THE PRESENT OUTLOOK IN ARMY EDUCATION

By Major-General CYRIL LLOYD, C.B., C.B.E., T.D.
Director of Army Education

THE experience gained by Army educationists between 1920 and 1939, the story of Army education during the Second World War and release period, together with the broad principles of post-war development, have been the theme of previous articles (*Nature*, **158**, 775, 821, December 1946). The contrast between the condition of education in the Army after the First World War and after the Second is clearly marked. It is the difference between the newly formed Army Educational Corps struggling against apathy, suspicion and even hostility, and a Corps recognized as an integral part of the national system and a pioneer in the field of further education.

The educational obligation of Service authorities has been defined in the National Service Act of 1947, in which a direct cross-reference to the Education Act of 1944 establishes the full responsibility of the Army to provide further education for all service personnel and to co-operate to the full with all local education authorities to ensure adequate facilities for that education.

The issue of Army Council Instructions authorizing the implementation of a definite plan for Army education which shall supersede that of the release period brings to maturity a scheme which has been in process of preparation for nearly two years. Each stage of the plan has been considered and endorsed by the Army Education Advisory Board under the chairmanship of Sir Philip Morris. The general plan has been designed to meet the educational needs of the peace-time Army and to form an integral part of its training and working programmes. The present transitional stage between the Army Education Scheme for the release period and the greater development towards this post-war scheme is to be known as the interim period.

The object is to provide for the soldier that which is required, educationally, to improve him both as a soldier and as a citizen and to meet his needs as an individual. As part of the national system, its aim is integrated as closely as possible with civilian education, and care has been taken to weld into the scheme provision for both the national service man and the regular soldier. Hitherto the machinery of the Central Advisory Council for Adult Education in H.M. Forces has been instrumental in securing civilian assistance for Army education. Negotiations are now proceeding which will, it is hoped, secure the continuance of this valuable work on a basis suited to the conditions of the peace-time Army on one hand and civil education on the other. Arrangements have also been made with the Ministry of Education for His Majesty's inspectors to co-operate in an advisory capacity with the military inspectors of the Directorate of Army Education, thus placing their experience and knowledge at the disposal of the Army.

The main types of education which will be provided are described as (*a*) general education and (*b*) individual education. The vast majority of the men and women entering the Army are catered for by general education. The soldier must first acquire that fundamental knowledge without which he can be neither an efficient soldier nor a satisfactory citizen. For the first six weeks he will receive instruction for two hours a week in current affairs and citizenship; thereafter time will be increased to three hours weekly, and English, mathematics, history/geography and general science will be added to the curriculum. Courses will be graded in three standards and there will be variations and exemptions for men above average, who will be catered for in ways appropriate to their particular educational needs. At the end of a year's service the national service man will leave the Army; but the regular soldier who remains will continue this work for four hours weekly during a further twenty-four months, after which only current affairs and citizenship will be compulsory, though he may continue his education in working time if he so desires.

The syllabuses are progressive, and these, together with specimen tests of attainment, are to be found in the General Education Handbook. This Handbook was designed for the use of instructors and, used with flexibility and careful selection, it will provide a guide for the establishment of a continuous liberal course of study. The approach in all subjects is adult and is based on the experience and interest of the individual.

General education will be carried out in working time; its counterpart, individual education, will be done in the soldier's off-duty hours in unit classes, educational centres, and Army colleges, under arrangements made with civilian education or by means of the War Office Correspondence Course Scheme. The soldier may undergo courses or pursue activities either to improve his prospects in civil life, or to satisfy his cultural needs or his desire for profitable leisure-time employment. An important aspect of individual education will be the resettlement education of the regular soldier and the development of a resettlement advice service. These activities are additional to continuation studies for those individuals who have reached the standard of School Certificate or other equivalent examination and whose guided reading periods will be catered for by the unit or higher formation reference libraries.

Men of exceptionally low standard will, immediately after enlistment, be given a special full-time course at a preliminary education centre to fit them to join the main stream of general education at a later date. The Royal Army Educational Corps has had considerable experience in combating the problem of illiteracy and as a consequence has evolved practical methods which, combined with sympathetic attention to the personal needs of each individual, have been found to produce a remarkable improvement in the reading age and general attitude of the backward adult.

The scheme will be staffed by full-time Royal Army Educational Corps instructors on an overall scale of one per 240 men, assisted by part-time instructors provided by units. The work of instructors will be supervised by R.A.E.C. officers, of whom one will be allotted to every 2,400 men. Each supervising officer will act as a travelling headmaster, exercising control over the work of instructors in a group of units. The smoothness of administration and organisation of the Corps is the duty of the R.A.E.C. staff officers provided in the War Office and on headquarter staffs. In the unit it is the commanding officer, with the assistance of his unit education officer, who is responsible for the educational progress of his men, and only through his co-operation can any plan succeed. The regimental officer is responsible for conducting discussions on current affairs and will always be chairman of such discussions.

Many of the present R.A.E.C. instructors are young in experience and, although graduates and trained teachers are to be found within their ranks, it will take time to build up a corps of instructors with a predominance of experienced and academically qualified personnel. The other major difficulty which only time can resolve is that of ensuring continuity of instruction. This will only be fully achieved when the Army as a whole becomes more stable in composition, so that the soldier's service is spent in two or three units at most. Despite these limitations, certain aspects of the plan are already in operation and working well; notably, perhaps, the work with illiterates at preliminary education centres. Here the adult approach through activity is reviving and stimulating interests and skills which have in some cases been dormant for years and in others barely existed. Much valuable work is also being done in the initial stages of the soldier's service, both in the special attention paid to current affairs and citizenship during basic military training, and in the care with which, before being sent overseas, the soldier is briefed as to conditions in the theatre to which he will go and in the historical, geographical and cultural background of the countries concerned. In this latter connexion, a comprehensive series of teaching aids in the form of posters, study briefs, films, film strips, exhibitions, etc., has been prepared and is already in production. In the case of more advanced students, too, there are indications that both unit and centralized library facilities are being used, there is an encouraging demand for correspondence courses, and in many areas civilian resources are being used to the full.

Stated simply, Army education shows to serving men and women how they fit into society as soldiers and citizens, and indicates how individual experience and self-expression may best contribute both to the development of the individual and to the common good. It is not only the future of the Army which is staked upon the training of young service men and women; as the result of their service experience they should return to the civilian community better informed, more self-reliant, in better shape physically, and better equipped both for work and play. In this process it is the task of Army education to give the soldier something which he will recognize as being of permanent value whether he thinks of himself primarily as a worker, as a citizen, or as an individual.

STRUCTURE AND PHYSICAL PROPERTIES OF METALS

THE autumn meeting of the X-ray Analysis Group of the Institute of Physics, held in Birmingham during November 20–21, 1947, was devoted to metals and alloys. The place of X-rays in their study was put in proper perspective: in some of the researches described they provided the main method of attack; in others they were subsidiary.

Dr. W. H. Taylor opened the first session by giving a general account of transformations, referring to the importance of the study of simple alloys as a basis for the study of the more complicated commercial ones. He instanced the order–disorder transformation, and pointed out that X-ray methods permit the study of long-range order, whereas the relationships between near neighbours are physically more significant. The use of crystal-reflected radiation may overcome this disadvantage by allowing changes in background scattering to be observed before ordinary superlattice lines appear[1].

Dissociation has also been studied[2] in the alloy Cu_4FeNi_3. X-ray powder-photographs show 'ghosts' at the sides of the main diffractions, and these are interpreted as evidence of a pseudo-periodic structure due to the incipient dissociation into two phases of similar structure.

A still more detailed investigation has been made of duralumin[3]. Streaks on Laue and oscillation photographs of a single crystal were ascribed to the segregation of copper atoms on sheets parallel to the (100) planes; the break-up of these streaks into spots showed that a metastable structure, $CuAl_2$, was forming, 'keyed' to the main lattice; this structure finally transformed to the stable $CuAl_2$ phase. Thus the changes occurring in age-hardening have been followed in great detail by means of X-rays.

Dr. H. Lipson gave an account of recent work on the alloy $AuCu_3$. Alloys of this type can have a domain structure, and this results in broadening of the superlattice lines with respect to the main lines. Attempts to determine the sizes of the domains from the breadths of the lines, however, yielded inconsistent results[4], and a further condition—for example, that the gold atoms tend to avoid each other[5]—must be imposed. The diffraction effects produced by this condition are unusual; in reciprocal space the superlattice reflexions are represented by disk-shaped volumes of differing orientations[6], and attempts have been made to detect these by means of oscillation photographs of single crystals. MacGillavry and Strijk[7] were unable to find the effect, and claimed that all the spots had cubic symmetry. Edmunds, Hinde, and Lipson[6], with a much smaller crystal, found it, and so did Guinier[8]. Quantitative confirmation, however, is still required, but the investigations promise to provide interesting evidence about transformations on the atomic scale.

Dr. A. J. Bradley presented a different approach to the study of alloys—that of metallography. He emphasized, however, the importance of previous study by X-rays, and gave as an example the system Fe-Ni-Al, in which the results of Köster[9] had been shown to be wrong because the possibility of three-phase regions had not been envisaged[10]. Although slower than the X-ray method, the microscopic method enables the dispositions of the various phases to be studied; Dr. Bradley showed many beautiful examples of photomicrographs of magnification up to 4,000, and claimed to be able to distinguish between ordered and disordered structures. The microscope is of particular value when changes in temperature are to be considered; X-ray methods fail in the Fe-Ni-Al system because high-temperature structures tend to transform on quenching. A high-temperature camera is required, and progress depends upon the production, in the near future, of a suitable instrument.

Mr. H. J. Goldschmidt showed how Dr. Bradley's results had enabled him to interpret some of the X-ray data he had obtained on the permanent-magnet alloys, 'Alnico' and 'Alcomax'. He found 'ghost' lines similar to those given by Cu_4FeNi_3, and said that the pseudo-periodic structure they indicate could be related to some of the microphotographs shown by Dr. Bradley. He also showed how reactions can take place even when the final state is the same as the first, and attributed the changes to Ostwald's law of successive reactions.