

## FIELD STUDIES IN EDUCATION

IN 1960 the Nature Conservancy set up a strong Study Group under the chairmanship of E. M. Nicholson to examine the role of field studies in education. The investigations of the Group were extensive, the work of many hands, so that the report, which has now been published, will serve to mould and to crystallize opinion for some time to come\*.

In the report, field studies are taken as comprising the out-of-doors aspects of biology and the earth sciences, geology and geography; and while in the discussion activities of students at field centres occupy a central place, consideration is given to the educational needs of children of any school age, members of youth organizations and, to a lesser degree, the public at large. In almost all respects the Group finds that present facilities fall seriously short of requirements; however, it is expecting a big drive forward in the next few years, associated with reforms in biology teaching which are now in train. Looking on the present situation as fluid and dynamic, the Group invites the co-operation of all people who have constructive proposals to offer. It is in this sense that the following comments are made.

The Group is at its best in presenting a comprehensive survey of facilities for field studies which are now available. It is less convincing in discussing their educational mission. It is a minor point that it makes no reference to the personal observation of the weather, of the expanse of the night sky viewed away from the lights and bustle of the towns, and of the experience of being alone with Nature between dusk and dawn.

More seriously, the Group assumes that children possess a special, innate curiosity about living things and that field studies should serve as a gateway to science. These assumptions are open to question. Altogether, the waxing and waning of interest in things at different stages of life deserve more attention than they have so far received. By the age of fifteen, most boys and girls feel that primroses and blackbirds count for little in their lives, yet at later ages they may become keen about flower gardening. That is why the teaching of natural history below the grammar school needs to be based on individual interest, for in the time available instruction in health and human physiology has more cogent priority.

Love of Nature is a complex emotion, sometimes imbued with patriotism. As the report shows, the organized study of wildlife in Holland is meagre; all the same, public support for conservation is massive, and in intensity of culture. Dutch farming is about the best in the world. Besides, in these days, evidence for the evolutionary origin and unity of all living matter has acquired such compelling validity that it provides grounds for our own reaction to Nature which, rising above aesthetic satisfaction, may attain to reverence of a spiritual kind.

In relation to field studies, as the report shows, the Forestry Commission is helping. However, it might well do much more, for besides possessing large areas of almost unspoiled country, the Commission could provide students with some comprehension of how in certain sectors biological science is being developed and applied. This is truer still of agriculture, in which context the work of the Association of Agriculture has been overlooked.

\* *Science Out of Doors: Report of the Study Group on Education and Field Biology*. Pp. xvi + 240. (London: Longmans, Green and Co., Ltd., 1963.) 12s. 6d.

Farming, for example, can present exemplifications of soil science, plant and animal nutrition, genetics, etc., which find little counterpart in the wild. Along these lines, agricultural colleges and farm institutes could be put to more imaginative use, and the National Agricultural Advisory Service is well placed for taking on a more educational role. For comparable reasons, efforts should be made to give some biology students at first hand a better understanding of the life and economic resources of the seas.

In the teaching of biology at all levels, emphasis on finding out will have been pressed too far if it prevents students from gaining some knowledge of the ways in which the application of science contributes to the welfare and culture of man. Of this, medicine is a striking example. Among sixth-form biologists attending field centres, would-be doctors probably make up the largest contingent. There is next to no flow of training in the reverse direction. In other words, the time has arrived when thought should be given to the expansion of field studies into a wider range, and then integrated with a still greater educational whole.

## FROM ELECTROMAGNETIC WAVES TO CHROMATOGRAPHIC PEAKS

## Comprehensive Biochemistry

Edited by Prof. Marcel Florkin and Prof. Elmer H. Stotz. Vol. 1: Atomic and Molecular Structure. Pp. xi + 253. 62s. Vol. 3: Methods for the Study of Molecules. Pp. xiii + 324. 80s. Vol. 4: Separation Methods. Pp. xiii + 282. 70s. (Amsterdam and New York: Elsevier Publishing Company, 1962.)

IF it is becoming necessary for the editorship, let alone the authorship, of a scientific treatise to be shared, it is surely presumptuous for one person to assume the role of critic. It is therefore with hesitation and humility that I attempt to survey the remaining three volumes of Section 1 of *Comprehensive Biochemistry*.

One's first impression is of a disciplined economy of style by an eminent and international team of authors. Volume 1 opens with accounts by W. Parker Alford and H. H. Jaffé of the modern concepts of atomic structure and valency, which, although not exhaustive, probably contain as much as the average biochemist has the time or will to absorb. The reader may find it advantageous to read two short chapters by G. J. Bullen at the beginning of Volume 3 before embarking on the long chapter by J. D. Bernal on the structure of molecules in Volume 1. It is curious that the editors should have considered it desirable to discuss molecular structure before dealing with crystallography and X-ray diffraction methods. Even the last-mentioned two topics could have been brought together in a single chapter. Fortunately, there are a number of cross-references. J. D. Bernal's chapter is divided into two main sections. The first deals with the general features of molecular structure, such as the types of interatomic forces which operate between non-covalently bound atoms, the classification of molecular shapes, and the physical properties of polymer aggregates. The second section considers biochemical molecules from simple amino-acids to proteins and nucleic acids. There is a short section on cellular structure, but the technique of electron microscopy is not described, although it receives passing mention in