

have we implanted the idea of the intrinsic grandeur or the essential ultimate value of their scientific studies? The spectre of specialism has pursued us. "Science" must be chemistry, physics, geology, botany—anything rather than the study of the dependency of human welfare upon our capacity to control our environment, and the contemplation of the majestic spectacle of the order of Nature gradually unfolding itself to man's consciousness and placing in his hand the implements of ever-augmenting power to control his destinies and attain that ultimate comprehension of the universe which has in all ages constituted the supreme aspiration of man. Had we offered this, had we employed scientific education rather than scientific training as the introductory chapter of the book of scientific knowledge, then all the educated civilised inhabitants of the world to-day would look to science for hope and inspiration, and we should hear no more of the conflict between science and the "humanities," for science would be recognised in its true light, as the first and greatest of the "humanities."

In the universities, even more than in the schools, specialisation has sacrificed education to the exigencies of training. Every opportunity is offered to the student of becoming an expert in the technique and a master of the details of any of the sciences, but on their relationship to the larger needs and aspirations of the world our instructors are silent. This silence arises only too often out of indifference, but where indifference does not prevail then an over-sensitive deference to professional etiquette no less effectually imposes silence upon the professional teacher of science. The desire not to trespass upon the technical field of a colleague and the desire to avoid the criticism of colleagues which may be aroused by the appearance of over-generalisation inhibit in almost every instance any deliberate attempt to open up before the student the deeper foundations and wider implications of the scientific discipline of thought.

As the demands for "vocational training" become more insistent and more complex, this condition becomes more and more aggravated, so that unless measures be deliberately taken to check the prevailing tendencies we may anticipate, alongside the continual improvement of technical training, the progressive deterioration of scientific education, with accompanying decay of scientific philosophy and increasing misunderstanding of the purposes and misapplication of the products of scientific investigation.

Much may be done by the individual teacher; still more might be accomplished by a deliberate campaign of popularisation, by taking the public into our confidence regarding our wider aims and the part played by investigation and discovery in the life and destiny of man. But there is one desirable measure which should be taken by the universities as the official leaders of educational reform, namely, the recognition of the study of the historical development of science in its relationship to human welfare and the evolution of human institutions, as a legitimate department of the many-sided curriculum which the modern universities offer to the student-public. It will be admitted, I think, that scientific investigation, discovery, and invention have played at least as great a part as war, literature, or commerce in the evolution of civilisation, and, that being the case, it is nothing less than astounding that while ample facilities are offered by our universities to the student of the history of war, literature, or commerce, no facilities and no academic recognition whatever are offered to the student of the history of science.

It is perhaps a debatable question whether this end could best be attained by the foundation of a new department and a separate chair or lectureship in the history of science, or whether the situation could prefer-

ably be met by the co-ordinated effort of existing departments. However this may be, one thing is certain, that the present atomistic condition of scientific learning in the minds of our students and the restricted utilitarianism of their outlook will not be corrected by offering them a "course in general science," consisting of a *mélange* of ill-assorted fragments of scientific specialities and necessarily failing to furnish either a vehicle of training or a vehicle of education; nor will it be corrected by offering them courses in another specialised course in the history of science in which that history is violently detached from the history of the development of man and of the evolution of his institutions, from the study of the part played by knowledge in determining the reaction of the mind of man to the varying circumstances by which from epoch to epoch he has successively found himself environed; for the new course must above all things be one of the "humanities."

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

MANCHESTER.—A group of large firms engaged in the principal industries of the Manchester district has offered to the governing body of the School of Technology the sum of 3000l., spread over a period of five years, towards the cost of establishing a new department of industrial management. The Manchester Education Committee has recommended that this gift be accepted and expressed its high appreciation of the donors' public spirit. It is proposed that a lecturer shall be appointed for this period of five years at a salary of 600l., to conduct research in the subject of industrial management, to organise a new department, to lecture to members of the University and to the public, and to assist industrial concerns in the solution of management problems. To make doubly sure that the department shall keep in close touch with practice, a number of managers, directors, scientific experts, and others who have had special experience or are responsible for important innovations, will be invited to deliver public lectures, for which they are being offered substantial fees. These lectures should be of assistance not only to future managers, but also to those already in that position; they will strengthen the idea that management is a science, and that every manager is, or should be, something of a scientific researcher.

SHEFFIELD.—It was something more than a domestic function at which the Marquis of Crewe was installed as Chancellor of the University on Friday, February 15. The ceremony was the first of its kind in Sheffield, as the late Chancellor was born, so to speak, with the University. He was part of the gift of the Crown, whereas Lord Crewe was elected by the Court in the manner prescribed by the charter. The formal act of installation was conceived as taking place at a meeting of the Court in the presence of the University, and the Senior Pro-Chancellor (Mr. H. K. Stephenson), who normally presides over the Court, performed the act of installation. This was a departure from the precedents of Leeds and Manchester, but the Sheffield interpretation of the meaning of the ceremony is probably based on sounder legal grounds. Once in the chair, the new Chancellor took charge of the proceedings with characteristic grace and dignity. Before declaring the Congregation open for the conferment of degrees, he spoke admirably on various burning problems, and his pronouncements should do much to increase the intimacy and friendliness of the relations between the civic and industrial life of the city—close as they already are. It was something to hear the first chairman of the Privy Council Committee on Scientific and Industrial Research say that in his view

"the closer the tie between the University and the prime industries of the city the better for both." The honorary graduates were introduced to the Chancellor by the Public Orator (Prof. A. H. Leahy) in terms which did full justice to a great occasion, for an assembly which included the Ambassadors of the great Allied Powers, France, the United States; and Italy, was a memorable assertion of the University's faith in the common cause, and the presence there of representatives of sister universities made that assertion more deeply significant. The University also did honour to itself by conferring the degree of Doctor of Letters on the President of the Board of Education, its former Vice-Chancellor.

DR. R. S. WILLOWS, head of the department of physics and mathematics at the Sir John Cass Technical Institute, Aldgate, London, has been appointed head physicist to Messrs. Tootal Broadhurst, Lee, and Co., of Manchester, in connection with their scheme for cotton research.

MR. D. B. MAIR and Mr. L. C. H. Weekes have been appointed Assistant Civil Service Commissioners. The former will also hold the office of Director of Examinations, and the latter that of Secretary to the Civil Service Commission. Mr. Stanley M. Leathes remains the First Commissioner, but Mr. Herbert W. Paul has retired from the post of Second Civil Service Commissioner which he has held since 1909.

THE course of public lectures on "Some Biological Problems of To-day," arranged in co-operation with the Imperial Studies Committee, are being continued at University College (Gower Street, W.C.) on Mondays at 4 p.m. The remaining lectures of the present term will deal with important questions of food production, as follows:—(1) The possibilities of increased crop production, by Dr. E. J. Russell; (2) Grassland and arable, by Mr. R. G. Stapledon; (3) Farm strategy of the past and for the future, by Mr. K. J. J. MacKenzie; (4) Spraying problems, by Dr. A. S. Horne; (5) Birds and insects in relation to crops, by Prof. S. J. Hickson; (6) Co-operation in food supply, by Mr. A. G. Tansley. The lectures are open to the public without fee or ticket.

THE first four lectures of the public university course on "Animal Life and Human Progress" at King's College, London, have been very well attended. Prof. A. Dendy delivered an introductory discourse on "Man's Account with the Lower Animals," Prof. G. C. Bourne has lectured on "Some Educational and Moral Aspects of Zoology," Mr. C. Tate Regan on "Museums and Research," and Prof. J. Arthur Thomson on "Man and the Web of Life." The remaining lectures of the course will be given by Prof. F. Wood Jones on "The Origin of Man" (February 27); Dr. R. T. Leiper, on "Some Inhabitants of Man and their Migrations" (March 6); Prof. R. T. Punnett, on "The Future of the Science of Breeding" (March 13); Prof. W. A. Herdman, on "Our Food from the Sea" (March 20); and Prof. Robert Newstead on "Tsetse-flies and Colonisation" (March 27). It is intended to publish the lectures in book form with Messrs. Constable and Co., Ltd., after the conclusion of the course.

THE annual general meeting of the Association of Technical Institutions will be held on February 22 and 23, at the Drapers' Hall, Throgmorton Street, E.C. The president, Sir Alfred Keogh, G.C.B., will take the chair, and deliver a short address. Papers will be read on the training of teachers for technical institutions and day continuation classes, by Principal Watson of Keighley, and on the Education (No. 2) Bill, 1918, by Prof. Wertheimer, of Bristol. Among the resolutions to be submitted to the meeting may be mentioned those

urging, in the interest of technical education, that scales of salary providing for adequate increases and reasonable prospects should be adopted for all fully qualified full-time teachers, and that the Government be requested to make a grant to technical-school teachers, as it has done in the case of primary- and secondary-school teachers; those expressing general approval of the provisions of Education (No. 2) Bill and recording the opinion that an alternative plan should be allowed in Section 10 of the Bill, such plan being half-time compulsory attendance from fourteen to sixteen years of age, together with encouragement of, and ample facilities for, attendance afterwards at evening classes for two evenings per week on technological or other subjects from sixteen to eighteen years of age, and those expressing disappointment that the Board of Education has not yet withdrawn or modified the objectionable features of the Regulations for Junior Technical Schools.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 7.—Sir J. J. Thomson, president, in the chair.—Prof. O. W. Richardson: The photo-electric action of X-rays. In this paper the excitation of electron emission by X-rays is discussed in relation to our knowledge of the photo-electric action of other types of radiation. The ratio E_K/E_A of the energy E_K emitted in the form of K secondary X-radiation to the energy E_A of the primary radiation (wave-length λ) absorbed is found in the case of bromine to be expressed to within the degree of accuracy of the available observations by the formula

$$E_K/E_A = \frac{\lambda}{(1+\beta)\lambda_K}$$

where

$$\beta = e^{-0.46 \frac{\lambda_{K\gamma} - \lambda}{\lambda}}$$

λ_K is the average wave-length of the K radiations and $\lambda_{K\gamma}$ is the wave-length of the shortest K radiation.—F. Soddy and J. A. Cranston: The parent of actinium. (1) In a full historical introduction the data obtained in 1909 relative to the rays and products of uranium-X are discussed, in so far as they throw light on the various possible modes of origin of actinium. (2) The minute growth of actinium previously put on record in 1913 as having been observed in the old uranium-X preparations has been confirmed by their later history and is now established beyond doubt. (3) Uranium-X₂ can be separated from uranium-X₁ by sublimation in a current of air charged with vapours of carbon tetrachloride at a temperature below visible red-heat. (4) 470 grams of a very pure Indian pitchblende were similarly treated in the expectation of removing eka-tantalum isotopic with uranium-X₂ and giving actinium in an α -ray change of long period. (5) The preparations so obtained were initially free from actinium, but one of them has produced it continuously with the lapse of time. (6) A direct comparison of the amount of actinium in this preparation after the lapse of 2.5 years with that in the original pitchblende showed that it was equal to that in about 0.25 gram. (7) On the assumptions that eka-tantalum and actinium are both long-lived, that no intermediate members intervene between them, and that the preparation contained the whole of the parent of actinium in the original mineral, the period of average life of actinium is calculated to be 5000 years. Nothing can yet be said definitely as to the period of the parent. (8) A second preparation separated from Joachimsthal pitchblende, the treatment of which commenced in 1903, and ended in 1914, with the carbon tetrachloride