Raleigh should be remembered with reference to tobacco. Its introduction was accomplished by Sir John Hawkins in 1565, and Raleigh early acquired the habit of smoking, which he succeeded in introducing to Court circles. Dr. Brushfield writes: "There can be no hesitation in affirming that Ralegh not only introduced it [tobacco] into general use in this country, but . . . was the first that brought it into fashion."

A BRITISH INSTITUTE OF INDUSTRIAL ART.

AT the Royal Society of Arts on October 28 the Right Hon. H. A. L. Fisher, President of the Board of Education, presided over a meeting called to consider a scheme for the promotion of a British Institute of Industrial Art. Mr. Fisher, in his introductory address, referred to the past history of industrial art in Great Britain, remarking that people in this country are apt to depreciate the national ability in artistic directions. What is needed is a centre to promote a closer relation between art and industry, and this the proposed scheme, which will involve the co-operation of the Board of Trade, the Board of Education, and the Royal Society of Arts, aims at providing. The chief feature of the scheme is a permanent exhibition to be held at the Victoria and Albert Museum, where representative works illustrating a high standard of British artistic craftsmanship will be shown. The exhibition should in time become self-supporting, and the nation would purchase annually a selected number of exhibits to form a permanent nucleus. The scheme also provides for a central fund to enable grants to be awarded for research and experimental work, institute scholarships, and initiate propaganda. Co-operation with the British School of Rome, with the view of enabling students to study Roman art, was proposed.

Lord Leverhulme, who opened the discussion, emphasised the importance of a shorter working day, combined with the more efficient use of machinery, in order to provide more leisure for study and artistic effort. Sir William McCormick remarked that the movement would be on parallel lines to the work of the Department of Scientific and Industrial Research, and mentioned several instances of processes—for example, the manufacture of fine porcelain—where scientific investigation and artistic effort could work in combination. Mr. Gordon Selfridge urged that a steady educational effort was needed before the public would sufficiently appreciate beautiful things to justify manufacturers in producing them. For the time being the scheme is to be administered by a representative executive committee, and it is hoped that ultimately sub-committees will be established to deal with the needs of individual industries requiring artistic talent.

CHEMICAL TECHNOLOGY AT THE IMPERIAL COLLEGE.

IN order to meet what seem to be the requirements of the post-war situation on a scale commensurate with Imperial needs, it is proposed to organise the future Department of Chemical Technology of the Imperial College of Science and Technology, South Kensington, so as to include the following four principal sections, namely:—

I.—*Fuel Technology and Chemistry of Gases, with Refractory Materials.*

(*a*) General fuel technology, and the constitution of peats, lignites, and coals; (*b*) the carbonisation of coal and wood distillation; (*c*) the chemistry of coal-tar, ammonia, and the manufacture of intermediate products from coal-tar; (*d*) the chemistry of gases and technical gas catalysis, with special reference to the new developments in the manufacture of ammonia, nitric acid, sulphuric anhydride, etc., resulting from the war; (*e*) refractory materials, clays, earths, and sands, used in furnace construction and the manufacture of ceramics, glass, and cements; and (*f*) technical analysis connected with the foregoing.

The arrangements contemplated under (*e*) would include some provision for investigating the materials used in the manufacture of *optical glass*, which it is hoped will be a useful adjunct to the new Department of Technical Optics; those under (*b*) meet the need, already felt in many quarters, of an adequate provision being made in this country for the scientific study of *wood distillation*, etc., in the interests of India and the Empire generally; and those under (*a*) will provide for an extension of the important investigations on lignites which have already been instituted in the Department during the war in the interests of the Dominions.

II.—*Chemical Engineering.*

Advanced study and investigations upon (*a*) the materials and principles involved in the design, construction, and use of plant for such general factory operations as the transportation of solids, liquids, and gases; filtration, desiccation, extraction, distillation, evaporation, crystallisation, etc.; condensing plant; the cooling, cleaning, and scrubbing of gases; the refining of solids, the concentration of acids; autoclaves and pressure plant, etc.; (*b*) the design and construction of foundations, flues, chimneys, etc.; and (*c*) factory economics and organisation. The underlying idea of this section of the Department's work is that students shall be trained in the working out of designs of commercial plant from their own notes and experimental work, including the drawing up of plans and specifications, and the organisation of factories in which the above-mentioned operations are carried out.

III.—*Electro-Chemistry.*

This section is to be developed so as to include broadly the principal applications of electricity in chemical industry, and especially to the many processes which are dependent upon the electrolytic or ionising actions of currents. These include, *inter alia*, the manufacture of caustic alkalis, chlorine, hypochlorites, etc.; "peroxidised" products such as persulphates perchlorites, permanganates, etc.; also white lead, and such metals as sodium, magnesium, aluminium, calcium, etc. Also many organic substances are nowadays made by electrolytic "reduction" or "oxidation" processes.

The value to this country of such processes has been emphasised by the experience of the war, and it is more than ever important for the well-being of our chemical industries that no time should be lost in developing at this college a sub-department in chemical technology for the special study of them.

IV.—*Technology of Carbohydrates, Fats, Oils, and Rubber.*

The selection of the subjects to be included under this section has been largely influenced by two considerations, namely:—

First, the already large provision (*a*) in Manchester, Leeds, and Huddersfield for advanced study and research upon dyes and tinctorial chemistry, as applied to the great textile industries of the country; (*b*) in Leeds and in London in connection with the leather

industries; and (*c*) in Birmingham in respect of the fermentation industries; and, secondly, the lack of any really adequate provision in this country for the needs of equally important branches of industry which depend upon the extraction and refining of certain well-defined groups of natural (and chiefly vegetable) raw materials.

The technology of the following groups of natural products has been selected because of their increasing economic importance, and of their close relationships with the work already developed in the botany department. It can scarcely be doubted that the study and investigation of their chemical properties, treatment, and uses in the Department of Chemical Technology will constitute an important link, not only with the work of the botany department, but also with the economic development of the vegetable resources of the Empire, on which grounds their adoption by the college may be urged as specially appropriate. The products in question are as follows:—(i) Celluloses, sugars, starches, gums, dextrins, and resins; (ii) animal and vegetable oils and fats, and the manufacture of glycerine, soap, and food products (*e.g.* margarine) therefrom; and (iii) rubber and similar materials.

Industrial Connection.

In the development of the foregoing scheme as a whole, emphasis is to be laid upon the importance of everything possible being done, both now and in the future, by way of establishing and extending connection between the various sections of the Department and the industries which they are severally designed to serve. The Department will also keep in close touch with the various organised efforts that are now being made to solve general industrial and economic problems by co-operative investigation and research.

The additional financial requirements for the important developments outlined above are estimated at 100,000*l.* for buildings and equipment, and not less than 10,000*l.* a year for maintenance and working expenses.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

LONDON.—The following doctorate has been conferred by the Senate:—*D.Sc.* (*Engineering*): Mr. Miles Walker, an external student, for a thesis entitled "Supply of Single-phase Power from Three-phase Systems."

TEACHERS have hitherto exercised but little influence on the public educational systems of this country. But if the public authorities that control this education are to exercise their growing power to the best advantage, they can scarcely do so without the increasing help of the teaching profession. The Teachers' Registration Council—"representative of the teaching profession"—was established in 1912. During its short life it has rendered valuable service to English education by preparing a register of teachers and by providing a teachers' parliament. But if the teaching profession is to take an effective part in directing a new national system of education, it can best do so by co-operating with the existing authorities on the lines indicated by the Whitley report. The initiative will probably have to come from the teachers. The Teachers' Registration Council can provide their side of the "Joint Industrial Council," but provincial councils of teachers are needed to provide their side of the "district councils." Accordingly a new step has been taken by the formation, at a meeting held in Manchester on October 26, of the first provincial council, representative of the teaching profession in Lancashire and Cheshire. The council consists of two representatives of each of the Universities—Manchester and Liverpool—and of the teachers' associations in these counties. It is anticipated that other provincial councils will quickly be set up elsewhere. Their establishment throughout the length and breadth of England will not only enable the teachers to exercise a profoundly beneficial influence upon the organisation of local education, but also be the means of securing a greater measure of life and liberty for the teaching profession.

SOCIETIES AND ACADEMIES.

LONDON.

Optical Society, October 10.—Prof. Cheshire, president, in the chair.—T. Y. **Baker**: Sources and magnitude of centring errors in a sextant. A centring error in a sextant is ordinarily due to the sextant being placed eccentrically on the dividing engine. In order to comply with the National Physical Laboratory's "A" class certificate, it is necessary that this eccentricity should not be such as to produce errors in the reading exceeding 40 seconds. This condition is satisfied provided the scale-centre lies within a certain ellipse the centre of which is the mechanical centre of the instrument,, and the axes of which lie one along and the other at right angles to the line of the middle reading. The semi-axes of this ellipse for a 7-in. sextant reading up to 120 are 5·2 mils and 0·7 mil respectively, but the former figure needs reduction to about 3 mils in order to allow of the vernier not reading "long" at the two ends of the scale. The customary practice of sextant-makers has been to readjust the position of the mechanical centre after the instrument has had the scale engraved. The workshop method of testing whether such readjustment is necessary is customarily the method of trying the length of the vernier against the scale at different points along the arc. The author showed that this method is not a sufficiently delicate test for the purpose of complying with the "A" certificate. An alternative method was described, in which the correctness or otherwise of the centre is determined by the tracing of a mark engraved upon the vernier against a circular arc cut from the same centre and at the same time as the marking of the scale. This method is being adopted by the Admiralty, and is already embodied in their specification for cadets' sextants.—T. **Chaundy**: Astigmatism: interchangeability of stop and object. For an object at O and a stop at S on the axis of an optical instrument, the astigmatism (*i.e.* astigmatic separation divided by the square of the height of the object) is to least order

$$\mu(1-\mathrm{FO.FS}/f^2)/\mu'.\mathrm{SO},$$

together with a quantity symmetrical in O and S. The planes of stop and object may thus be interchanged without change in value of the astigmatism if $\mathrm{FO.FS}=f^2$. In this case, with like end-media, F′, S′, O′ (the images of F, S, O in the instrument) are symmetrically placed with respect to F, O, S. In particular, an object at one focus and a stop at the other are interchangeable. The astigmatism in this case is unaltered by reversal of the instrument; its consequent convenience in calculation is pointed out. In particular, all the primary aberrations may be determined by differentiation of its expression in terms of the powers and separations of the system.

Royal Microscopical Society, October 16.—J. E. **Barnard**: A new illuminant for microscopical work. Note on the reports of the Medical Research Committee on the standardisation of pathological methods.