ENVIRONMENTAL EDUCATION AND THE CHRISTCHURCH BOTANIC GARDENS

By Warren Jowett

Shirley Boys' High School

INTRODUCTION

One of the outstanding features of the Christchurch Botanic Gardens is the New Zealand "Bush" area. Here there has been developed an indigenous forest habitat representing some of the forest vegetation which covered large areas of New Zealand before the arrival of man. This group of plants illustrates some aspects of the educational potential of the Botanic Gardens. In addition to the study of the plants themselves a teacher is able to incorporate a wide range of ecological topics; examples of stratification, ecological niche, competition, adaptation, ecosystem can be studied. Also topics of a conservation nature such as protection of indigenous forests, the effects of introduced animals, extinction (and recolonisation!) of native birds can be discussed in a realistic setting. The Bush can also be used for historic and cultural studies. Topics such as the use and abuse of plants by Polynesian and European man; the sawmilling industry of Canterbury; the vegetation and landscape of early Christchurch.

The realisation of the educational potential of the Gardens has led recently to the preparation of some teaching material. This has been prepared for a secondary school clientele and is mainly botanical and ecological in its approach. The intention of the author is that the pupils, by using the material, will learn something about the plants they see, the ecological concepts they are introduced to and the purpose and beauty of the Gardens.

However the Gardens also have a great potential in the broader field of environmental education. Environmental education can be defined as that which encourages the development of a conservation ethic within an individual by creating an awareness of and sensitivity to the environment in which the individual lives.

The potential of the Gardens as a resource area for environmental education can perhaps best be illustrated by referring to three existing environmental education programmes which are operating from Botanic Gardens: one from Australia, the other two from the United States.

ENVIRONMENTAL EDUCATION PROGRAMMES IN BOTANIC GARDENS

1. Adelaide Botanic Garden

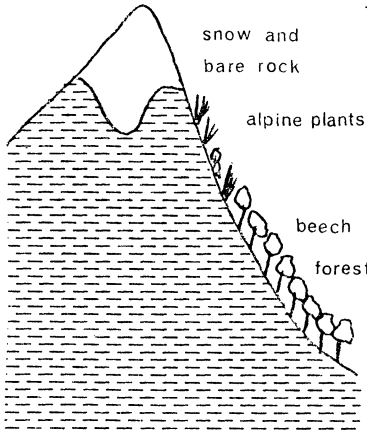
These Gardens maintain an education service which is staffed by teachers seconded from the teaching service for periods ranging from two to four years. The type of educational material they have prepared can be seen in this list of their publications: (a selection only)

(a) Gardens in bottles

(b) Music activities and the environment

4. BEECH FOREST

Below the alpine plants grows the beech forest. The edge of this forest is called the TIMBERLINE. In many areas the timberline has been changed by erosion and fires. Many of the mountains east of the main divide now have no forest at all - also because of fires and erosion.



1. If it is a sunny day, you will notice how shady it is under the beech trees. The CANOPY (the forest "roof") has made it shady inside the forest. What other changes to the climate could the canopy make?

   List here:

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2. Look up: Can you see any light?

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   Why do the trees form such a dense canopy?

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3. Look down: The dead leaves form the LITTER LAYER. Why are dead leaves important to living trees?

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Beech trees are evergreen. They have leaves on them all year. Very few native trees in New Zealand are deciduous and are bare in winter.

4. THE ANIMALS OF THE BEECH FOREST

LISTEN. In New Zealand forests we see many birds. What do the trees provide for the birds?

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5. Write down the names of birds you see in the forest.

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6. Deer also live in beech forests. What do they eat? Does this harm the forest?

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A sample of a worksheet from a "Habitat Trail" in the Christchurch Botanic Gardens. This is a nature trail designed for 3rd and 4th forms which visits various habitats which are represented in the Gardens.

1. Adelaide Botanic Garden (Continued)

(c) Environment games

(d) Nature walks on a variety of topics e.g. plant adaptations, leaves, classification, plant/animal relationships, plant diversity

(e) Resource booklet describing activities to carry out in the Gardens in art and craft, drama, physical education, creative writing, music, mathematics, spelling and language, science and social studies

(f) Booklet outlining science curriculum and Adelaide Botanic Garden correlation.

2. Missouri Botanical Garden, St. Louis

The seven full-time professional staff members of these Gardens are involved with educational programmes at two separate sites. One is the Botanical Garden situated in St. Louis on a 32 hectare site. The other is the Shaw Arboretum located in a rural setting some 35 minutes from the city and on an area of 1000 hectares.

In the past the education programmes of these two sites have been mainly botanical and ecological. However the Gardens staff now see a new role of increasing importance in the field of environmental education. Examples of the innovative programmes they are developing in this field are:

(a) Creating Environmental study areas

Schools are encouraged to develop and improve their own environmental education programme capability rather than using the Arboretum simply as a field trip site. Schools are shown how to develop with inexpensive or free materials small plots of land as illustrative environmental study sites.

(b) Acclimatizing

Courses are conducted for children in this new approach to natural awareness and ecological education developed by the American environmentalist Steve Van Matre.

(c) Environmental Education Training Project

A course is run for St. Louis city teachers of grades 4 to 6 in environmental education, funded by the United States Office of Education, Office of Environmental Education. The course has two purposes; to train teachers and to produce a training guide for use in school systems across the country.

The Missouri Gardens are also extending their environmental education programmes into the field of continuing education.

3. National Environmental Study Areas

The Shaw Arboretum of the Missouri Gardens is now designated a National Environmental Education Landmark (NEEL). This is an award made to a site in the United States which is called A National Environmental Study Area (NESA) and which has conducted outstanding

programmes and facilities in the field of environmental education. NESA sites are areas or buildings which have educational potential. A site with educational potential is defined as :

> "one which accelerates this prccess (of studying relationships in the total human environment), examples of the relationships found throughout the total human environment exist at this site in unusually striking relief". [1]

NESA sites are established with the support of the U.S. National Park Service. The aims of the NESA programme are :

1. Introduce children to the total environment - cultural, natural, past and present.
2. Develop in them an understanding of man's use of his resources.
3. Equip them to accept a responsible and active role in the world they are shaping and being shaped by. [2]

The NESA programme involves an elaborate but well-documented procedure to be followed in establishing such a site. Steering committees, workshops, development of resource material, community involvement are all part of the NESA establishment procedure.

THE ROLE OF THE CHRISTCHURCH GARDENS IN ENVIRONMENTAL EDUCATION

It would appear from the forementioned programmes that a botanic gardens is well suited for environmental education in an urban setting. There is no reason to suspect that the Christchurch Gardens would be otherwise. These gardens meet all of the requirements the U.S. National Parks Service see as essential for a NESA:

1. Have specific educational possibilities
2. Contain elements that illustrate the effects of human activity
3. Be easily accessible to students
4. Have such facilities as parking areas, drinking fountains and rest rooms
5. Be resistant to repeated use by groups of students.[3]

The rich resources of the Gardens could be used to extend children's understandings and perceptions of their environments - biological, cultural, aesthetic and historical. To achieve this, a major emphasis would need to be made in the area of teacher education. Teachers generally have received training which has been specialised in focus. They must then be made aware of the multi-disciplinary, multi-process demands of environmental education as well as becoming familiar with the resources of the Gardens.

Teachers are now confronted with a bewildering array of materials when making curriculum decisions for their classrooms. What they require in this area of education is material that is local in content, readily accessible, easily introduced to their classrooms and relevant to the backgrounds and needs of their pupils.

EXTENSION TO OTHER AREAS IN CHRISTCHURCH

Within the Christchurch urban area there are many other locations which are suitable as environmental study areas. Having established an educational programme at the Gardens it could then be possible to encourage other local authorities to do the same. The education service at the Gardens could act as the co-ordinating centre for the development of these programmes. It is favourably located for this function, being in close proximity to the Department of Education, the Canterbury Education Board and the Environment Centre. Classroom accommodation is available in the old university buildings. Other urban locations with potential as environmental study areas include:

1. Spencer Park sand dune - Brooklands lagoon area (Waimairi County Council / North Canterbury Catchment Board)
2. Riccarton Bush (Riccarton Borough Council)
3. Avon-Heathcote Estuary (Christchurch City Council / Christchurch Drainage Board)
4. Victoria Park - Sugarloaf reserve (Christchurch City Council / Lands and Survey Department).

THE RESOURCE / CLASSROOM INTERFACE

A number of organisations are coming to realise that they have a contribution to make in the environmental education field. In Christchurch this concern has been felt by the staff of the Botanic Gardens, the Environment Centre, the Health Department of the Christchurch City Council and the Christchurch Drainage Board to name a few. Nationally, organisations such as the New Zealand Forest Service, Commission for the Environment, Environmental Council, National Conservation Week Campaign Committee, have all been involved in this field. But what effect have all of these contributions had on the environmental education programme being taught in the classroom? Publicity material and booklets these programmes generate generally join the growing pile of environmental education material that the teacher has constantly pushed at him. He seldom has time to study this material and make a choice of what will best suit his pupil's needs. The result is that the teacher will either do nothing or revert to material and methods he has used in the past, which probably achieves little in increasing the environmental awareness and sensitivity of his pupils.

The environmental agencies need to change their attitude of "Here we are, this is what we have got to offer, take it and use it', to one of "Here we are, this is what we have got to offer, how can this be of use to you". Teachers and teacher organisations have to be asked what they need to enable them to conduct environmental education programmes.

The material must be relevant and readily usable in their local situation. In Christchurch the Gardens provides the opportunity to achieve these requirements with a seconded-teacher based education service. Once operating such a system would demonstrate the collaborative relationship that can be established between an institution (i.e. in this case the Botanic Gardens) and schools to achieve mutually acceptable educational goals.

The environmental education needs of school pupils and their teachers today are resources they can use which are locally based. It is the environmental awareness and sensitivity of young people living in their own communities which is at stake. It will only be when significant changes are made at this level that changes in attitude at a regional or national level will become apparent.

References

1. National Environmental Study Area: A Guide. U.S. Department of the Interior; National Park Service. 1972.

2. A Guide to Planning and Conducting Environmental Study Area Workshops. National Education Association; U.S. Department of Interior, National Park Service. 1972.

3. Man and his Environment - An Introduction to using Environmental Study Areas. National Education Association. 1970.

Seed Set and Germination in *Pachystegia*

M.J.A. Simpson and B.P.J. Molloy

It is well known that seed set is poor in Compositae and particularly so in a good many New Zealand representatives of the family. Germination too is often unpredictable. With selected seeds of *Pachystegia insignis* var. *minor* collected from a garden plant growing at Botany Division, Lincoln, ex Kekerengu, Kaikoura coast we have had good and rapid germination with fresh seeds. Last year Brian Molloy drew attention to large numbers of volunteer seedlings near this plant. For the species, (*P. insignis*) L. Metcalf (1972) wrote that in the Christchurch Botanic Gardens self sown seedlings appeared in quantity beneath the bushes in the autumn. Self sowing has also been reported at Otari Native Plant Museum, Wellington (Fisher, Setchell and Watkins 1970) but the same authors mention that an Auckland gardener, Mrs. Bedford "has grown pachystegias from cuttings although I understand she has never succeeded in getting the seed to germinate". Recently Mr. Ian J. Tweedy of this society remarked that although he has grown and flowered a healthy plant of *P. insignis* for sixteen years in his garden at Bryndwr he has never had a volunteer seedling and "seeds" collected from his plants have failed to germinate whilst seeds acquired from other sources have been grown successfully by him.

This year Brian Molloy brought in six heads from each of his garden plants of *P. insignis* and *P. insignis* var. *minor*. We counted the filled and empty seeds in each head and later looked at seed heads from plants of both taxons growing in their natural habitat on the Kaikoura coast and at Molesworth and from two other gardens (see Table 1). There are more florets in the larger capitulum of the species than in the variety but the variety sets a larger proportion of good seeds than the species. In one garden collection of the species (d) no seed