

## AN EXPERIMENT IN CONSERVATION EDUCATION: THE DRUM MANOR BUTTERFLY GARDEN

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A butterfly garden has been opened in the forest park at Drum Manor, County Tyrone, Northern Ireland (U.K.). It is designed to attract a large population of native butterflies and to allow them to be observed easily, in their adult and developmental stages, by naturalists and the general public. Besides contributing to the conservation of butterflies, it serves as an educational demonstration of how to combine formal with semi-wild gardening in the interests of nature conservation. Lists of natural and substitute food-plants and nectar flowers suitable for such gardens are given.

### INTRODUCTION

On May 15th 1970, Major James Chichester-Clark, then Prime Minister of Northern Ireland, formally opened a new forest park at Drum Manor, near Cookstown, Co. Tyrone. A novel feature of this park is the Butterfly Garden, the first public garden of its kind in the British Isles and probably the first in Europe. The suggestion of putting the old walled garden of the estate to this use came from Mr. F. Hamilton, then the local organizer of the Royal Society for the Protection of Birds. Its realization, and its now assured success, have come about through the interest and dedication of the staff of the Forestry Division of the Ministry of Agriculture and the work of local men taken on under unemployment relief schemes.

The Garden was created for three reasons: to aid butterfly conservation; as an unusual attraction for visitors; and most important, to educate the public in the aims and methods of conservation in a familiar context, that of gardening.

Drum Manor is a property of about 70 hectares dating from the Plantation Period of the seventeenth century. In 1964 it was purchased by the Forestry Division from Maxwell Archibald Close. It is on hilly ground, nowhere more than 150 m above sea level. It is a typical Irish gentleman's estate in the fashion of the eighteenth and early nineteenth centuries, with a house (now in ruins) and out-buildings, two walled gardens, a chain of fine ornamental lakes in a sheltered hollow, and about 30 hectares of parkland, avenues and old planted woods, the latter including a high proportion of

exotic trees such as *Tsuga*,<sup>†</sup> *Sequoia* and *Quercus cerris*. The outlying meadows have recently been planted with commercial conifer crops.

### AIMS AND METHODS

#### *General*

The Butterfly Garden is not a zoo; the butterflies in it come and go at will. They are the native species of the district, to which may in due course be added introduced colonies of a very few other North Irish species not found in the immediate neighbourhood. It is the designers' aim to make the Garden so attractive to the local butterflies that they will congregate there in large numbers for the benefit of visitors and establish breeding colonies there.

#### *Conservation and Conservation Research*

The Garden is contributing to actual conservation in several ways, which will now be explained with the necessary background information.

Northern Ireland, as an area entirely glaciated in the last Ice Age and soon afterwards cut off from the continent by two strips of water, has only 26 species of butterflies (Table 1), fewer than Great Britain and far fewer than France or Germany. Although the species list is short, nearly all the non-migrants exist in Northern Ireland as distinctive and sometimes striking subspecies, which are worth an effort to conserve. The Common Blue (*Polyommatus icarus* Linn.), for example, is larger and more brilliantly coloured than anywhere else in its range.

<sup>†</sup> All botanical names in this paper follow Ref. 1.

TABLE I  
Northern Irish butterflies and their status in the Butterfly Garden

Species	Status in Northern Ireland	Status in Garden	Food plants	
			Natural	In garden
1. <i>Pararge egeria</i> Linn. (Speckled Wood)	Common everywhere	Present	Common grasses	ditto
2. <i>Pararge megaera</i> Linn. (Wall)	In all districts	Absent, likely to establish	Common grasses	ditto
3. <i>Eumenis semele</i> Linn. (Grayling)	Common on coast only	Absent, not expected	Common grasses	—
4. <i>Maniola jurtina</i> Linn. (Meadow Brown)	Common everywhere	Present	Common grasses	ditto
5. <i>Coenonympha pamphilus</i> Linn. (Small Heath)	Common everywhere	Present	Common grasses	ditto
6. <i>Coenonympha tullia</i> Müller (Large Heath)	Local on bogs	Absent, not expected	<i>Molinia caerulea</i> <i>Rhynchospora alba</i>	—
7. <i>Aphantopus hyperanthus</i> Linn. (Ringlet)	Common everywhere	Present	Common grasses	ditto
8. <i>Argynnis aglaia</i> Linn. (Dark Green Fritillary)	Local, mainly coastal	Absent, not expected	<i>Viola</i> spp.	—
9. <i>Argynnis paphia</i> Linn. (Silver-Washed Fritillary)	Local, mainly in old native woods	Present	<i>Viola</i> spp.	ditto
10. <i>Euphydryas aurinia</i> Rott. (Marsh Fritillary)	Widely distributed, very local	May appear casually	<i>Scabiosa succisa</i>	—
11. <i>Vanessa atalanta</i> Linn. (Red Admiral)	Migrant, often common	Present	<i>Urtica dioica</i>	ditto
12. <i>Vanessa cardui</i> Linn. (Painted Lady)	Migrant, usually rather scarce	Expected occasionally	<i>Carduus</i> spp.	ditto
13. <i>Aglais urticae</i> Linn. (Small Tortoiseshell)	Common everywhere	Present	<i>Urtica dioica</i>	ditto
14. <i>Nymphalis io</i> Linn. (Peacock)	Increasingly common recently	Present	<i>Urtica dioica</i>	ditto
15. <i>Polyommatus icarus</i> Rott. (Common Blue)	In all districts but local	To be introduced	<i>Lotus corniculatus</i>	ditto
16. <i>Celastrina argiolus</i> Linn. (Holly Blue)	Uncommon, very local	To be introduced	<i>Ilex aquifolium</i>	ditto
17. <i>Cupido minimus</i> Fuessly (Small Blue)	Rare, local	Absent, not expected	<i>Anthyllis vulneraria</i>	—
18. <i>Lycaena phlaeas</i> Linn. (Small Copper)	General	Probably present	<i>Rumex</i> spp.	ditto
19. <i>Callophrys rubi</i> Linn. (Green Hairstreak)	Local on bogs	Absent, not expected	<i>Erica tetralix</i> etc.	—
20. <i>Leptidea sinapis</i> Linn. (Wood White)	Locally common	To be introduced	<i>Lathyrus pratensis</i>	ditto
21. <i>Pieris brassicae</i> Linn. (Large White)	Generally common, resident and migrant	Present	Various <i>Cruciferae</i>	<i>Hesperis matronalis</i> , <i>Tropaeolum majus</i>
22. <i>Pieris rapae</i> Linn. (Small White)	Very common near houses	Present	As for previous species	ditto
23. <i>Pieris napi</i> Linn. (Green-Veined White)	Very common everywhere	Present	<i>Cardamine pratensis</i> etc.	<i>Hesperis matronalis</i> , <i>Arabis albida</i>
24. <i>Anthocharis cardamines</i> Linn. (Orange Tip)	Common everywhere	Present	<i>Cardamine pratensis</i>	<i>Hesperis matronalis</i>
25. <i>Gonepteryx rhamni</i> Linn. (Brimstone)	In west only, uncommon	Introduction to be attempted	<i>Rhamnus catharticus</i>	<i>Rhamnus catharticus</i> <i>Frangula alnus</i>
26. <i>Erynnis tages</i> Linn. (Dingy Skipper)	In west only, rare	Introduction may be attempted	<i>Lotus corniculatus</i>	ditto

TABLE II  
Climate of Aldergrove (Northern Ireland) compared with Kew (London)  
(Aldergrove meteorological station is 35 km east of Drum Manor and at the same altitude)

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Aldergrove	3.7 <i>1.5</i>	4.2 <i>2.3</i>	5.9 <i>3.3</i>	7.8 <i>5.0</i>	10.5 <i>6.3</i>	13.3 <i>6.0</i>	14.7 <i>4.4</i>	14.6 <i>4.4</i>	12.7 <i>3.6</i>	9.7 <i>2.6</i>	6.6 <i>1.8</i>	4.9 <i>1.1</i>
Kew	4.2 <i>1.5</i>	4.4 <i>2.3</i>	6.6 <i>3.6</i>	9.3 <i>5.3</i>	12.4 <i>6.4</i>	15.8 <i>7.1</i>	17.6 <i>6.4</i>	17.2 <i>6.1</i>	14.8 <i>4.7</i>	10.8 <i>3.1</i>	7.2 <i>1.8</i>	5.2 <i>1.3</i>

Monthly mean temperatures (°C), and average daily hours of sunshine (in italics) (data from Ref. 2).

The Wood White (*Leptidea sinapis* Linn.) differs greatly in appearance from the British form and might prove to be an endemic species if breeding experiments were made. Several species are endangered and are now receiving protection through the Nature Reserves Committee of the Ministry of Development.

In Northern Ireland the provision of sites with a good microclimate is an unusually important requirement for butterfly conservation. The Province has a maritime climate with low summer air-temperatures (Table II) and much wind, causing butterflies of most species to avoid open country and congregate in sheltered spots. The average hours of sunshine compare unfavourably, especially in July, with England and the continent. There are many hazy days in summer when it takes the shelter of a south-facing wall or wood border to tempt most butterflies into activity. The Garden has as good a microclimate as could be contrived in an open place. It is enclosed by a wall 3.5 m high, and flanked outside the wall on its north-east and north-west sides by high trees, which cut off cold winds without making shade. Of course, the same factors earlier determined the planning of the Garden for vegetable growing. Many other semi-derelict walled vegetable gardens in Ireland would make equally good butterfly gardens.

There are indications that butterfly populations in Northern Ireland may sometimes be limited by the nectar supply. Neglected places which in drier climates would be overgrown with nectar-bearing wild flowers, especially *Compositae*, *Cruciferae*, *Leguminosae* and *Labiatae*, tend to become choked with tall grasses which stay green all summer and shade out the flowers. Only dry, stony ground, or soil on which the vegetation is cut or grazed, will maintain a natural cover rich in such flowers. In the Garden, an abundant supply of nectar from

March to October is being provided in three ways. First, by suitable choice of garden shrubs and flowers, in which we have been greatly helped by a book of L. Hugh Newman;<sup>3</sup> secondly, by a varied cutting regime for the grass areas, based upon the studies of road verges<sup>4</sup> made by the Nature Conservancy in England; and thirdly, as an experiment, by deliberately creating a stony, infertile area in one corner of the Garden and letting it develop a semi-natural weed cover. It is hoped that the rich nectar supply in the Garden will help to enlarge butterfly populations not only in the Garden itself but also in the forest park generally. Late summer nectar is probably particularly important for the attractive Peacock (*Nymphalis io* Linn.) and Small Tortoiseshell (*Aglais urticae* Linn.) butterflies, which must have good reserves in order to survive their hibernation from October to March. There is not much wild nectar in late September and October in Ireland; moreover, the relatively high winter temperatures, in which these two species are not always completely torpid, may cause them to use up their reserves faster than in more continental climates. In course of time they have probably come to depend on garden flowers, such as *Aster* spp. and *Buddleia*, for their nectar supply immediately before hibernation. It is suggestive that the growth of suburban living and suburban gardening since the middle of last century has coincided with an extension of the northern limit<sup>5</sup> of the Peacock Butterfly in Ireland from about lat 53°30' to the north coast, 55°20'. Various popular flowering shrubs, all exotics, are being planted for amenity and in order to learn whether they have any attraction for butterflies as nectar sources.

Hibernating quarters are required for the imagines of the two butterfly species just mentioned, and will be needed later for the Brimstone (*Gonepteryx rhamni* Linn.) which it is hoped to introduce.

As an experiment, special hibernation boxes are being put up on the walls. The extent to which they are used will give some clue to the plenty or scarcity of other hibernation sites, on which there is no reliable information. With the replacement of native woods by managed plantations lacking hollow trees, and the increasingly tight construction

of houses and farm buildings, it seems likely that traditional hibernational sites are becoming scarcer.

A wide range of larval food plants will be maintained in the Garden, so that as many butterfly species as possible can go through their whole life cycle there. Some of the species in Table I feed as larvae on common grasses and *Rumex* spp., which

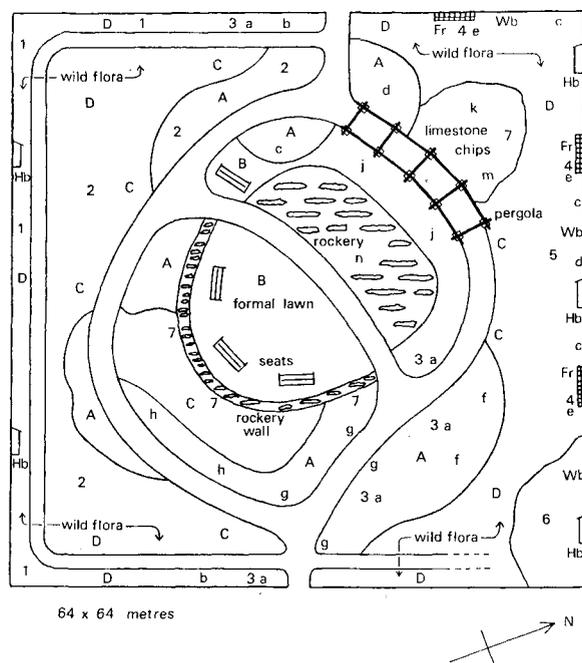


FIGURE 1 Plan of the Drum Manor Butterfly Garden (schematic).

#### Abbreviations

Fr climbing frames for *Tropaeolum majus*  
Hb hibernating boxes  
Wb boxes on walls for *Centranthus ruber*

#### Ground Management

A weeded flower-beds  
B grass cut weekly in summer; not weeded  
C grass cut every third week in summer; not weeded  
D wild vegetation; peripheral 5-m zone never cut, remainder cut once a year in June

#### Plants introduced as food for larvae

1 *Rhamnus catharticus*  
2 *Ilex aquifolium* (wild and also cultivars)  
3 *Hesperis matronalis*  
4 *Tropaeolum majus* (climbing variety)  
5 *Frangula alnus*  
6 *Urtica dioica*  
7 *Lotus corniculatus*

#### Plants introduced to supply nectar

a *Hesperis matronalis*

b *Lythrum salicaria*  
c *Buddleia davidii*  
d *Buddleia globosa*  
e *Tropaeolum majus*  
f *Aster novae-angliae* and *novi-belgii* cultivars  
g *Lavandula spica*  
h *Erica cinerea*  
j *Rubus fruticosus*  
k *Chrysanthemum leucanthemum*  
m *Hieracium* (wild spp.)  
n Rockery plants as follows:  
*Aubrietia* spp., *Alyssum* spp., *Nepeta cartaria*, *Myosotis* spp., *Sedum* spp., *Thymus* spp., etc.

Ornamental shrubs (not shown in Figure; mostly planted in weeded beds marked A).

*Choisya ternata*  
*Deutzia* spp.  
*Hypericum* spp.  
*Olearia macrodonta*  
*Berberis stenophylla*  
*Cotoneaster* spp.  
*Eucryphia glutinosa*  
*Weigela florida*

are present naturally and need only be managed with care to avoid injury to larvae and pupae. Bird's Foot Trefoil (*Lotus corniculatus*) is being planted for the Common Blue (*Polyommatus icarus* Linn.) and the Dingy Skipper (*Erynnis tages* Linn.) and nettles (*Urtica dioica*) for the Vanessid butterflies. The Green-Veined White (*Pieris napi* Linn.) and Orange Tip (*Anthocharis cardamines* Linn.) feed naturally on cruciferous plants confined to marshy ground, which cannot conveniently be provided. The policy for these and the other common Whites is to plant non-indigenous flowers known to serve as alternative food plants (see Table I). These are also excellent nectar sources. Many trees of Holly (*Ilex aquifolium*) and Buckthorn (*Rhamnus catharticus* and also *Frangula alnus*) are being planted with the idea of introducing the Holly Blue (*Celastrina argiolus* Linn.) and Brimstone Butterflies in a few years' time. Buckthorns may also be planted in the forest park outside the Garden, where none at present exist. It might be doubted whether a colony of an introduced species could be viable in such a small area. However, there is a numerous and increasing colony of Holly Blues in a Northern Ireland nature reserve only about twice as big as the Garden. Experience with these small colonies may help conservation planning in other places in the Province.

### Amenity

Forest parks are basically an amenity. Both for this reason and in order to make its conservation message more acceptable to the public, an effort has been made to give the Garden a pleasing appearance. To the visitor entering by the east door, the view is dominated by a fine pergola standing on slightly elevated ground in the north-west quarter, (Figures 1 and 2). This has masonry pillars of local limestone, and unpeeled logs as cross-members. In front of it is a large rockery of the same stone. The centre of the Garden, in front of the rockery, is occupied by a flat lawn with seats from which visi-

tors can view the butterflies on the rockery and nearby buddleia bushes. The central part, and the approach to it from the east door, are the most "formal" parts of the Garden, with frequently mown grass and flower-beds kept weeded. Moving outwards, the treatment becomes progressively less formal, ending with a zone of wild and practically untouched vegetation near the walls. These outlying parts are accessible by small paths to facilitate natural history studies by field clubs and school parties. The formal and wild areas harmonize well to an aesthetically successful whole.

### Conservation Education

In our society most people work in towns, and an increasing proportion of these live in the suburbs, or in small satellite towns, and have gardens of their own. Suburban gardens now constitute one of the major wildlife habitats of the British Isles and other western countries. Unlike most rural landowners, the occupier of such a garden is under no economic pressure to use it in any particular way. Within limits, he can grow what he likes in it and maintain it as he sees fit. How gardeners actually use this freedom tends to be decided by current conventions, the example of neighbours, the influence of advertisers, and ideas picked up from television, gardening magazines and the gardening columns of newspapers. Notions of nature conservation have so far had little effect. It would be a huge victory for conservation if gardeners could be made conservation-conscious. Unfortunately, anti-conservationist influences are at work in the gardening world. There is, for example, social pressure for "tidiness" in gardens. In order to achieve it without the increasingly expensive services of a gardener, or too much work on the owner's part, grass is being replaced by crazy paving and hedges by fences. Beds of alpines and annuals are giving way to roses and dwarf conifers. The remaining grass is often sprayed to eliminate broad-leaved "weeds" and mosses. The manufacturers of garden chemicals

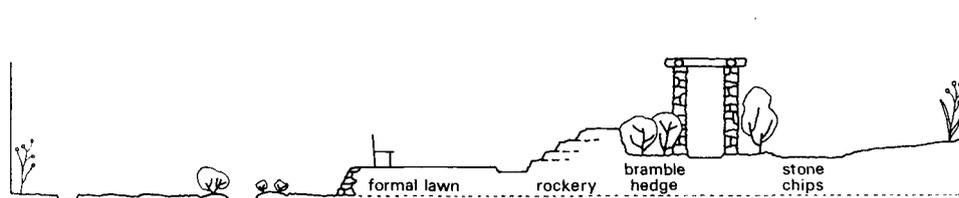


FIGURE 2 Diagonal section through the Garden from NNW (at right) to SSE (schematic, vertical scale exaggerated).

are only too pleased to help, and it would take a Vance Packard to find out how far they have actually engineered the fashions which now give rise to a demand for their products. The ultimate step of replacing the remaining real plants by artificial plastic grass and flowers no longer strikes everyone as ridiculous.

How can the conservationist influence gardening opinion? The approach we are using in the Butterfly Garden is to set an example that will be seen by as many people as possible, and to lose no opportunity of explaining and publicising it. How effective forest parks can be as a means of communication between conservationists and the public will be appreciated from the fact that in 1969 Northern Ireland, with a population of about 1.5 million, recorded 514,000 visits to forest parks.<sup>6</sup>

In more detail, the educational aims of the Butterfly Garden are: to acquaint visitors with the variety of native butterflies in the Province; to show that anyone who gardens in the right way can have many butterflies of many species around his home; to demonstrate that the informal style of gardening required can produce an attractive garden; and to show that wild plants, "weeds" and "untidiness" are needed for nature conservation and can be worked into the design of a garden so as to enhance rather than injure its appearance.

A change to more informal gardening could bring benefits to people as well as to wildlife. For parents, it would help to reduce the tensions of suburban living by making gardening more of a relaxation and less of a tyranny. For children, it would make gardens more interesting to play in and less easily damaged by their misdemeanours, besides giving them casual opportunities for watching wildlife which could increase their sympathy for conservation ideals in later years.

Information about the Garden is provided in concise form on a plaque at the entrance, and more fully in an exhibit at the Visitors' Centre. Such centres are a usual feature of Northern Ireland forest parks. They contain exhibits of photographs, dioramas etc. concerned with the natural history and management of the forests. A particular point of interest in the Drum Manor centre will be the life and work of a local naturalist, Thomas Greer. Greer, who lived from 1874 to 1949, was a well-known Cookstown Justice of the Peace. He did an enormous amount of excellent work on the botany and lepidoptera of East Tyrone, which appeared in a long series of publications.<sup>7</sup> He was equally well known as a racing motorcyclist, and it was a

motorcycling accident that finally claimed him at the age of 75. Permission has been obtained to name the Garden after him.

## DESIGN AND MAINTENANCE

The layout is shown in Figures 1 and 2, and with the help of the key is largely self-explanatory. A few points are worth special mention.

The plantings are nearly all of perennial herbs, shrubs and trees. Annuals have been avoided in order to reduce the work of maintenance.

No pesticides or herbicides of any kind are used, not because they would always be unacceptable from the conservation standpoint, but because it is desired to present a consistent and easily-understood image to the public.

Fertilizer will not be used on the lawns, because a dense growth of grass is not wanted. In Northern Ireland, lawns which do not get inorganic fertilizer often have many daisies (*Bellis perennis*) and dandelions (*Taraxacum officinale*), both good nectar flowers for butterflies.

The design of the hibernation boxes is shown in Figure 3. As there is no previous experience with such boxes, it is not known how satisfactory they will be. The slots admit butterflies easily but keep even small birds out. The lids are hinged so that the hibernating butterflies can be counted.

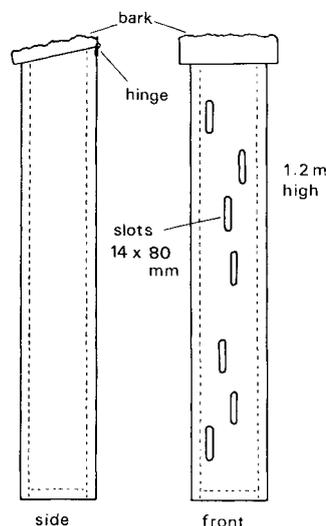


FIGURE 3 Hibernation box; unplanned, unpainted wood; inside partly lined with bark; fastened to wall with bottom about 1.7 m above ground.

Wood preservatives are not being used for the present on the hibernation boxes or on the climbing frames being set up for "nasturtiums" (*Tropaeolum majus*). This policy may well have to be changed in time.

## RESULTS

The Garden has already attracted public interest. The Forestry Division at first regarded it as rather a gamble, but is now fully committed and satisfied with its prospects. There is no doubt whatever of its success in attracting butterflies. On September 9th, 1971, a cool day (16°C) with intermittent sunshine, there were about 50 Peacock butterflies, 20 Small Tortoiseshells, 10 Silver-Washed Fritillaries and smaller numbers of several other species inside the four walls. It is unusual to see butterflies in such large numbers in Northern Ireland. The Vanessa butterflies spent the sunny intervals taking nectar from the flower-spikes of buddleia and, whenever the sun was obscured, came down to bask on the stones of the rockery. In the two years of operation, however, butterflies have been scarce in late June because of a temporary shortage of nectar flowers at that season and the absence of suitable butterfly species. This situation should improve with the growth of the bramble hedge behind the rockery and the contemplated introduction of the Wood White† and Common Blue. Operation of the Garden

† In work to be published we have successfully introduced this species to an abandoned quarry near Lisburn, Northern Ireland.

has revealed another unforeseen but not very worrying snag. When the buddleias are in flower, the butterflies are so strongly attracted to them that they pay little attention to the other nectar flowers.

## ACKNOWLEDGMENT

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