COMMUNITY STUDIES IN THE SECONDARY SCHOOL

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The last fifteen years have seen an increasing awareness of the importance of ecology in the teaching of senior biology in our secondary schools. The approach, however, has usually been along traditional lines with the study of well defined natural communities involving the detailed description of the physical features of the habitat, the compilation of species lists and an emphasis on methods for method's sake. This narrow and academic approach to the study of living communities has tended to bring fieldwork into disrepute and, for many students, has obscured the basic issues involved. More recently, we have seen a re-emergence of ecology as a fundamental part of senior biology courses with a more dynamic approach placing the emphasis on the principles illustrated by a particular ecological situation rather than by the rote-learning of isolated or ill-assorted facts.

This change in our attitude towards ecology is but one facet of a widespread reappraisal of science teaching as a whole. The accumulation of facts and the memorization of detail which has been a feature of science courses in the past, is seen to have little meaning for the majority of students and is recognised as being an unrealistic preparation for those wishing to advance in science. Modern science teaching aims at a cultivation of understanding with an emphasis on scientific method. Pupils are encouraged by open-ended experiments and original investigations to become personally involved in scientific situations and to develop powers of independent thought. Fieldwork, more than any other branch of school science, offers a challenge to both the gifted and less able student in providing opportunities for original investigations and true scientific endeavour.

The current emphasis on the principles of ecology has led to the widespread use of the school grounds as a convenient source of illustrative material. The success many teachers have had in using such local ecological situations has removed many of the objections to the study of more distant communities attempted hitherto. There still remain, however, many principles which can be more readily taught by the study of well established and more complex communities. Concepts of zonation, stratification and succession are more clearly illustrated in a large-scale situation and such areas allow the study of populations to be taken to a more advanced level. In selecting sites for study, care must be taken, as in any branch of science teaching, to see that the practical work illustrates a particular principle, develops a certain concept or reinforces basic ideas. It is most important that the purpose of the field exercise be clearly recognised by all those concerned in its execution.

The problems associated with the provision of worthwhile fieldwork within the secondary school situation are considerable. Large classes, timetable restrictions, difficulties of transport, scarcity of reference material pertaining to the local area, which can be readily understood by pupils, the commitments of many of the students to sport and other extra-curricular activities, the demands of other areas of the examination syllabus and the shortage of qualified teachers, all prevent extensive ecological programmes being undertaken.

In spite of these difficulties, most schools make detailed studies of natural communities. Surely few areas in the world can offer the diversity of habitat studies available to New Zealand students; and throughout the country, areas of forest, swamp, alpine tussock, sand dune, wasteland, freshwater and rocky shore are being examined by secondary school groups. Several schools have established field clubs or make special expeditions during vacations to study such places as Mayor Island, Little Barrier, North Cape, Fiordland, and even Fiji and the Barrier Reef. In the South Island, field stations have been established to enable as many groups as possible to have the experience of living and working in natural communities. One hopes to see the extension of this type of facility to other areas. For although cold logic proclaims that these studies provide little factual material which could not be developed in some other way at home, we must recognise that such excursions bring a wide range of additional benefits.

Whatever definition of education we accept, one of its main aims must surely be to increase the student's breadth of experience. We must remember that most sixth form students have only a very limited knowledge of the New Zealand flora and fauna, and that the great majority of our pupils, particularly in urban areas, have never experienced the sounds and smells of dense forest, have never seen alpine tussock in the early morning sunlight and have not had the fascination of sorting an evening plankton haul. The enthusiasm engendered by such activities is infectious and only through such first-hand experience can we hope to achieve the interested and informed public which is one aim of our teaching.

The value of community studies in senior biology courses lies not only in their inherent interest, but also in the way in which they serve to provide a framework for other sections of the work. The areas of taxonomy, physiology, genetics, behaviour and evolution, all assume new meaning when examples are drawn from familiar ecological situations. In breaking down the traditional academic divisions of biology and in trying to avoid an abstract presentation, we are making an effort to cater for those students for whom the sixth form year represents their last formal contact with biology. With an ever-increasing number of our students remaining at secondary school for four or five years, the composition of our senior forms is changing — over 80% now require a terminal course rather than preparation for university studies.

The social aspects of field trips are no less important than the growth of knowledge and experience. Adolescence is often a difficult period in a student's life and the community living associated with longer field trips encourages a growth of mutual understanding, an appreciation of others and the making of individual adjustments. It encourages too, a sense of identity and unity within the class which is frequently reflected in improved performance at school. Such improvement in the tone and attitude of a class following a weekend or week-long field excursion, more than repays the effort involved and these social benefits, apart from the obvious scholastic gain, make the organisation of a field trip early in the year a valuable part of the senior biology course.

A community study offers the challenge of a major project, its very complexity demanding effort and arousing interest. In developing an understanding of community composition and in interpreting the functional relationships of its constituent populations, students must undertake extensive research in the field, laboratory and library and employ the techniques and resources of other disciplines such as chemistry, physics, history and geography. The opportunity this gives to draw together various interests within the school is most satisfying at a time when specialisation is tending to establishing groups of senior pupils who have little contact with one another.

The organisation of the trip itself involves students in arranging transport, accommodation, equipment and food, and frequently this allows pupils, undistinguished in the classroom, to show initiative and undertake responsibility. From a teacher's point of view, a community study requires a fresh approach, for it cannot be the teacher-dominated situation often found in the classroom. Individual and group activity must be encouraged and prior organisation will avoid the need for detailed instructions in the field. The use of prepared result sheets can do much to make maximum use of the time available in the field and ensures the collection and recording of data in a form suitable for later correlation and analysis. The writing up of fieldwork shows the need for valid methods, for accuracy in observing and recording, for quantitative data, charts, tables and statistical analysis; and, in providing a permanent record of work done, an incentive to the student and a purpose to the exercise which may otherwise be lacking.

Since time in the field is limited, the scope of any ecological exercise must be clearly defined. Usually this will involve the recognition and interpretation of a pattern with the suggested hypotheses being tested by more observations or by experiment in the field or in the laboratory. But whatever the nature of a particular project, a great deal of emphasis must be placed on the need to maintain the community in its natural state. This is, of course, sound scientific practice but it is also an essential part of a student's training to respect living organisms and to disturb them and their surroundings as little as possible. The danger of indiscriminate collecting has been made all too obvious by the denuding of certain foreshore communities near our major cities and teachers must stress the need for conservation and incorporate this into their field exercises.

What then is the change in our approach to ecology? A swing away from purely descriptive fieldwork towards a more questioning and experimental approach aimed at developing an understanding of the basic principles underlying community organisation, has resulted in communities, populations and individual organisms being studied, not as an end in themselves, but as illustrating a particular concept. Students are encouraged to recognise that the unity which exists among living things at the molecular and cellular level may also be seen at the higher levels of biological organisation. By exploring new areas and introducing new ideas, we perhaps can foster in our students an interest in plants and animals and an awareness of the fascination of the communities around them. In this way we hope to educate a public conscious of its environment and mindful of its responsibility for maintaining the balance of life within these communities and the biosphere as a whole. If, through our teaching of ecology in secondary schools, we can bring a greater awareness of such problems as pest control, sewage disposal, soil erosion and the effects of large-scale development projects, then our efforts will have been worthwhile; for ecology is more than just a part of a biology course, ecology is part of an education.