

are passing: in physical problems such as the coping with the bodily changes of adolescence; emotional problems such as those arising from the development of sexual interests and urges; and social problems such as those of the relations between the young people and their parents, between young men and young women, and between the individual and society.

The age-range covered by youth service is one in which young people are very interested in the development of physical fitness, strength, agility and grace; and any plans for health education should take full advantage of this interest. The keen desire to make oneself attractive to other people provides a very valuable opportunity for education in the care of the body generally and perhaps particularly in the attainment of grace and poise and in the care of the hair and complexion.

The period of adolescence is also one in which it is essential to give some training for approaching maturity. Examples of such training are marriage preparation, parentcraft, home economics, and instruction in the measures needed for the maintenance in full health of the individual, the family and the community.

It is clear that in most youth organizations very little will be possible in the way of systematic courses of instruction. Young people in their leisure hours wish for recreation, and lectures should be arranged mainly in response to demands made by the members themselves. The skilful teacher will be able to stimulate such demands—often as a result of informal discussions which make clear the need for further information on specific topics—and lectures which have been requested by the members are likely to be given much more attention than would have been the case had they been forced on the members by the leader.

But while it is true that the atmosphere and practice of the educational system will be a vital part of health education throughout, this is pre-eminently true of the youth organizations. The whole routine of the club—activities, toilet arrangements, concern for the cleanliness of premises and equipment, insistence that habits acquired in the organization are for everyday use and not 'for club night only', personal relationships between leaders and members and between one member and another—is of the utmost importance. Thus the encouragement of camping, rambling, youth hostels, etc., as well as the more formal type of physical recreation, is an essential part of health education.

The extent to which health education will be carried out in youth organizations will depend largely upon the degree to which the leaders are themselves educated, able to colour the whole life of their organization, and able and ready to stimulate and respond to demands for information. In addition, therefore, to those qualities of personality which are essential to any successful youth work, all leaders should be alive to the need for and the possibilities of health education, should themselves have a positive attitude to health and should have that necessary minimum of basic factual knowledge which will enable them to plan their programmes in the best way.

Moreover, each club or group of clubs should have at least one leader specially qualified in health education. This person might in many cases be the physical recreation instructor, in other cases the instructor in first aid and home nursing or allied subjects.

Ideally, too, each club would have a medical adviser—who would be available to advise the youth leaders and the young people upon matters within his province. It must be recognized, however, that this ideal will not be attained for a long time ahead, and it is therefore all the more important that meanwhile there should be a corps of fairly highly trained youth leaders (each of whom might serve a group of clubs) who, while naturally not attempting to carry out the work of a medical practitioner, would nevertheless be able to give the organizations covered by them skilled help and advice on the principles of healthy living. The Central Council for Health Education is able to give local authorities help in training youth leaders to carry out this work.

No amount of training will make good leaders out of poor material; but native abilities and aptitudes may be reinforced by courses of instruction. In the organization of such courses the Central Council for Health Education again can give considerable help, and indeed, regards the training of youth leaders as one of its most important tasks. It has already held many such courses and is developing co-operation with the Central Council of Physical Recreation so that theory and practice may march together.

In this connexion, it is worth considering the institution of a certificate in health education along lines somewhat similar to that in physical recreation, awarded at present by the Central Council of Physical Recreation. Youth leaders, like other students, are the more likely to give serious study to a matter when they are working for a test, and have a natural desire for some documentary evidence of the standard they have attained. The Central Council for Health Education hopes to discuss with the Board of Education and its Youth Advisory Council the desirability of such a certificate and the terms upon which it might be awarded to persons judged suitable from other points of view.

While it is true that the best youth leaders can do excellent work even in a very poor environment, it is equally true that a general high standard of achievement depends upon the availability of adequate accommodation and equipment. Club premises which, with proper cloakroom, lavatory and toilet accommodation, will reinforce, not contradict, health teaching; physical recreation apparatus, playing fields, camping sites, swimming pool, youth hostels—these are the basic material requirements. There is also particular need for a permanent residential school, with attached model club, in which, throughout the year, youth leaders from all parts of the country may gather for training and refresher courses, of which the theory and practice of health education should form an important part.

THE PHILOSOPHY OF RESEARCH

THE American Philosophical Society arranged a symposium on the "Organisation, Direction and Support of Research" for its autumn meeting, held during November 19–20, 1943, and the papers presented have now been published (*Proc. Amer. Phil. Soc.*, 87, No. 4, January 29, 1944). Together they constitute a notable contribution to the philosophy of research, dealing on the whole with strategy rather than with tactics, and though concerned primarily with American conditions, they are highly relevant to the present discussions in Great Britain on the

organization of research, the functions of the universities, the relations between teaching and research and like problems.

The first paper, Dr. J. B. Conant's Franklin Medal Lecture on "The Advancement of Learning in the United States in the Post-war World", well illustrates the general validity of the symposium. Free inquiry, he points out, is the necessary condition for the advancement of learning in any age, but while welcoming the debate between the schools of Bernal and Polanyi on the planning of science, Dr. Conant urges that relevance, not utility, should be the touchstone: in each area of the entire field of learning, the activities under way must be manifestly relevant to the future of our civilization. Following the argument of Francis Bacon, he reminds us that we must not mistake the mere acquisition of information for an advance in knowledge, and strikes a note of caution about our understanding of the scientific method and its limitations which recurs frequently in the symposium. Only in situations where value judgments can be eliminated from the frame of reference are methods comparable to those used in the advancement of knowledge really applicable, and yet the difference between disciplined and well-informed judgments, involving values on one hand and on the other extravagant and ignorant opinion, marks the boundary between civilization and barbarism. Developing this distinction between accumulative knowledge and philosophy, Dr. Conant refers to the confusion between what is social science and what is social philosophy. He believes that, like the service of social science and the practice of the arts of democratic government, they are vocations which cannot be combined. A major share in both advancing learning and fostering philosophy will be the responsibility of the universities, though research institutes will play an important part, and whether or not professional education is combined with research, it is essential that our intellectual leaders be in close contact with the most promising youths of the oncoming generation. We need not organize institutions of higher education into a hierarchy; but we must make it an ambition of the people to foster the spirit of free inquiry. The unity of the world of pure learning is based, not on a common method, but on a common dedication.

Prof. H. S. Taylor's paper on "The Organisation, Direction and Support of Research in the Physical Sciences" covers more the problems considered in such reports as those of the Parliamentary and Scientific Committee on "Scientific Research and the Universities". After reviewing briefly the research structure in the United States, in Great Britain and in the U.S.S.R. and commenting on the relation between research and education—the immense needs for technological and scientific training must be balanced by competent education in the liberal arts and humane studies—he asserts that the problem of direction of research is a problem of personnel and is resolved when a competent director is found. The body responsible for such selection should consist primarily of scientific men, and breadth of interest within that body should help to promote wisdom of choice. In regard to the support of research, he points out that research workers and directors have local responsibilities which, if recognized, might well broaden the bases from which private support of research might come. As regards the support of fundamental research by industry, he looks to the prosecution of fundamental studies in research institutes, co-operatively sup-

ported, and concerned also with the dissemination of research information and the training in methods of research of specially selected personnel at the graduate student level for future positions of responsibility within the industry. Speaking of State and Government support of fundamental research, Prof. Taylor insists that scientific men must be masters in their own households; the processes of mutual co-operation and assistance among the individual sciences must be multiplied, and the isolation of one science from another must progressively diminish.

In his paper "The Discovery and Interpretation of Biological Phenomena", Dr. W. Bronk, like Dr. Conant, and Marjorie H. Nicholson in her subsequent paper on "Merchants of Light: Scholarship in Arts and Letters", draws fresh inspiration from Bacon, and discusses more particularly the influence of scientific societies and institutes on teaching and research. He stresses the need in our teaching for more concern with the generalizations and relationships of science, more attention to the analytical processes, and less to the description of phenomena, particularly in training biological investigators, and pleads for clear thinking about the impediments which certain of our scientific compartments offer to effective research, and the limitations they impose on the character of the training we give our future investigators.

No summary could do justice to this suggestive address, which is practical rather than philosophical, and much the same must be said of Alan Gregg's "A Critique of Medical Research". This is somewhat more philosophical and is concerned primarily with the strategy of medical research. Commenting on an important point made, for example, in the last annual report of the Carnegie Corporation of New York, that research funds are increasingly earmarked for specific purposes by the donors, so that experience in selecting research problems and projects is on the whole too infrequent in the medical schools, he insists that the right of choosing the subject to be studied, of planning and performing some crucial experiment, belongs not to the donor or the administrator but to the investigator himself. The essential pre-occupation of wise administrators is to create and to foster the circumstances, the human relationships, in which gifted men will be most productive and prodigal of their gifts; and besides the creation of fluid research funds Dr. Gregg suggests that the creation of readerships, or posts of equal pay and tenure to professorships, but without the traditions or connotation thereof, is urgently needed to correct that characteristic of American research in which ability in research is neutralized, sterilized or otherwise wasted by the existing demands of administration and teaching. As to probable directions and characteristics of medical research in the next few decades, he instances the study of the effect of differences of environment on genetically similar organisms, genetics, biophysics and chemotherapy.

Dr. K. K. Darrow, in much the shortest paper, contributes a few crisp comments including a defence of the present system; while much the longest paper is that by H. A. Innis on "Political Economy in the Modern State". This is a major contribution to the debate to which Prof. F. Hayek's "The Road to Serfdom" has recently contributed in Great Britain, and Mr. Innis's extensive quotations from Mark Pattison may well set the contestants searching that writer anew. This sound philosophical paper has its place also in the discussion on the place of the universities

and their functions, and in Roy F. Nichol's paper on "War and Research in Social Science", Prof. R. L. Schuyler's paper on "War and Historiography" and Marjorie Nicholson's paper, there are stimulating comments and contributions to the fundamental thinking and philosophy on which alone the wise organization and direction of scientific research can be based.

OBITUARIES

Prof. W. E. H. Berwick

WILLIAM EDWARD HODGSON BERWICK, who died at Bangor on May 13, 1944, was professor of mathematics in the University College of North Wales from 1926 until his retirement, due to ill-health, in 1941. The title of emeritus professor was then conferred upon him by the University of Wales.

Berwick was born at Bradford on March 11, 1888, and was educated at Bradford Grammar School and at Clare College, Cambridge, of which he was a scholar from 1906 until 1910. He was bracketed Fourth Wrangler with C. G. Darwin and G. H. Livens in the Tripos of 1909 (the last year of the order of merit). In 1910 he was placed in the first class of Part II of the Tripos, and he was a Smith's Prizeman in 1911. His mathematical distinction was later recognized by a fellowship at his old College (1921-24) and by a Cambridge Sc.D. in 1925.

After two years as assistant lecturer at Bristol, Berwick went to Bangor as assistant lecturer and afterwards lecturer. Here he remained until 1920, except for two years spent in the anti-aircraft experimental section of the Munitions Inventions Department. At Bangor he had a congenial colleague in G. B. Mathews, who for many years had been almost the only worker on number-theory in England. From Bangor, Berwick went to Leeds, as lecturer and afterwards reader in mathematical analysis.

He was appointed to the chair at Bangor in 1926. Shortly after this, his health began to deteriorate, but he struggled with great courage and fortitude, against increasing disabilities, to continue his teaching work and research.

Berwick's mathematical activity was concerned entirely with number-theory, the theory of equations, and topics arising out of them. His main publication was a Cambridge tract, "Integral Bases", in which he developed methods for determining an integral basis for any algebraic number-field. In particular, such a basis is determined for the field defined by $\sqrt[n]{a}$. This required the discussion of twenty-three separate cases, depending on the nature of the common factors of n and a . The tract is a substantial contribution to algebraic number-theory, and it exhibits Berwick's interest in, and remarkable talent for, difficult enumerations and calculations. This talent was also shown in his calculations dealing with the complex multiplication of the elliptic functions.

Berwick also edited a second edition of Mathews' tract on "Algebraic Equations", to which he added appreciably. He published a number of original papers on complex multiplication and on the resolvents of quintic and sextic equations. He gave a good exposition of the latter subject in a lecture to the London Mathematical Society (printed in the *Journal*, 3; 1928).

Prof. Berwick leaves a widow, to whom all sympathy is due. H. DAVENPORT.

We regret to announce the following deaths:

Lieut.-Colonel L. F. Goodwin, professor of industrial chemistry and chemical engineering in the Queen's University, Kingston, Ontario, on August 15.

Prof. G. F. Stout, during 1903-36 professor of logic and metaphysics in the University of St. Andrews, on August 18, aged eighty-four.

NEWS and VIEWS

Mathematics at Bedford College, London:

Retirement of Prof. Harold Simpson

PROF. HAROLD SIMPSON retires from the chair of mathematics at Bedford College, University of London, at the end of the present session. After a distinguished career at Oxford and a short period at Bangor, North Wales, he became head of the Mathematics Department at Bedford College in 1907 and was appointed professor there in 1912. Prof. Simpson has contributed many important articles on various topics to mathematical and scientific periodicals; in addition, he has written four valuable books. (These have appeared under the name Hilton, which Prof. Simpson gave up in 1939.) The first of these, on "Mathematical Crystallography", appeared in 1903, and his interest in this application of mathematics continues; he has served on the council of the Mineralogical Society on various occasions since 1908 and often attended the meetings of the Geology Section of the British Association. His next books, on "Finite Groups" (1907) and "Homogeneous Linear Substitutions" (1914), are in certain respects an almost essential complement to his first, having regard to the state of algebraic knowledge in Britain at the time. His other book, "Algebraic Plane Curves" (1920, 1932), is well known both to teachers and to

students. Prof. Simpson has served on the council of the London Mathematical Society since 1915 and has been librarian since 1925.

Prof. Simpson played a very active and useful part in the affairs of the University of London. In particular, his colleagues will remember the skill and patience which he exercised in dealing with the business of the various committees with which he was concerned. Many hundreds of students of Bedford College will remember with gratitude his exceptional ability as a teacher; his sympathetic and understanding nature was particularly apparent to those students not so gifted in his subject, but all regard him with affection. Outside his own subject and in addition to his interest in geology, Prof. Simpson was deeply interested in architecture and in music. Students at Bedford College will remember the excursions he organized for them to various centres of architectural interest and his activities with them in the College Musical Society.

Appointment of Dr. W. N. Bailey

DR. W. N. BAILEY, Richardson lecturer in pure mathematics in the University of Manchester, has been appointed to the University chair of mathematics at Bedford College, London. He is perhaps