

clearly where it was best to draw generic lines. While it must be admitted that there are many minor differences in the generic concepts exhibited in the scholarly and monumental works to which I here refer, yet they establish a good usage, which on the whole has a considerable measure of uniformity, and goes far to establish the rank of such categories as genus, species, and variety.

Let me urge that, while we remit no effort to secure further light on this subject, there should be a general agreement to treat the accepted and traditional interpretation of large and important genera as sacred and binding until we can furnish definite and convincing evidence that change is needful, and that for the welfare and dignity of our science all should unite in opposing changes of the artificial sort, which consist merely in the shifting of ranks and modification of standards.

*Investigations and Commercial Tests in Connection with the Work of an Engineering College.*¹

In any school it is necessary, in securing the best efficiency in instruction, that the professors shall be able to speak with authority on the subjects which they teach. In technical schools those who teach the practical engineering subjects cannot speak with authority unless they have had practical experience. Investigations and commercial tests may serve to give them this practical experience, and the question naturally arises, Is it a good policy for professors to conduct such work in connection with their regular college duties?

Let us consider the various ways in which a professor in an engineering school may acquire the practical experience which is necessary in his work.

First, he may be called to a professorship from the practical field.

Second, after teaching for a time and finding how necessary a practical experience is in his work, he may turn to the practical field, and then return to teaching.

Third, he may undertake practical work in connection with his college duties, and gain his experience in this way.

Each method possesses its own advantages and disadvantages. Starting with the first, it must be admitted that many of our best instructors have entered the teaching line after they have had experience in the practical field. Such a man has an advantage in being able to make use of this experience immediately, when he starts at his teaching work. There is a disadvantage, however, in the fact that should he have secured a mature experience in the practical field, he will necessarily be no longer a young man, and it may be hard for him to teach and properly to adapt himself to the theoretical part of his course.

The advantages of the second system of securing a practical experience, where the professor leaves the teaching field, takes up outside work, and then returns to teaching, are that during his practical career he will be very much alive to the points he should look into, and, furthermore, if he returns to teaching he will possess the advantage of having experience both as a teacher and as a practical engineer.

We will now take up the third method, where a professor obtains his practical experience by conducting outside work in connection with his college duties. The outside work undertaken by a professor should be that of a scientific or strictly engineering type.

The advantage to a college in having its professors do research and outside work is that what reflects to the credit of the professor will reflect to the credit of the college. Furthermore, the college will be looked to as a source from which an unbiased opinion can be obtained, and in maintaining this standard it will be fulfilling a high and useful mission. The results of the investigations may be made the subjects of scientific papers to be read before the various societies, and any reputation that a professor gains in this way will benefit his college.

The day is past when there can be a strict line drawn between the work of the consulting engineer and that of the professor who teaches in the same field. The ideal

professor in a given line should be able to take up the work of the consulting engineer in that line, and the ideal consulting engineer should possess enough technical knowledge to fit him for being a professor. There should be no jealousy, but rather a bond of friendship in that the fundamentals which each should master are the same.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The results of a census undertaken each year by the *Magazine* show that there are 2722 undergraduates actually in residence this term, as compared with 2621 in Hilary term, 1905. The increase is probably due to the Rhodes scholars and to the fact that a larger proportion of undergraduates now complete three years of residence than was the case a few years back. The three largest colleges are Christ Church, New College, and Balliol, with 211, 210, and 181 members in residence.

A long vacation course in geography will be held in Oxford between August 7 and 25, provided that sufficient names are sent to the Reader in Geography, Old Ashmolean Building, Oxford, by June 1. The course will include lectures and demonstrations in the School of Geography, and surveying and map-drawing in the field.

At a meeting of the Junior Scientific Club, held on Wednesday, February 14, at the museum, papers were read by Prof. Miers on "Spontaneous Crystallisation," and by Mr. C. G. E. Farmer on "The Use of Finely Divided Metals in Organic Chemistry."

CAMBRIDGE.—The regulations for the diploma in mining engineering were passed by the Senate last Thursday. Among the chief of these regulations is that the candidate may take such parts of the natural sciences tripos and of the special examination in mechanism and applied sciences as bear upon the subject of mining engineering, or a candidate may take honours in the mechanical sciences tripos. Details of the examination and the schedules in the art of mining and in metallurgy will be found in the *Cambridge University Reporter* for December 5, 1905.

The Smith's prizes for 1904 have been adjudged as follows, the names being in alphabetical order:—C. F. Russell, Pembroke, for his essay on "The Geometrical Interpretation of Apolar Binary Forms"; F. J. M. Stratton, Gonville and Caius College, for his essay on "A Problem in Tidal Evolution Suggested by the Motion of Saturn's Ninth Satellite."

Mr. J. W. Nicholson, of Trinity College, has been elected to the Isaac Newton studentship in astronomy and physical optics, of the value of 250*l.* for one year, for study and research in astronomy.

Mr. R. H. Rastall, late scholar of Christ's College, Harkness scholar in 1903, has been elected to a junior fellowship at Christ's College. Mr. Rastall has worked chiefly in the Geological Museum at Cambridge, and has written on the Blea Wyke beds of Yorkshire and on "The Buttermere and Ennerdale Granophyre" of Lakeland.

DR. C. H. LEES, lecturer in physics and assistant director of the physical laboratories of the University of Manchester, has been appointed professor of physics at the East London College.

THE King's Speech, read by His Majesty at the opening of Parliament on Monday, promised that, at the earliest possible moment, a Bill would be introduced "for amending the existing law with regard to education in England and Wales."

THE Lancashire County Education Committee has recommended the council to make a grant of 100*l.* a year to the fund for the establishment of a department in economic botany in the University of Liverpool. The cost of the proposed department has in consequence now been completely guaranteed.

THE Senate of the University of St. Andrews has resolved to confer the following honorary degrees, among others, at the graduation ceremonial on April 3:—LL.D., Dr. A. C. L. G. Gunther, F.R.S., in appreciation of his lifelong and distinguished labours in zoology, Prof. J. C. Wilson, Oxford, and Prof. A. H. Young, Manchester.

¹ From the address of Prof. D. S. Jacobus, president of Section D, Mechanical Science and Engineering.

AN open competitive examination for not fewer than twelve situations as assistant examiner in the Patent Office will be held by the Civil Service Commissioners in April next. The examination will commence on April 23, and forms of application for admission to it are now ready for issue, and may be obtained on request addressed by letter to the secretary, Civil Service Commission, Burlington Gardens, London, W.

At the annual conference of the Labour Representation Committee held on February 16 considerable discussion took place on the following resolution:—"That this conference condemns the educational policy of the Government as laid down in the Act of 1902, and demands the formulation of an educational programme based upon the principle of equal opportunities for all, such programme to aim at securing—(1) that immediate provision be made for giving at least one free meal per day to all school children; (2) that all grades of education shall be free and State maintained; (3) that all education shall be free, and that secondary and technological education be placed within the reach of every child by the granting of bursaries or maintenance scholarships to all children whose usefulness would be enhanced by such extended education; further, that adequate provision be made for children to continue at school until the age of sixteen years, or until such age as the university course begins; (4) that provision be made to continue the education of capable students through the university courses; (5) that the standard of capacity shall be judged by work previously accomplished, and not by competitive examination; (6) that the education in all State-supported schools shall be secular; (7) that all State-supported schools shall be under the control of and their affairs administered by the directly elected representatives of the people; (8) that each educational district shall be required to train the number of pupil teachers demanded by local needs, and for this purpose to establish training colleges, preferably in connection with universities or university colleges; (9) that the cost of the above-mentioned reforms shall be borne by the National Exchequer out of revenue obtained through broadening the basis of taxation, and by the restoration and democratic administration of valuable misappropriated educational charities and endowments." "This conference, therefore, instructs the committee (or such body as may be appointed for the purpose) to draft a Bill embodying the principle of the said resolution, with a view to the Labour group introducing it early into Parliament." A division having been taken, the result was declared as follows:—817,000 votes for the resolution and 76,000 for its rejection. The resolution was therefore carried. In view of the growing importance of the labour interest, it is satisfactory and gratifying to find a large and representative body of labour delegates appreciating the fact that the future welfare of the country is closely bound up with the provision of a rational system of national education.

THE publication on February 19 of a correspondence between Mr. A. H. D. Acland, formerly Minister of Education, and Mr. Birrell, President of the Board of Education, is gratifying evidence that at last something is to be done in the direction of providing adequate Exchequer grants for English secondary education. Mr. Birrell, in reply to a series of suggestions made by Mr. Acland, announces that provision is to be made in the Estimates for this year for a considerable increase of the Exchequer grants (1) in aid of secondary schools; (2) to alleviate the burden now placed upon local authorities in respect of the education of teachers; and (3) to assist further the building of training colleges for teachers by the local authorities. How much higher education in this country has suffered from the inadequate education of boys in our secondary schools, which, through want of funds, are too often under- and inefficiently staffed and equipped, has been pointed out in these columns with patient persistence. It is earnestly to be hoped that the findings of the Royal Commission on Secondary Education of ten years ago will now be considered seriously, and a statesmanlike attempt made to secure for the pupils in whose hands our future success as a manufacturing nation lies, a rational and complete secondary education which will enable them to take proper advantage of

higher technical instruction. The promise that local education authorities are to be helped—in a degree commensurate with modern needs—in the pressing work of supplying more training college accommodation is heartily to be welcomed. The proportion of fully trained teachers in our elementary schools is at present scandalously low; and this is due primarily to the fact that until quite recently the only training colleges were those built—with the aid of special State grants like that of 1835—by the National and the British and Foreign School Societies, and supported largely by Government grants on each teacher in training. Though in recent years the work of day training departments in connection with university colleges has improved the facilities for the training of teachers, much yet remains to be accomplished if English elementary education is to take advantage of modern educational enlightenment. Local education authorities, with their knowledge of local needs, will be in a position, when helped by the promised Treasury grants, to start the much needed provision of more colleges where teachers may become acquainted with the principles upon which successful teaching must be based. In carrying out this important work, the need of training for secondary school teachers must not be forgotten. Most masters in secondary schools begin their work knowing only what to teach, and nothing of how to teach.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 25.—"On the Effect of High Temperatures on Radium Emanation." By W. Makower. Communicated by Prof. Arthur Schuster, F.R.S.

(1) The activity of radium emanation in radio-active equilibrium with its products A, B, and C, is changed by heating above 1000° C.

(2) The effect increases with the temperature up to 1200° C., and possibly beyond this temperature.

(3) The effect increases with the time of heating for about the first hour, but subsequent heating is without effect.

PARIS.

Academy of Sciences, February 12.—M. H. Poincaré in the chair.—Some properties of the α rays emitted by radium and by bodies rendered active by radium: Henri Becquerel. Some experiments of Prof. Rutherford recently published have led the author to repeat some of his earlier work on the deviation of the radium rays. In the present paper full details are given of the strength of the magnetic field, and the dimensions and arrangement of the apparatus. As a result, M. Becquerel definitely rejects the interpretation deduced by him from his earlier experiments and the hypothesis of an increase in the radius of curvature along the trajectory, and accepts the explanation of Prof. Rutherford, all the measurements confirming the existence of a reduced velocity for the α rays when traversing a leaf of aluminium. There is no difference in the behaviour of α rays arising from radium salts or from bodies rendered active by the emanation.—The internal pressure of fluids and the equation of Clausius: E. H. Amagat.—Some lemmas relating to quasi-waves of shock: P. Duhem.—Observation of the eclipse of the moon of February 9, 1906, made at the Observatory of Paris: P. Salet. Note on the time of contact, with especial reference to the difference observed between the photographic and visual observations in different eclipses.—Observations of the Brooks comet (1906a) made at the Observatory of Algiers with the 31.8 cm. equatorial: MM. Rambaud and Sy. Observations on the apparent positions of the comet and the positions of the comparison stars were made on January 31 and February 2. On January 31 the comet had the appearance of a round nebulosity with an eccentric nucleus, with a lustre comparable with that of a star of the eleventh magnitude.—Observations of the sun made at the Observatory of Lyons with the 16 cm. Brunner equatorial during the third quarter of 1905: J. Guillaume. Fifty-six days were available for observations during the quarter, the results of which are summarised in three tables showing the number of spots, their distribution in latitude, and the distribution of the faculae in latitude.—Integral functions: Ed. Maillet.—A