

A New Approach to School Mathematics

WITH the re-classification of secondary schools in Great Britain under the new Education Act, there is an urgent need for the complete overhaul of the curricula of these schools. This is especially true in the case of mathematics, evidence of which is to be found in the recent reports on school certificate mathematics (Conf. Exam. Bodies and Teachers' Associations, 1944); on the teaching of mathematics to physicists (Mathematical Association and the Institute of Physics, 1944); and on sixth form examinations in mathematics (Cambridge Joint Advisory Committee for Mathematics, 1945). In suggesting an alternative syllabus to those in operation at present, the first-named report makes the significant remark: "The whole syllabus is inspired by a desire to bring mathematics more closely in relation with the life and experience of the pupil". Herein lies the kernel of the question, and it is symptomatic of the dissatisfaction felt at the existing courses, which are largely dominated by the syllabuses of the examining authorities. With approximately four-fifths of the pupils now leaving secondary schools at school certificate level, the huge gap between examination mathematics and the essential needs of after-school life calls for some fundamental change. The need for a fresh approach to the mathematical curriculum has been ably dealt with by Mr. C. T. Lear Caton in his presidential address to the Midland Branch of the Mathematical Association (*Math. Gaz.*, July 1945), and his advocacy "to replan the mathematics courses in all types of schools to fit in with the new educational structure and to contribute more effectively to the needs of the post-war world" sums up very concisely the case for immediate reform.

In Britain, the logical process of making necessary basic changes in established systems is traditionally slow; but the second great world war has shattered many of those systems so that progressive action is urgently imperative. The late Sir J. J. Thomson ("Recollections and Reflections") tells of a student who only learned to respect mathematics because of its application to billiards! This interesting case typifies the need for emphasizing the outward aspect of the subject and provides the clue to the guiding principle for reform. The problem, however, is far from easy, for it will obviously be dangerous to swing over to the other extreme by rejecting all that has no relation to what Sir Percy Nunn calls "the world of outer realities lying in time and space" ("The Teaching of Algebra"). On the other hand, there is little reason in placing a canopy of alleged difficulty round such a topic as infinite series when they hold the very key to the method of calculating tables, about which most students are so inquisitive. Indeed, the whole trend of any movement towards an intelligent reformation must be directed with much understanding, mature knowledge and an absolutely unbiased outlook.

Quality Control in Business

A SERIES of six articles by Mr. William B. Rice on quality control in business production and administration have been separately reprinted from *Western Industry*, the *Journal of the American Statistical Association* and the *Accounting Review*, and provides a useful introductory account for anyone interested in the application of statistical methods in business. Mr. Rice, who is the director of the Department of

Statistics and Reports of the Plomb Tool Company of Los Angeles, writes with first-hand experience of the methods he describes and drives home his points with a wealth of practical illustration. The first four of his articles deal with the control of quality of a manufactured product on fairly familiar lines—an expository presentation which should do much to arouse interest among manufacturers. In the remaining two he extends the technique to business administration and office accounting, showing, for example, how excessive overtime costs in a department of an engineering plant were tracked down and eliminated, and how administrative charges in a business were brought under control. This is quite a recent development of the subject, and provides an interesting illustration of the growth of scientific methods in the most ordinary commercial operations.

The statistical theory required in quality control is comparatively elementary; but the most striking successes have been obtained by introducing it into factory production processes. In some cases the methods amount to little more than a systematic sampling of the product and a graphical presentation of the results; and yet they appear to lead to the tracing of sources of trouble in the manufacturing process with an efficiency which astonishes nobody more than the men who have had years of experience on the job and are naturally inclined to think that they have nothing more to learn about it.

Nutritive Values of War-time Foods

DIETARY surveys of the population which are being carried out by the Ministries of Food and Health have created a demand for food-tables giving, for raw foods, values for proteins, fats and carbohydrates and for the relatively small number of minerals and vitamins most likely to be deficient in human diet. Values for the composition of many foodstuffs consumed in war-time were not available in existing tables, and the differences between the values for war-time and peace-time foods are often very great. The Medical Research Council War Memorandum No. 14 now sets out "Nutritive Values of Wartime Foods" (Tables compiled for the Accessory Food Factors Committee. London: H.M. Stationery Office). Numerous analytical data, published and unpublished, have been considered in selecting the representative values in these tables. Many individuals have been consulted and have provided valuable data and advice. The values, including those for waste, are based for the most part on the results of direct analyses carried out during recent years in Britain. Such values were not always available, particularly for the vitamins, and it was necessary to make a selection from the values in the literature, distinguishing carefully those foods the composition of which had not been affected by the War. The losses during cooking are variable, affecting vitamin C severely, vitamin B₁ to a less extent and vitamin A probably still less. For processed foods, an allowance for loss of vitamins by destruction during cooking has been made in the tables.

Control of Weeds by Spraying

Loss in yield of cereal crops from competition with annual weeds is more serious than is generally realized, and gains of more than 50 per cent can often be expected as a result of correct spraying with a selective weed killer. Advisory Leaflet No. 315, *Weed Control in Cereals*, issued by the Ministry of Agriculture,

gives much useful information on the subject. Up to the present, sulphuric acid has proved to be the most effective chemical for the purpose, as it kills a wide range of weeds and is quick acting even in dull weather. Its highly corrosive properties, however, make it difficult to handle; so copper chloride and dinitro-ortho-cresol (D.N.O.C.) are suggested as alternatives. Directions for the use of all three substances are given, and comparison made between the concentrations of spray required in each case for the eradication of a number of common weeds. As regards time of spraying, rather more latitude is possible with copper chloride and dinitro-ortho-cresol than with sulphuric acid, which kills weeds only in the seedling stage, but usually the acid has a slight advantage if the weather is cold and dull. Full instructions are given in the use of these spray materials, and any precautions necessary for the protection of the operator or care of equipment clearly mentioned.

West of Scotland Field Studies Council

In 1944 members of the Glasgow and Andersonian Natural History and Microscopical Society, including Dr. Inglis Cameron, carried out preliminary work which resulted in the inauguration in April 1945 of the West of Scotland Field Studies Council. On the Council are representatives of youth organizations, scientific societies, colleges and the University of Glasgow. Prof. Balfour Brown and Prof. C. M. Yonge, who have connexions with similar organizations in the south of Britain, are also on the Council. The Council is mainly, but not exclusively, concerned with the popularization of field studies. Its membership is widely representative, and includes amateur and professional naturalists, educationists, representatives of the Scottish Youth Hostels Association, Boy Scouts, etc. Its constitution provides it with useful powers of co-option. The Council is anxious to get in touch with other organizations of a similar nature, so that some type of co-operation may be established and there may be a free exchange of ideas. It has already set up panels of lecturers and outdoor guides, and is considering the preparation of guide-books to the natural history of the west of Scotland. The chairman is Prof. John Walton; the honorary secretary is Dr. T. Gregory Absalom, Art Galleries and Museum, Kelvingrove, Glasgow, C.3, to whom communications should be addressed.

Durban Museum and Art Gallery

In the annual report for 1943-44 of the Durban Museum and Art Gallery, it is reported that their position as institutions of visual education and aesthetic enjoyment has been well maintained; but reference is made to the now common need among museums in all parts of the world for further and more suitable accommodation. Besides the usual routine work, many public lectures were given in the Museum and Art Gallery throughout the year, and there was much activity in connexion with the school services. The showing of educational films evidently takes a prominent place in these services. In reference to adult education, it is of interest that the South African Minister of Education appointed a committee to inquire into, and report upon, the part played by the Museum and Art Gallery in this realm of their activities. One of the photographic plates in this report depicts an interesting group of carved stone figures entitled "Baya Huba", by Mary Stainbank; this was recently acquired by the Art Gallery.

Biochemical Research Foundation of the Franklin Institute

In Reports of the Biochemical Research Foundation of the Franklin Institute (7; 1942-43), stress is laid on the importance of co-ordination of the sciences of physics, chemistry and biology. By this means it is often possible to obtain a comprehensive view of a problem, whereas the isolated methods of the past would only come to an *impasse*. There are more scientific trained personnel in this Institute than in almost any college, and, free from the burden of teaching, all are co-ordinated and organized towards the special end. Direction of research towards certain projects is thus possible, and groups of scientific workers of varied character together with apparatus of unique quality are brought to bear on the elucidation of any problem. An example of this type of group co-operative work is the successful separation by physico-chemical methods followed by biological study of certain surface antigens of the typhoid bacillus having high immunizing powers without any great degree of toxicity.

Announcements

MR. ROY INNES has been appointed general secretary of the Association of Scientific Workers. Mr. Innes took a degree in mathematics and physics at the University of Manchester in 1937. For a time he was a science teacher, and in 1939 entered the newly formed Operational Research Section attached to Fighter Command, R.A.F. He succeeds Mrs. Reinet Fremlin, who has been with the Association for eight years.

AN open meeting to discuss "Social Security for Chemists" has been arranged by the London Section of the British Association of Chemists. It will be held at the Assembly Hall, Royal Empire Society, Northumberland Avenue, at 6.30 p.m. on September 19.

Voks Bulletin No. 6, of the U.S.S.R. Society for Cultural Relations with Foreign Countries, includes a tribute to Mendeléeff, by M. Pervukhim, People's Commissar of the Chemical Industry of the U.S.S.R., in connexion with the seventy-fifth anniversary of the discovery of the periodic law, and an article by the late A. Fersman, of the Academy of Sciences of the U.S.S.R., on the periodic law and its significance for natural science, in which its bearing on geochemistry as well as on cosmic processes and theoretical chemistry generally are considered.

THE following appointments have been made in the newly formed Department of Animal Health at the University College of Wales, Aberystwyth: Mr. R. Phillips, formerly senior lecturer in agriculture, to undertake research in animal husbandry and the administration of investigational centres; Dr. W. C. Evans, at present biochemist to the Inoculation Department, St. Mary's Hospital, London, to be special lecturer in biochemistry; Mr. E. Parker Pollard has been seconded by the Cooper Technical Bureau for research in parasitology; Mr. D. N. Fidler, to be research assistant (animal husbandry); Mr. R. A. Evans, at present of Crooke's Laboratories, and Mr. A. W. Davies, formerly of the Dunn Nutritional Laboratory, Cambridge, to be research assistants (biochemistry); Mr. T. R. Thomas, Carmarthen, to be consulting veterinary surgeon.