species of Canarium, which has been termed Indian white mahogany, is likely to take an important place in the future. It is a smooth, even-grained wood which will be available at a very reasonable price. Haldu (*Adina cordifolia*) is a bright canary-coloured wood notable for the smooth and even regularity of the grain. It is possible to carve it in any direction without splitting—a striking quality which gives it a particular value. Perhaps the finest carving wood which it is possible to obtain, however, is Indian red pear (*Bursera serrata*), which possesses the above qualities in a unique degree. Other woods which are chiefly notable for their decorative qualities are Indian red zebra-wood (*Melanorrhoea usitata*), Indian primavera, yellowheart (*Fagraea fragrans*), and the handsome striped and mottled ebony known as Andaman marblewood (*Diospyros Kurzii*). It becomes abundantly clear that the only thing necessary for these timbers of India to take the important position which their merits deserve is that the representatives of the Government in India should continue to provide regular and certain supplies, and to this end extensive arrangements are now being made.

The United Kingdom.—About seventy varieties of timbers grown in the United Kingdom were shown, and these included such importations as the silver wattle of Australia and the black walnut (*Juglans nigra*) of America. Floorings in yew (*Taxus baccata*), cherry (*Prunus Avium*), and beech (*Fagus sylvatica*), amongst others, illustrated a little-known use for these woods. The decorative effect of English brown oak (*Quercus Robur*) was shown in various articles. Other exhibits, such as the gondola of an aeroplane made in English ash (*Fraxinus excelsior*), called to mind the large part played in the war by the native timbers.

Other countries showing interesting exhibits, of which space forbids mention, were British Honduras, Ceylon, Fiji, Newfoundland, New South Wales, New Zealand, Union of South Africa, Tasmania, and Trinidad.

The Education Act, 1918.

LONDON COUNTY COUNCIL DRAFT SCHEME.

THE Education Act of 1918, which among its provisions requires that draft schemes for giving effect to them shall be submitted by the local education authorities, has resulted in a remarkably interesting document just issued by the Education Committee of the London County Council, in which is set forth not only a scheme for the administration of the Act within the county, but also a most informing summary of the history of education in London during the nineteenth century and of the various legislative enactments passed from time to time, notably those of 1870 and 1902, to increase the facilities and improve the quality of education especially for the large population immediately within its area, now amounting to upwards of 4½ millions. The report further makes clear the present activities of the Committee with its 951 separate elementary schools, in which 695,197 pupils are enrolled, with an average attendance of 590,633, from which figures it would appear that more than 100,000 children are constantly absent. The schools are staffed by 20,000 teachers (less than one-third are men), of whom only 300 are uncertificated. In addition to the ordinary elementary schools there was organised in 1910 a system of central schools to the number of 51, distributed more or less evenly throughout the County of London, and filled with pupils selected partly by means of junior county scholarships at about eleven years of age with a view to an advanced course of training of four years.

The Council, as the local education authority, is concerned not only with the mental well-being of the child, but also with its physical and social welfare. Having regard to the fact stated by Sir George Newman in a recent report, that there were more than one million children in attendance at public elementary schools in England and Wales who were unable by reason of physical or mental defects to take effective advantage of the instruction offered, no feature of the past and future work of the Council can be regarded as of greater importance than the effort to raise and maintain the standard of bodily health and intellectual vigour of the children of London. The statutory medical inspection in the schools is carried out by 57 assistant medical officers and a staff of 208 nurses under the Medical Officer of Health of the county. The county is divided into five areas, each under a divisional medical officer, a superintendent of nurses, a treatment organiser, and a children's work director. During 1919 169,200 cases of various kinds were treated, and for 1920–21 provision is to be made for 40,000 cases more. A fee of 1*s.* is required in each case where the parents can afford it, otherwise the treatment is free.

There is special provision for anæmic and subnormal children, for those with speech defect, of whom there are about 1200 in the schools who need treatment, and for blind and deaf children, of whom there are 317 and 693 of the elementary-school class respectively, whilst there are also 659 partly blind and 117 partly deaf London children.

All these measures denote a seriously important and beneficial advance upon the almost entire neglect of child-life in the nineteenth century. The provision of higher education within the county includes 23 schools provided and maintained by the authority and attended by 8702 pupils, 31 schools with 11,808 pupils aided by the authority, 47 other public secondary schools with 16,462 pupils, 40 schools conducted by religious bodies with 5170 pupils, and, lastly, 421 private schools with 27,295 pupils. The last two groups are regarded as preparatory rather than as secondary. There is thus a total of 562 schools in the county area with 68,807 pupils under instruction, much of which, it is not unreasonable to say in respect of the great majority of the private schools, can scarcely be efficient either in subject or in quality. The Council maintains five training colleges for teachers, one of which is a school of the University of London, and makes maintenance grants to three recognised training colleges within its area for domestic-economy teachers.

The provision of technical education within the county since the passing of the Technical Instruction Acts of 1889 and 1891 comes under review, and is marked by three periods of development. The first covers the years 1889–1904, and embraces the work of the Technical Education Board established in 1893; the second from 1904 to 1909, which followed the traditions and policy of the Board; and the third from 1909 to the present time, which has aimed at a progressive delimitation of the functions of rival institutions and at a general endeavour to co-ordinate all forms of education.

In 1892 a general survey was made of the needs of London as a preliminary to the operations of the Technical Education Board, and, as a result, the Board made direct grants in aid of polytechnics and other institutions for their maintenance and equipment and for the extension of their work. There were 26 technical institutions so aided in 1903, some of which were under the direct control of the Council, and grants were also made to the extent of 33,000*l.* in aid of science and language teaching in the secondary schools. A system of scholarships was

©1920 Nature Publishing Group

established in aid of boys and girls of ability to obtain an education beyond the primary stages, and to assist adults in their studies in art, science, and technological subjects in day and evening institutions; and the Board, having regard to the importance of educating the future leaders of industry and commerce, not only aided in the establishment of the London School of Economics, but also made grants of 17,000*l.* a year in 1903–4 to institutions and schools of the University of London. This policy has been greatly developed since 1904, when the Council became the local authority for all forms of education. Some measure of the expansion of the work undertaken in the polytechnics may be seen on a comparison of the student-hours worked in the departments of engineering, mathematics, physics, and chemistry in 1900–1 and in 1919 (November), from which it appears that the hours in 1900–1 were 268,344 and in 1919 795,000.

The growth of expenditure in polytechnics, technical institutes, schools of art, science, art, and commercial centres, and in ordinary evening classes is indicated by the following figures:—In 1904 the expenditure was 369,400*l.*, and in 1919–20 (estimated) 822,514*l.* Twenty-six special institutions for art, technical, and domestic subjects are now wholly maintained by the Council, and twenty-nine others are aided by annual grants. Twelve polytechnics and colleges receive annual subsidies ranging from 400*l.* to 3500*l.*, amounting in the aggregate to 23,250*l.*, whilst the block grant made to ten polytechnics and colleges in 1911–12 of 86,381*l.* was increased in 1919–20 to 139,950*l.*, exclusive of 60,000*l.* in respect of war bonus and improved salary scales. In 1919–20 an equipment grant was also made to these institutions of 13,900*l.* The Council in 1918 introduced a new scale of salaries for principals and other teachers in technical institutions, whereby the minimum salary for principals in the lowest group was fixed at 440*l.* and the maximum in the highest group at 1250*l.* The salaries for heads of departments range from 440*l.* to 840*l.* (men) and from 340*l.* to 640*l.* (women), and whole-time lecturers' salaries are fixed from 225*l.* to 490*l.* (men) and from 180*l.* to 340*l.* (women). The Council works in close association with the University of London, to which it gives annual grants-in-aid, which at the present time amount to about 47,000*l.* This includes provision for nineteen professorial chairs in languages and literature, mathematics, science, education, and economics. The Council also maintains a school of the University, the London Day Training College, at an annual cost of 10,000*l.*, and is spending in 1919–20 about 13,000*l.* in aid of university students, mainly in London, Oxford, and Cambridge, which altogether brings up the annual expenditure in support of university education to about 70,000*l.* Capital grants have further been made at various times in aid of certain schools of the University for the erection and improvement of buildings. Thus grants were made to University College and to Bedford College each of 30,000*l.* Land of the value of 66,700*l.* was also assigned at a peppercorn rent for the new building of the London School of Economics. The grant to the Imperial College of Science and Technology has been increased from 5000*l.* in 1908–9 to 13,000*l.* in 1918–19.

Many of the reforms foreshadowed by the Education Act, 1918, have already been anticipated, such, for example, as the reduction in the size of classes, the establishment of central schools, the promotion of physical training, and the provision of maintenance allowances. The raising of the school age to fourteen *plus* and the reduction aforesaid will necessitate the provision of school-places for 120,000 children, 32,000 of which have been already provided, and will entail the appointment of 200 new teachers each year for ten years. Nineteen per cent., or some 14,000 children between eleven and twelve years of age, are fitted for some special type of school, and the Council has therefore decided to increase the number of central schools already provided from 60 to 100, and to lengthen the course in such schools to five years. Thus some 80 per cent. of the children remain to be dealt with until they reach the limits of the compulsory age, and measures are being taken to ensure the most enlightened treatment of such children in regard to both their physical and intellectual training such as prevails in the secondary schools. The attendance at the secondary schools in London ranges from 1·3 per 1000 in Shoreditch to 18·8 per 1000 in Lewisham. Additional accommodation is urgently needed, and the Council proposes therefore to build four entirely new schools and to rebuild or enlarge seventeen more.

It is anticipated that the new scholarship scheme of the Council and the better conditions of service will attract more candidates to the teaching profession. The report of the Board of Education for 1918 shows that in England only 150 men and 4000 women completed courses of training as teachers, whereas in 1914 the corresponding figures were about 2000 men and 3600 women. The annual requirements of London alone will in the near future be at least 1200, and with the view of meeting in part this demand the Council proposes to build three new training colleges for 750 students, which proposal will involve a capital expenditure of some 600,000*l.* The Council aims ultimately at securing a university course for all teachers. A much enlarged scheme of maintenance scholarships is submitted, the ultimate gross cost of which, including the cost of examinations, is estimated to reach about 1,178,000*l.* in 1931, made up of 730,000*l.* for education and 448,000*l.* for maintenance.

The day accommodation in the present polytechnics, in the various institutes, and in schools for special trades is about 2500, and it is proposed to increase it to 5600. A large amount of original research has been undertaken in the institutions both before and during the war in the domains of chemistry, physics, and engineering, and notably in the industries of photo-engraving, lithography, and tanning. This has led the Council to provide additional facilities to meet the requirements of research. Close consideration has been given to problems arising out of the powers and duties imposed by the Act in respect of adolescents engaged in employment. Provision is to be made next October for about 15,000 young persons, and an equal number will then be added to the total enrolment each succeeding three months for a period of two years. The number will then be 120,000, and in 1928, when those aged from sixteen to eighteen come under the Act, the number will be doubled. Meanwhile, it is proposed to establish as a first provision twenty-two day continuation schools at a cost on capital account of 131,000*l.* and of 116,500*l.* for maintenance. The scheme when fully matured is estimated to cost for the two age-groups 14–15 and 15–16 1,000,000*l.* annually, and when five years later the age-group 16–18 is dealt with the cost may be doubled. The movement of adult education by the W.E.A. has the full sympathy of the Council, which proposes to support it through the University of London.

Pending the re-organisation of the University of London, the system of annual grants, which amount to 46,813*l.* to the University and non-incorporated colleges, will remain as at present. By the Act of 1918 local education authorities may aid any investigation for the advancement of knowledge in or in connection with an educational institution. London, by reason of

©1920 Nature Publishing Group

the large scale of its operations, offers the most promising field in the world for research in the domain of education, which is the "key" to all original investigation, scientific or industrial, and in connection with the national movement for reconstruction. It includes the study of the mental development of the individuals to be educated and the study of the teaching methods most effective in securing that end. It is therefore proposed to encourage and aid extended educational research. The total estimated expenditure of the Education Committee of the Council for 1920–21 is estimated at 11,711,379*l.*, being for elementary education 9,351,294*l.* and for higher education 2,360,085*l.*, of which sum 5,514,206*l.* is raised from rates, or a rate of 2*s.* 5*d.* in the pound. A forecast is given of the *additional* expenditure in London arising out of the requirements of the Education Act, 1918, which will in 1920–21 amount to 116,000*l.*, and gradually increase until in 1930–31 it is estimated that it will be 3,037,500*l.*, of which sum taxation will bear half the cost, the other half being raised by an additional rate of 8*d.* in the pound on the present assessment. The report extends to 100 pages, and is abundantly illustrated by diagrams, maps, tables, and illustrations of buildings.

The Society of Chemical Industry.

THE Society of Chemical Industry held its thirty-ninth annual general meeting at Newcastle-upon-Tyne on July 13–16, this being the fourth occasion upon which the society has selected Newcastle as its meeting place. Appropriately enough, a series of papers dealing with the manufacture of coke was read and discussed at the first business meeting, whilst the second was devoted to papers dealing mainly with miscellaneous metallurgical questions. Simultaneously the Chemical Engineering Group of the society held a conference devoted to problems connected with filtration and allied methods of separating liquids from solids.

Among the first day's papers two dealt with coke-oven construction. Mr. W. A. Ward discussed "Modern By-product Coke-oven Construction" from the point of view both of the best type to be adopted in different circumstances and of the details of design of the oven itself. Mr. Ward pointed out that the generally accepted view that the regenerative oven is more efficient than the non-regenerative oven is not strictly correct, and that in either case "the surplus energy is the same, because the amount of heat necessary to coke the coal is the same. . . . The difference lies simply in the manner in which the surplus heat is made use of." He showed that it is true that the former type can generally produce a larger amount of power available for use outside the coking plant, but that this is due to the fact that the former uses the more efficient form of power generation, namely, the gas engine as compared with the steam engine. Mr. Ward remarked also that there is no reason why any one of the various types of modern coke-oven should give better results than any other. He proceeded to give much useful information on details of construction; for example, he held strongly with the advantages to be gained in most cases by compressing the coal, but advocated the use of the modern electrically driven top-charging machine instead of the machine making a compressed cake of coal, which is then pushed into the oven, and he gave short descriptions of the modern methods for quenching, screening, and loading the coke.

Mr. W. J. Rees contributed a paper on "The Corrosion of Coke-oven Walls," which he attributed mainly to the sodic chloride and sodic sulphate in the coal, and pointed but that hot, moist air carrying salt vapour has a highly corrosive action on fireclay bricks, much more, in fact, than on other refractory bricks. In the salt glazing of bricks the saline vapour is allowed to come in contact with the brick only at a temperature of about 1200° C., at which the chemical action is rapid; in the coke-oven, on the contrary, the walls of the oven never attain this temperature, with the result that the salt vapour penetrates into the interior of the brick and turns it into a weak, spongy mass, easily broken away. It would appear that the best brick for ovens carbonising salty coal is a good silica brick.

Mr. Harold E. Wright, in his paper "Coke-oven Gas for Town Supply," showed that illuminating gas can be produced more economically in the coke-oven than in the gas retort, and that, wherever circumstances permit of its adoption, the regenerative coke-oven producing metallurgical coke can supply better and cheaper gas to the town consumer than can the ordinary process of gas manufacture.

Dr. E. W. Smith, in "By-products from Coke-oven Gas," dealt with a similar subject from a somewhat different point of view, but came to the same conclusion, stating that it is only necessary to remove sulphuretted hydrogen from coke-oven gas in order to make it suitable for town supply, and that experience at Birmingham has shown that the yields of by-products from coke-ovens were just as good as from horizontal gas retorts.

Messrs. G. W. Henson and S. H. Fowles contributed a paper on "The More Economical Utilisation of the Coke-oven and Blast-furnace Gases for Heating and Power." They added numerous data and calculations to support the view which has been repeatedly put forward within recent years, that with regenerative coke-ovens built near the blast furnaces and steelworks, and with proper cleaning of the blast-furnace gases (for which they apparently prefer the Halberg-Beth method), better results are obtained in iron and steel manufacture and a large surplus of power can be generated by means of gas engines, which can supply all the power required by a modern iron and steel plant, whilst a considerable proportion of the coke-oven gas can be utilised in the melting furnace. They also suggest that a certain proportion of the electricity generated can be applied to the finishing of the steel manufacture in the electric furnace, which they consider has no competitor as an appliance for refining steel.

Amongst the metallurgical papers was one on "Some Properties of 60–40 Brass" by Prof. C. H. Desch. Such brass contains two constituents, the α solid solution containing 70 per cent. of copper and and β solid solution with 53·5 per cent. of copper; this latter constituent is plastic at high temperatures, and enables the metal to be hot-rolled, worked, or extruded. It was found in practice, however, that such brass varied greatly in the ease with which it could be machined, and the present paper deals with the reasons for such variation, which was traced to differences of structure. A fine fibrous structure was found to give the best results, and this can be obtained by using brass containing as nearly as possible 40 per cent. of zinc, extruded at a moderate temperature in very powerful presses.

Mr. D. W. Jones, in a paper on "Chemical Sheet-Lead," showed the importance of using the purest possible lead in connection with acid plant, but that in case of need copper will to some extent counteract the injurious effect of antimony and bismuth.

Mr. D. F. Campbell described "Recent Developments of the Electric Furnace in Great Britain," and showed the progress that had been made in this branch

©1920 Nature Publishing Group