ONE of the most important changes which the war has brought about in our educational institutions has been the rapid conversion of the engineering laboratories of our universities, colleges, and schools into training centres for munition-makers or into munition works. The number of those trained who are now doing work of national importance must be very large. According to a report of the Education Committee of the London County Council the institutions under its control train 3000 per annum, while the output of gauges from the institutions employed in their manufacture exceeds 30,000 per annum. Between one and two hundred woodwork instructors in the employ of the council have become proficient in metalwork, and the remarkable results which have been obtained by sending men and women without any previous experience of metalworking through a five or six weeks' training have taught the committee the desirability of devoting much more attention to instruction in workshop processes and production in educational institutions after the war. Hitherto such training has been left to the factories, but recent experience has shown that it ought to form a more intimate part of the work of the technical schools. It is of importance to ascertain to what extent the experience of authorities in other parts of the country agrees with that of London.

WE have received from Delhi a copy of the report of a conference held in January last of the directors of public instruction for the various provinces of India (see NATURE, March 8, p. 38). The conference was opened by the Viceroy, Lord Chelmsford, who, in the course of his inaugural address, urged the directors in their work of developing technical education in India not to overlook the claims of agricultural and commercial education. He said the great advance made by scientific agriculture during the last half century justifies us in pressing forward with a policy of agricultural education in India, and though the directors would not claim to speak as experts on the agricultural side, their educational experience qualifies them to give useful hints with regard to an advance along this road. Again, on the commercial side of education, he expressed surprise to find how little has been done in spite of India's large and growing commerce. Compared with a technical institution, a commercial school is a relatively cheap institution, and one would think that there was a great opening in the big towns of India for good commercial schools. In technical training in its narrower sense he said sight must not be lost of workshop practice in outside works. Laboratory training, however good, is no real substitute for the discipline of the workshop. The directors discussed, among other subjects, the teaching of science in the secondary schools of India. It appears that in the higher classes of Madras schools elementary science is obligatory. In Bombay science is compulsory in Government high schools, and the University demands a study of science from matriculation candidates, though it conducts no examination in science at this stage. In the provinces which come under the Calcutta matriculation the position of science teaching is not satisfactory. In Bengal there is practically no science teaching whatever in schools for Indian pupils. One of the optional subjects for the matriculation examination is elementary mechanics, but very few candidates offer this subject. Geography is also an optional subject for matriculation. Otherwise, no provision whatever is made in the Calcutta University matriculation for the teaching of science. Looking to the peculiar difficulties which underlie the educational problem in Bengal, it was thought practical science should be made obligatory and be included in the school-leaving certificate.

THE Association of Headmasters, which, it will be remembered, is concerned with secondary education, has adopted and circulated an "educational policy" which may be taken to embody the considered opinion of the headmasters of the secondary schools in this country as to what are desirable educational changes to meet the conditions which will follow the declaration of peace. Their policy insists, among other points, that elementary education should be considered as a preliminary or preparatory stage. It is not yet possible to require that no one shall be allowed to leave school in order to earn money before the age of eighteen; but it is possible to provide that no child's education shall wholly cease on its leaving the elementary school, and that up to the age of eighteen education shall never be wholly subordinated to the ability to earn wages. There must be a considerable increase (1) in the number of secondary schools—*i.e.* schools which provide some form of whole-time general education as distinct from technical training up to the age of eighteen, and (2) in facilities for part-time education. The chief needs in respect of secondary education enumerated by the policy are:—(*a*) More extensive and more varied provision for children capable of profiting by a definite course of education up to the age of eighteen. (*b*) The encouragement and assistance of a much larger number of children to take full advantage of such provision. This involves the lengthening of school life by means of (1) the provision of adequate scholarships and maintenance allowances; (2) the requirement that all pupils who enter a secondary school shall continue in attendance at some such school until the age of sixteen. (*c*) As in the case of elementary schools, the expenditure of much more money in attracting competent persons into the teaching profession. With reference to the curriculum it is stated that one of the most serious dangers to secondary education lies in the overcrowding of the time-table through the conflicting demands of an ever-increasing number of subjects. In framing curricula the first consideration should be to guard against this overcrowding, and to ensure that sufficient time is available for the adequate treatment of the subjects which are taught. No boy should be allowed to specialise until he has attained a satisfactory standard of general education. This standard should be that which a boy of ordinary ability may be expected to reach at the age of sixteen. The subjects of a general education should include as a rule Scripture, English, history, geography, mathematics, science, and ordinarily two languages other than the pupil's own—in most cases these should be French and Latin.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, July 9.—M. Ed. Perrier in the chair.—L. **Maquenne** and E. **Demoussy**: The influence of mineral matter on the germination of peas. Peas have been germinated in sand moistened with distilled water containing varying known amounts of metallic salts and the length of the roots measured after six days' germination. Twelve metals were used in these experiments, details being given of the results obtained with each one. Calcium would appear to be the only element which, in the absence of any other, is capable of producing normal germination, and the amounts required are extraordinarily small. The growth of the stem will be the object of further researches.—E. **Ariès**: The sign of the specific heat of saturated vapour in the neighbourhood of the critical state.—A. **Thybaut**: Tautochrone curves.—G. L. le **Cocq**: All known systems of hyperstatic suspension bridges are

derivatives of isostatic suspension bridges, and the latter are only particular cases of one single and unique system which includes all.—M. **Siegbahn**: High-frequency spectra. Some of the work recently published by MM. R. Ledoux-Lebard and A. Dauvillier has been anticipated by the author and E. Friman (*Phil. Mag.*, July, 1916).—P. **Chevenard**: The mechanism of the tempering of carbon steels. The results of the experiments described completely confirm the conclusions recently published by MM. Portevin and Garvin.—A. **Portevin**: The manganese steels. The steels were submitted to very slow cooling, seventy-five hours in cooling from 1300° to 100° C. The results, given in detail, differ considerably from the effect of a normal annealing (three to five hours from 1000° C.). —E. **Urbain**: A method of determining molecular weights. The method is based on determinations of the boiling point of a mixture of the liquid the molecular weight of which is to be measured with a non-miscible liquid, such as water, and the composition of the distillate. Examples are given of the measurement of the molecular weights by this method of benzene, carbon tetrachloride, and limonene.—Mlle. Y. **Dehorne**: The presence of the genus Stromatoporella in the Senonian in the neighbourhood of Martigues (Bouches-du-Rhône).—L. **Bordas**: The egg deposition of *Rhynchites conicus* and the anatomy of its larva. This parasite has caused great damage to apple, pear, cherry, and peach trees in Rennes and its neighbourhood.—A. **Compton**: Cerebrospinal meningitis and meteorology

July 16.—M. Camille Jordan in the chair.—A. **Lacroix**: The felspathic ortho-amphibolites and ortho-pyroxenites of Madagascar.—G. **Bigourdan**: A gardener-astronomer of the seventeenth century, Elzéar Féronce: Calignon de Peyrins and the reciprocation of the pendulum.—G. **Gouy**: Interferences with large differences of path.—G. A. **Boulenger**: The evolution of the poison apparatus of snakes. Remarks on a recent communication of Mme. Marie Phisalix.—J. **Priwaloff**: The convergence of conjugated trigonometrical series. —E. **Vessiot**: The canonical equations and developments in series of celestial mechanics.—M. **Amsler**: The development in a continued fraction of a quadratic irrational.—V. M. **Hegly**: Flow over a weir in a free sheet with lateral contraction.—MM. **Luizet** and **Guillaume**: Occultations observed during the total eclipse of the moon of July 4, 1917, at the Lyons Observatory.—St. **Procopiu**: Induction apparatus for detecting projectiles in wounds. A modification of the Hughes induction balance in which a galvanometer replaces the telephone. The deviations of the galvanometer vary with the distance of the projectile from the surface.—A. **Colani**: Study of the system water, uranyl oxalate, sodium oxalate.—A. **Pictet**, O. **Kaiser**, and A. **Labouchère**: The alcohols and bases of vacuum tar. Six alcohols and six bases were isolated. The alcohol of lowest boiling point was proved to be *p*-methyl-*cyclo*hexanol (hexahydro-*p*-cresol). The other alcohols were not identified, but belong to the hydroaromatic series. It is probable that these alcohols exist in the coal, since the benzene extract contains these alcohols in practically the same proportions as the vacuum tar. —Em. **Saillard**: The action of acids on the rotatory power of saccharose and invert-sugar in the presence of soluble salts.—F. X. **Skupienski**: Sexuality in the Myxomycetes group of fungi.—Mme. M. **Phisalix**: The subjective value of the evolution of the poison apparatus of snakes and the physiological action of the poisons in systematic classification.—MM. **Denier** and **Vernet**: The bacteriological study of the natural coagulation of the latex of *Hevea brasiliensis*.—A. **Policard** and B. **Desplas**: The histological mechanism of granulation of wounds in man.

BOOKS RECEIVED.

Scientific Treatise on Smoke Abatement. By H. Hamilton. Pp. xiii+155. (Manchester: Sherratt and Hughes.) 5*s*. net.

History of the Spanish Conquest of Yucatan and of the Itzas. By P. A. Means. Pp. xv+206+plates. (Cambridge, Mass.: The Peabody Museum.)

Notes on the Order of my Categories and Alphabet. By R. E. Dennett. Pp. 18. (Lagos: Government Printer.)

The African Table of Periodic Law. By R. E. Dennett. Pp. 12. (Lagos: Government Printer.)

Studies in Psychology. Contributed by Colleagues and Former Students of E. Bradford Titchener. Pp. 337. (Worcester, Mass.: L. N. Wilson.)

Results of Atmospheric-Electric Observations made Aboard the *Galilee* (1907–8) and the *Carnegie* (1909–16). By L. A. Bauer and W. F. G. Swann. (Washington: Carnegie Institution.)

The Magnetic Work of the *Galilee*. By L. A. Bauer, W. J. Peters, and J. A. Fleming. (Washington: Carnegie Institution.)

The Magnetic Work of the *Carnegie* (1909–16). By L. A. Bauer, W. J. Peters, J. P. Ault, and J. A. Fleming. Some Discussions of the Ocean Magnetic Work (1905–16). By L. A. Bauer and W. J. Peters. (Washington: Carnegie Institution.)

A Class-Book of Organic Chemistry. By Prof. J. B. Cohen. Pp. viii+344. (London: Macmillan and Co., Ltd.) 4*s*. 6*d*.

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