of the architect's profession was given on January 31 by Mr. Ernest George, president of the Royal Institute of British Architects, and has been printed in the *Builder* for February 5. Mr. George offered much valuable advice to the student; earnest application is necessary, and a thorough education in science and art, as well as in wider fields of knowledge. There will be no time for idling; an

architect must recognise that he is a man of business, with grave responsibilities to his client, and must cultivate methodical habits and exactness. The art of public speaking should be part of the architect's equipment; he may thus often contribute profitably to discussions.

THE scheme for a London pageant which was before the public some time ago is now merged into a larger scheme of a Festival of Empire, to be held at the Crystal Palace this summer in the months of May, June, and July. The London pageant will form part of the scheme of the festival of empire. The council of the festival has invited the cooperation of the University Extension Board of the University of London in arranging courses of lectures preparatory to the pageant. The Board has accordingly arranged a course, to be given by Mr. Kenneth H. Vickers, on the history of London, arranged specially in view of the pageant of London to be held at the Crystal Palace as a part of the festival of empire. This course will be given in the London Day Training College on Thursday evenings at 8 o'clock, beginning February 17, when Sir R. Melvill Beachcroft, chairman of the London County Council, will take the chair. It is hoped that further courses of this kind will be arranged in different parts of London later in the year.

OF recent years the system of furthering scientific research most in vogue has consisted in the foundation of studentships or fellowships tenable at some university, for which recently graduated students of that or other universities are eligible. While this movement has undoubtedly led to the performance of a large amount of research in experimental science, and has, in this respect, been an unqualified success, it is a matter of common experience that the holders of these endowments have not, as a rule, reached a sufficiently mature age or acquired sufficient experience to initiate and develop original work in pure science. Indeed, it is not uncommon to find a successful research student baffled by a comparatively simple problem in mathematical analysis. In an article on "An Empire University" in the *Standard* for February 7, Dr. Waller, F.R.S., proposes a scheme which would obviate this difficulty. He suggests a class of appointment the holder of which should devote half his time to, and receive half his stipend from, teaching, the other half of his time being given to research, for which the corresponding remuneration should take the form of a fellowship. It is pointed out that this combination of teaching and research could not fail to have a beneficial effect in infusing an element of originality and individuality into the teaching. Dr. Waller's proposal might further have the advantage of improving the position of the existing underpaid assistant lecturers in our university colleges. Many of these at the present time turn out really excellent original work in addition to teaching, in return for a stipend which compares unfavourably with the awards made to research students for advanced study alone. There certainly appears to be a loss of efficiency in the existing system.

THE annual meeting of the Association of Technical Institutions was held at the Skinners' Hall, London, on February 11 and 12. Dr. R. T. Glazebrook, F.R.S., president of the association, delivered his address, and dealt with the questions, What should be the aims of those teachers whose work lies mainly in the technical institutions of the country, and what should be their position in the scheme of education which is being gradually evolved? He pointed out that in Germany the great technical institutions have developed almost independently of the old universities, and asked, Are we to look forward to the growth of technical universities in each town arising naturally out of the technical colleges, but independent of and at the same time rivals of the existing universities? The answer Dr. Glazebrook thinks should be in the negative, with possibly one or two exceptions. It would be suicidal to suggest that in Manchester, Birmingham, Leeds, or Liverpool there should be two degree-giving bodies, one concerned with arts and pure science and the other with applied science. Modern universities, he said, will do for us what technical high schools have done for Germany. Speaking of London, Dr. Glazebrook said we may take it that the Imperial College of Science and Technology will in time become the technical university of London, whether as a part of London University or as a new university. On the second day of the meeting a general discussion took place upon the examination of evening students by the Board of Education, the City and Guilds Institute, the Royal Society of Arts, and the London Chamber of Commerce. Speaking on behalf of the Board of Education, Mr. C. A. Buckmaster said the Board is at present considering the whole subject of examinations, and will be glad to receive any information which the association can put before it. It realises the immense difficulties connected with the long period of the examinations, and will be prepared to do what it can to diminish the inconvenience. With regard to the Whitworth examinations, the Board of Education has to administer the will of Sir Joseph Whitworth, and though slight modifications of the scheme are possible, it would require an Act of Parliament to enable the Board to put it wholly into the melting-pot so that it may come out in a different form. After further discussion, a resolution was passed instructing the council to consider the subject of examinations in all its bearings.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 10.—Sir Archibald Geikie, K.C.B., president, in the chair.—Dr. C. **Chree**: Some phenomena of magnetic disturbances at Kew. A recent paper ("Phil. Trans.," A, vol. ccviii., p. 205) discussed the diurnal inequality of Kew magnetic declination derived from 209 of the most highly disturbed days of the eleven years 1890 to 1900. The present paper discusses the corresponding phenomena for the same days in the other magnetic elements. It is shown that the irregular changes which form the most obvious feature of magnetic storms are accompanied by large *regular* diurnal changes, which are specially striking in the vertical force. In this element the disturbed days referred to above gave a regular diurnal inequality, the range of which in the average month of the year was about four times that given by the Astronomer Royal's "quiet" days. The influence of the hour of the day on the character of the disturbance is visible even on casual inspection of the vertical force curves. When disturbances lasting only a few hours occur in the late afternoon, there is almost invariably a rise in the force, whereas when they occur in the early morning there is a fall. Besides dealing with the analysis of the diurnal inequalities derived from the disturbed day curves, the paper discusses some new phenomena observed in the a-periodic changes of the magnetic elements. —R. B. **Sangster**: A novel phenomenon in the diurnal inequality of terrestrial magnetism at certain stations. The mean diurnal inequality at Greenwich for epoch 1900–6, at Falmouth, 1903–7, and at Pawlowsk (Russia), 1873–85, is dealt with so as to exhibit the inequality in the plane of the astronomical meridian. It is then shown that the component of the force parallel to the earth's axis has little, or no, variation during the hours from noon to about 5 p.m. There is, however, considerable simultaneous variation in the declination and in the horizontal and vertical forces. The winter months invariably showed a shorter duration of the feature, and, generally, a larger diurnal range produced a more exact and lengthened exhibition of the phenomenon. The phenomenon was found to exist whether "quiet" days or "all" days were dealt with, and, while long periods naturally furnished smoother curves, the feature was also prominent in cases where the mean of only five "quiet" days in a single month was employed.—Prof. P. V. **Bevan**: The absorption spectra of vapours of the alkali metals. The paper gives an account of the absorption spectra of vapours of the metals potassium, rubidium, and cæsium. Prof. R. W. Wood has shown that the absorption spectrum of sodium vapour has for its most striking feature the lines of the principal series. The same series lines for the metals of this communication appear in the absorption spectra. The author has measured the wave-lengths of these lines so that now 24 potassium lines, 25 rubidium lines, and 19 cæsium lines are known of the principal series. Of these, 15 are new in the case of potassium, 21 in the case of rubidium, and 12 in the case of cæsium. In the cases of rubidium and cæsium, the metals themselves were not available, but by heating the chlorides with sodium or