DERNFORD FEN

BISHOP'S STORTFORD COLLEGE
NATURAL HISTORY SOCIETY

Bishop's Stortford College
Natural History Society

A Survey of
DERNFORD FEN
Sawston, Cambridgeshire
1950 - 58

This publication takes the place of the Society's annual report *Coturnix* for 1958

THE DERNFORD SCENE

Left — A backwater of the R. Dern. The region shown is the edge of the alder-swamp. **Centre** — The Corn Bunting; male **above,** sitting female **below.** A new arrival, invading the drier open ground from arable fields to the east. **Right** — The edge of Home Scrub from the middle of Fen Marsh.

SURVEY OF DERNFORD FEN, CAMBRIDGESHIRE

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DERNFORD FEN, CAMBRIDGESHIRE, 1950-58

A Survey by Members of
BISHOP'S STORTFORD COLLEGE
NATURAL HISTORY SOCIETY

INTRODUCTION

There should be nothing dilettante about Natural History research. If it is to be done, it is to be done properly. There is no point in leaving nature's marvels half explored; indeed they do not become marvels until a great amount of research, painstaking and imaginative, has been done. Only then can conclusions be dared; only then can nature's secrets be made to reveal themselves. That is why it is a great moment when, after eight years of work, this survey of Dernford Fen comes to be published. For many laymen, it will make difficult reading; but behind it, we must remember, lie the fruitful experiences of many, many boys who have spent their weekends and holidays exploring this little-known area, so rich in natural historical resources—and exploring it, too, knowing very well that the record which they were helping to build up was likely to remain the only record. For Dernford Fen is gradually drying up. Systematic research, a puzzled-out conclusion, constant contact with nature in its minutest detail, all this these boys have experienced. We hope that their investigations will serve not only as a basis for future observers, but as a method of preserving information of sometimes rare local specimens which might have gone unknown.

P. W. ROWE,
Headmaster,
The College, Bishop's Stortford.
June 21st, 1958.

PHYSIOGRAPHICAL AND GEOLOGICAL FEATURES OF DERNFORD FEN

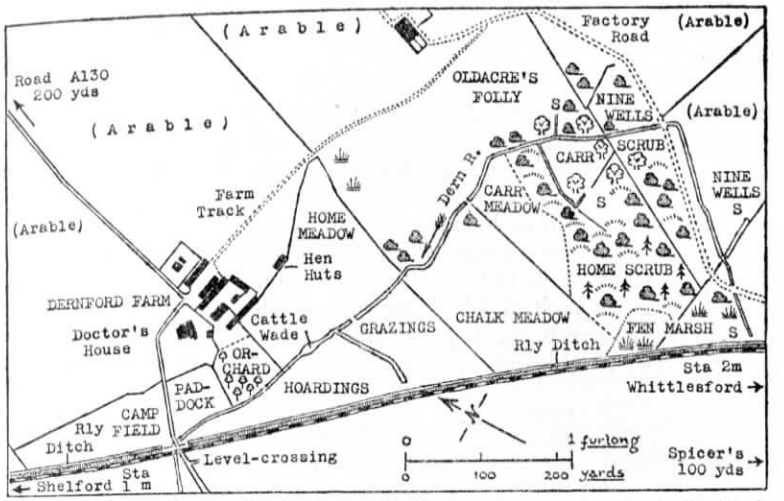


Fig. 1.—Map of Dernford Fen. Regions under survey named in block capitals; vegetational symbols spaced conventionally; springs marked S. Drawn by D. J. PEGRUM.

THE NATURE OF A FEN

A true fen results from the silting-up of a river which has flowed through chalk or limestone strata. This silting-up may occur either near the estuary or well upstream. The deposits are base-rich, with compounds of calcium as important constituents, and the water generally shows an alkaline pH value until it is neutralised by the weak humic acids resulting from the decomposition of accumulated plant debris.

DERNFORD FEN, SAWSTON, CAMBRIDGESHIRE

Position. Dernford Fen (grid. ref. 52/474504) lies beyond the east bank of the River Cam, c.1 mile N.W. of Sawston parish church. Nearby villages include Hauxton (2½ miles N.W.), Great Shelford (1½ miles N.) and Whittlesford (1½ miles S.). Cambridge city centre is 5 miles to the north and Bishop's Stortford 18 miles to the south. The railway-line from Liverpool St. to Cambridge crosses the area, and Dernford must be familiar to regular passengers between Whittlesford and Shelford stations as the site of two large hoardings, advertising respectively the " News of the World " and " Sisco Paints."

At one time Dernford extended from the east side of the railway, across the line, right up to the Cam itself, which here bends sharply away to the west half a mile from the track. Today, however, much of the area west of the railway is covered by Spicer's Paper Mills and other smaller undertakings; and although it is likely that pockets of the " Greater " Dernford still remain behind these buildings, Spicer's have

refused permission for us to examine the ground here. The land on the east side of the line is completely unspoiled, however, and the owners of this part of Dernford, Whiterod Bros., have been very co-operative and allowed us to wander freely over their land. It is this eastern area which is designated " Dernford Fen" throughout the present Report.

Topography. Altitude 55 ft.; length $\frac{5}{8}$ mile; greatest width $\frac{1}{4}$ mile; area of non-cultivated part c. 70 acres. A D-shaped piece of country running N.W.-S.E., including dry and wet pasture, marsh, scrub, and a small alder-swamp, the whole surrounded on three sides by arable fields managed by Whiterod Bros. from Dernford Farm. A small stream, which we have named the " Dern," rises at the southern edge of the area from a main source and three supplementary springs, and subsequently flows N.W. to join the Cam. The area is divided up into fields, to each of which we have given a name for purposes of reference (see map, fig. 1, page 5).

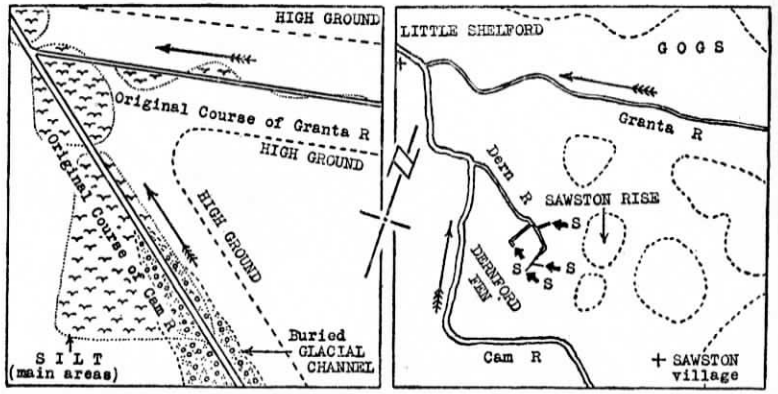


Fig. 2.—Formation of Dernford Fen. Left, river-system at end of Pleistocene age; right, system in Recent times. During Recent age, Cam has undergone diversions from its earlier course through accumulations of silt. The R. Dern may indicate part of its former bed. Springs supplying the Dern are marked S.

Drawn by T. J. C. HALL and J. S. W. HINCH.

Present drainage system. Dernford appears to be the remnant of a river-valley fen, originally of fair size, formed in a bend of the Cam. Considerable stretches of damp meadow-land lie beyond the present Dernford in the direction of Shelford station. Water accumulates in the southern part of Dernford through drainage from two pieces of high ground; the Gog Magog Hills to the N.E. and a ridge on the N.W. side of Sawston village just above Dernford (see fig. 2). It is the hill at Sawston which immediately gives rise to the Dern from springs at its foot. There are standing pools of water in the marsh, and also along the edges of the railway embankment where efficient drainage ditches have been constructed by the engineers. It seems likely that the building of the railway has brought about a gradual fall in the water-table here and, in consequence, disturbances in the balance of the wild life.

Nature of soil and water. Fundamentally the soil is alluvium deposited on chalk. Results of analytical work carried out in the laboratory by DJC are given below.

SOIL ANALYSES, DERNFORD FEN, JULY 1955

True soil by volume, humus and water-content by weight.

Components of true soil determined by agitating sample vigorously with water in a column 1 metre tall, then timing the period taken for each component to settle. Following table is used :

Settlement Times	*Component Types*
0—30 secs.	Stones and Coarse Sand
31—60 secs.	Fine Sand
61 secs.—6 hrs.	Coarse Silt
6—18 hrs.	Fine Silt
18 hrs. plus.	Clay

Average values from three samples taken from each of four localities, resolved as percentages.

	Grazings	*Fen Marsh*	*Carr*	*Nine-Wells Scrub*
Fine Sand	0	0	7	20
Coarse Silt	92	90	72	20
Chalky Fine Silt	5	0	0	0
Non-chalky Fine Silt	3	10	12	50
Clay	0	0	9	10
True soil percentage by volume ...	100	100	100	100
True soil percentage by weight ...	86.9	29.8	45.2	81.2
Water	7.2	57.6	37.4	12.5
Humus (=combustible organic matter)	5.9	12.6	17.4	6.3
	100.0	100.0	100.0	100.0

The trend in the series is roughly N.W.-S.E. Note that the humus content is highest in the wet localities, and that there is a tendency for the texture of the soil to become finer towards the south, in spite of the increase in sand in this direction.

An analysis of the water from the R. Dern, carried out in May '56, gave the following values in parts per million for the metallic and acidic radicles of the commoner dissolved substances : sodium 1.4, potassium 8.7, magnesium 28.3, calcium 59.5, chloride 14, sulphate 15, and carbonate 137.2. Thus the water is probably more-or-less typical of the kind of hard water which comes off chalk strata.

A universal indicator shows the pH of nearly all the water in this stream to be 7.0 (i.e. neutral); but the pH tends to shift towards the alkaline values at the immediate source. There are small pools in the Fen Marsh locality where, from time to time, slightly acid conditions have been detected.

Geology. The adjacent geological areas are gault clay on the west (emerging at Hauxton) and chalk on the east, the crests of the chalk hills sometimes being capped with boulder clay. Dernford undoubtedly stands on a firm foundation, and in this connection we have received

a letter from Mr. E. D. Robinson, District Engineer British Railways (Eastern Region) Cambridge, from which the following is extracted:

"We have no records regarding difficulties which might have been encountered during the construction of the Eastern Counties Railway in 1845 over this section. Contrary to our experience elsewhere in the peat fen north of Cambridge, the railway formation at Dernford seems to have been well founded and we do not experience any undue settlement. I assume from this that the depth of peat or bog land cannot have been very deep and the tipped embankment carrying the railway presumably bears directly upon the harder strata below the fen." (23/3/56.)

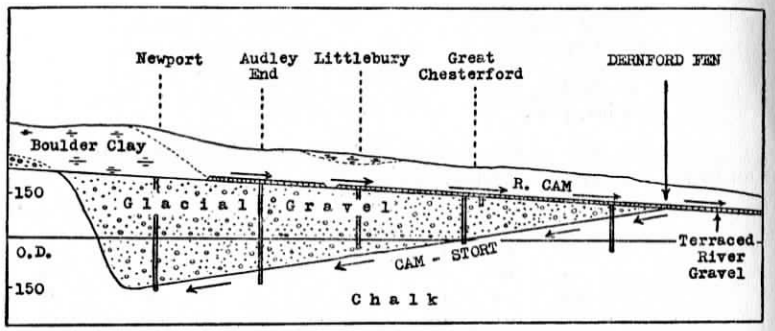


Fig. 3.—Buried Glacial Channel ("Cam-Stort") of Cam Valley. Diagram runs S.-N. and represents a length of c.16 miles. Heights relative to Ordnance Datum (O.D.) are in feet. Positions of six well-borings are shown.

Drawn by D. J. PEGRUM.

Dernford may have had a particularly interesting geological history. Well-borings made between Cambridge and Quendon have revealed the presence of a buried glacial channel running beneath the valley of the modern Cam, the glacial gravel and sand becoming progressively deeper towards the south until it reaches a maximum thickness of 350ft. underneath Newport (Essex). Professor J. E. Marr (18) ascribed the drift-filled channel to a stream that "once flowed from a spot north of Whittlesford in a southward direction, over ground occupied by the present watershed of the Granta (or Cam)," and whose waters "have been diverted to their present direction by the blocking of this channel with Drift." If the floor of the buried channel is charted, it is found to emerge at the surface in the Dernford area, and it is thus possible that the modern "fen" represents the source of a river which, in one of the Ice Ages, flowed into the Thames (see fig. 3). We have named this extinct water-course the "Cam-Stort."

A good deal of interest has been shown by members of the Natural History Society (notably PJC, PBF, NCM, DWN and RMR) in the geological structures and the fossil remains exposed in the flanks of this valley by the opening up of chalk and gravel pits. Work has continued from Dernford itself well towards the Stortford district. PBF and RMR have added this supplement to the original notes by DJC and TJCH.

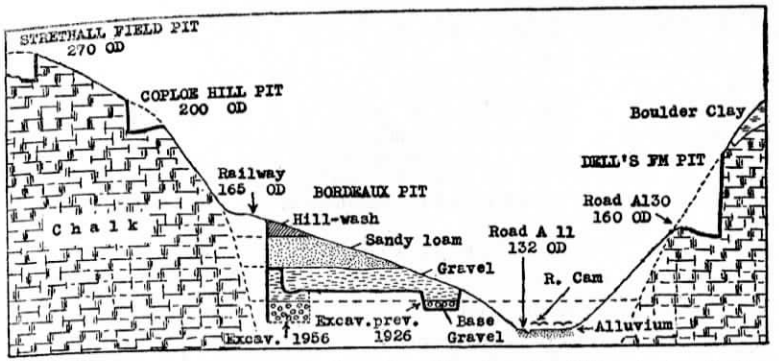


Fig. 4.—Terraced river gravels in valley 5½ miles S. of Dernford. Section runs S.W.-N.E. for 2½ miles and passes through four pits. Worked flints and bones of Ice Age mammals found in base gravel at Bordeaux Pit. Region surveyed by RCB, PJC, PBF, NCM, DWN and RMR.

Drawn by P. J. LAWRENCE.

In the chalk pits on either side of the Cam-Stort valley we have collected fossils of several different types, some of which have proved most revealing. Perhaps the most useful group has been the belemnites, of which three types are particularly noteworthy, *Actinocamax plenus, Belemnitella mucronata* and *A. quadratus.* These are useful in showing the ages of the chalk deposits in which they lie, *plenus* being the oldest and *quadratus* the youngest. So far we have found only *plenus* and *mucronata* in the immediate neighbourhood of the glacial valley. Two sea-urchins, *Echinocorys scutatus* and *Holaster subglobosus,* occur in much the same places. Near Stortford, in the pits at Farnham and Stansted, marked differences are noticed: at Farnham, the predominant fossils are belemnites and urchins, while at Stansted we have found large numbers of fossilised worm-casts, water-worn belemnites and the scallop *Pecten* (=*Chlamys*) *fissicosta.* The Farnham pit lies in the chalk, but the pit at Stansted is in the valley itself, recent alluvium brought down by the Stort overlying the deeper glacial gravel now exposed by the mechanical diggers. Some of the Stansted fossils have probably been dislodged from their strata and brought down by the stream.

In the shallower pit at Bordeaux Farm, Little Chesterford, 5½ miles down the valley from Dernford, earlier workers discovered the remains of the following mammals; *Elephas primigenius, Hippopotamus* sp., and *Rhinoceros tichorhinus* (see fig. 4).

D. J. COVE and T. J. C. HALL.
P. B. FRESHWATER and R. M. READ.

(Bibliography: 18, 36.)

THE VASCULAR PLANTS OF DERNFORD FEN

Foreword by AD—The list of 233 kinds of vascular plants known to occur on Dernford Fen (impressive, even though far from exhaustive) has been compiled over the years from records made by practically every boy visiting the area. It is fair to select for special mention, however, six who concentrated particularly on this aspect of the Dernford life: they are, RWB, DJC, PHK, RTL, NO and PER. In the summary which follows, GSB has analysed the information in terms of its ecological significance.

THE DERNFORD PLANT COMMUNITIES

Vegetational succession. To some extent, the term "fen" as applied to Dernford is misleading, since wet conditions are restricted mainly to the southern third of the area and railway ditch. In the south, it is possible to trace the succession from open water, through grassland and scrub, to the true fenland climatic climax of alder-wood (carr). Over most of the area, however, several sub-climaxes exist, each depending for its stability upon various edaphic and biotic factors. The schema represents the main succession and the subsidiary communities arising from it.

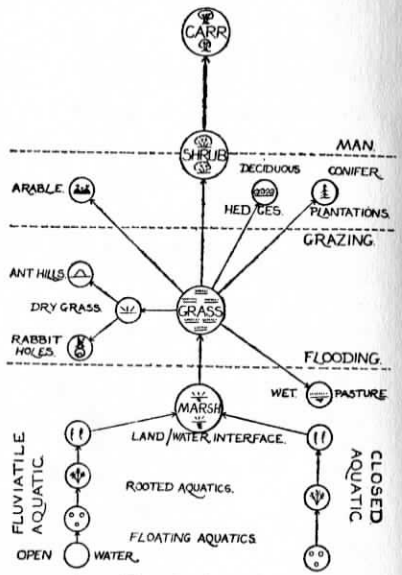


Fig. 5.—Main stages in vegetational succession, Dernford. The horizontal lines show the principal factors responsible for stabilising the various sub-climaxes.

Drawn by J. S. W. HINCH.

Marsh can arise from either flowing (fluviatile) water or from stagnant (closed) water, in both of which floating, rooted and reed-swamp plants occur. Grassland can develop from marsh; or conversely, grassland can be reconverted into marsh by flooding. Scrub eventually replaces open grassland; but man has established deciduous hedgerows and non-deciduous conifer plantations, as well as ploughing up grassland for arable farming. Both ants and rabbits have had their effects on the vegetation, but it is by grazing that grassland is perpetuated. In the natural course of events, low-lying grassland is unstable, passing through scrub into woodland.

Features of particular importance in each kind of community are outlined below.

Fluviatile and closed aquatic communities. The R. Dern is the main habitat of the fluviatile aquatic plants; and there are several small pools of stagnant water at the edge of Fen Marsh, as well as the

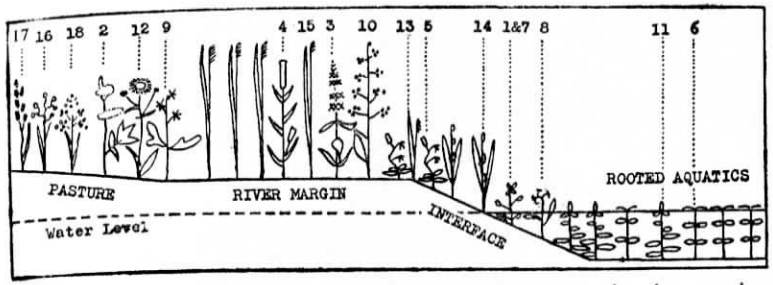


Fig. 6.—**Profile chart, R. Dern—Grazings, showing vegetational succession from running water** (right) **to chalk pasture** (left). Numbers refer to species in systematic list. Surveyed 10/8/55 by PER.

Drawn by R. H. COUCHER.

railway ditch, which provide closed aquatic conditions. *Lemna* is an abundant floating aquatic in both communities. The water of the Dern is completely free from industrial pollution and supports dense masses of *Potamogeton* and *Callitriche,* and *Ranunculus aquatilis* in slow-flowing stretches. *R. aquatilis* occurs here and there in closed water. In the Dern, marginal rooted aquatics include such forms as *Veronica anagallis-aquatica, Myosotis scorpioides, Apium nodiflorum* and *Rorippa spp.*: some of these also occur in closed conditions, but here *Scrophularia aquatica, Alisma plantago-aquatica, Glyceria fluitans* and *Phragmites communis* are more general.

Marsh. The marsh in the south is particularly rich in species. We have identified several sedges, including *Cladium mariscus,* which is typical of East Anglian fens, and *Carex flacca,* a more generally distributed sedge but one which is also abundant in fens. *Schoenus nigricans* is a third species notable for its affinity for fenland conditions. The grass *Molinia caerulea,* here very plentiful, is also general in undrained fens. Of the eight orchids discovered at Dernford, three are closely associated with the marsh and are noted for a tendency to flourish where fenland conditions prevail: these are, *Epipactis palustris, Dactylorchis fuchsii* and *D. incarnata.*

Grassland. 1. Wet pasture. Carr Meadow and the flanks of the railway ditches. Generally an intermediate zone between true marsh and dry, chalky grassland. A typical grass is *Festuca pratensis:* associated with it are such species as the sedge *Carex nigra* (especially in localities with abundant leaf-litter) and the rush *Juncus inflexus* (in the more alkaline parts), and dicotyledons such as *Ajuga reptans, Hypericum tetrapterum* and *Potentilla anserina.* The last is interesting in having its leaves covered with long, silky hairs which can hardly be used to restrict water-loss here, but which may assist it to survive under xerophytic conditions (as on heaps of gravel) or halophytic conditions (on sandy coasts).

2. Dry pasture. Extensive, covering the greater part of Chalk and Home Meadows, the Hoardings and the Grazings. The influence of the chalky substrate is very obvious, many species being calcicoles and/or xerophytes. The dominant grass, *Bromus erectus,* is typical

of dry chalk grassland : here it is associated with the grass *Briza media* which, unlike the *Bromus,* extends into slightly damper patches (especially in the Hoardings). Among the calcicoles which abound here, we may select for particular mention *Primula veris, Blackstonia perfoliata, Pimpinella saxifraga, Polygala calcarea,* the thistle *Carduus nutans* and the orchid *Ophrys apifera.*

3. Anthills. Associated with dry grassland, and mainly the work of the ant *Acanthomyops flava.* These hummocks, usually orientated east-west, consist of very fine, chalky soil, well drained as a result both of its texture and its slope. A plant virtually confined to anthills is *Thymus drucei,* normally rare in S.E. England and there only found on chalk downs. Two other species, *Trifolium dubium* and *Myosotis arvensis,* are also commonest at Dernford on anthills.

4. Rabbit scrapes. Rabbits create local " deserts " by forming a ramp of fine soil at the mouths of their burrows. Usually the first plant to colonise this soil is the stonecrop *Sedum acre,* a fact also noted by Wallis in 1904. The increasing scarcity of this plant since the myxomatosis outbreak has been evident. Among the annuals growing here are *Capsella bursa-pastoris* and *Myosotis arvensis:* a common perennial following *Sedum* is the chickweed *Cerastium holosteoides.*

Arable land. Many weeds of cultivated ground grow as a result of the ploughing up of grassland and the planting of crops. Annuals predominate, and these include *Capsella,* the poppy *Papaver rhoeas,* the pansy *Viola tricolor,* the chickweed *Stellaria media,* the umbellifer *Aethusa cynapium,* the deadnettle *Lamium purpureum* and the grass *Poa annua,* besides a range of goosefoot species, *Chenopodium* agg., very difficult to separate out. As examples of perennials we may note the composite *Sonchus arvensis* and the fodder-plant *Onobrychis viciifolia.* Several, such as the last-named, show affinities for chalky soil.

Deciduous hedgerows. Having been planted over a century ago to subdivide the fen into parcels, they now contain some self-set species. Shrubs include *Rhamnus cathartica, Prunus spinosa* and *Ligustrum vulgare;* ground-carpet herbs such forms as *Stachys sylvatica, Tragopogon pratensis* and *Arum maculatum.*

Coniferous plantations. Home Scrub. There is nothing on Dernford suggesting a true coniferous wood. The only gymnosperm is *Picea* sp., represented as scattered specimens. The spruce demonstrates xerophytic adaptations.

Scrub. Home and Nine Wells Scrubs. But for the controlling influence of grazing cattle, this would become more universal : as it is, most of the scrub is confined to the damper areas from which stock is excluded. *Crataegus monogyna* is the dominant in this zone, but *Rosa* spp. (*R. canina* in particular) are important as subdominants in drier places. Where damp ground links the succession from marsh to fen carr, the shrubs include *Rhamnus* and *Salix* spp. The blackberry-like shrubs *Rubus fruticosus* and *caesius* form dense mats in several places. The most conspicuous deciduous trees are probably *Fraxinus excelsior* in Nine Wells Scrub and *Betula* in the western half of Home Scrub.

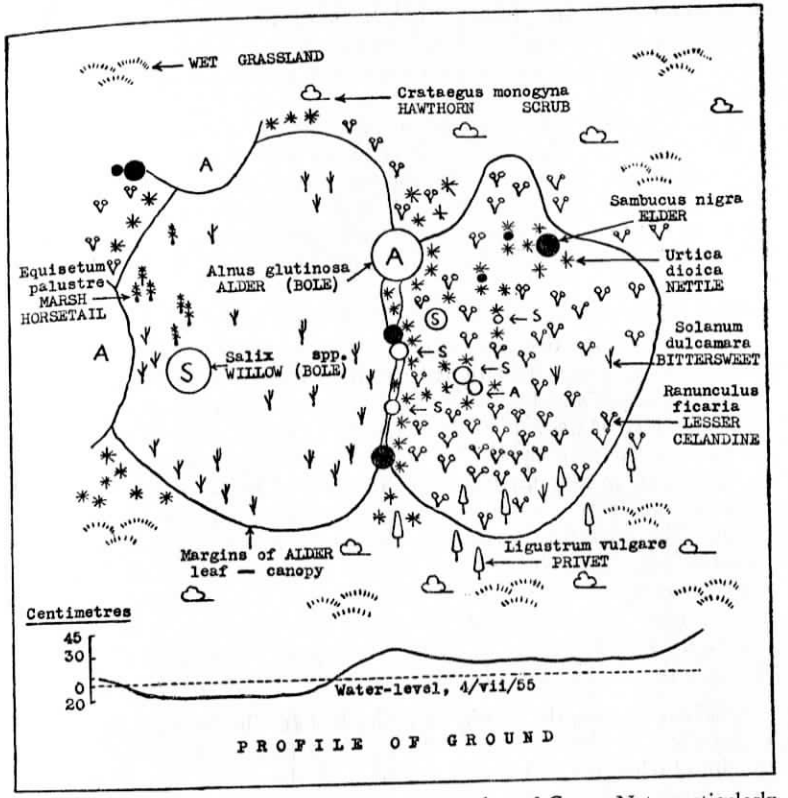


Fig. 7.—Quadrat, 5 metres square, at S.W. edge of Carr. Note particularly Bittersweet as shrub in standing water, and Elder restricted to higher ground with abundant Lesser Celandine and Nettles. Surveyed July '55 by DJC and TJCH.

Drawn by D. J. PEGRUM.

Fen carr. Alder swamp, the natural climatic climax in succession from true fen to deciduous woodland, resulting from the gradual accumulation of organic debris with a resultant lowering of the water-table. At Dernford, the small carr-wood is gloomily impressive, the dominant trees being tall and closely packed, and standing in oozy soil black with humus from rotting debris and surrounded by the back-waters of the R. Dern. An important shrub here is *Solanum dulcamara,* especially in pools of standing water. *Ranunculus ficaria* is an abundant component on the ground-flora on slightly elevated ground.

EVIDENCE FOR THE EXISTENCE OF TRUE FEN

The flora-list provides irrefutable evidence that some of the wet ground is a fen. Wallis (34) selects for particular mention in this connection the following six species : *Molinia varia* (=*M. caerulea*), *Cladium jamaicense* (=*C. mariscus*), *Schoenus nigricans, Epipactis palustris, Orchis* (=*Dactylorchis*) *incarnata* and *Pinguicula vulgaris.* Of these, we have only failed to find the last, a plant of exceptional interest

on account of its insectivorous habit. Very determined searches have been made for it, and we must conclude that it is now extinct in the part of Dernford to which we have access (although what lies behind the buildings of Spicer's factory across the railway-line is anybody's guess). Dr. M. H. Clifford has drawn our attention to the fact that, in these latitudes, *C. mariscus* fails to set viable seed and propagates vegetatively by rhizomes, so that the presence of this plant here suggests a relict fen flora. In June '56, CM reported specimens of *Peucedanum palustre*, a typical fenland species and well known to entomologists as the food-plant of the swallowtail butterfly at Wicken Fen.

DERNFORD AS A HABITAT FOR XEROPHYTES AND CALCICOLES

The extensive dry chalkland would appear to provide xerophytic conditions. In the systematic list, we have marked off all those species known to possess adaptations for restrictions of water-loss (e.g. reduction of leaf-surface or a succulent habit) and, for the rest, we have followed the practice adopted by Wallis and taken hirsuteness as indicative of an adaptation to xerophytism. Such a method has obvious limitations, since xerophytism is often a matter of sunken stomata or thickened cuticles, the investigation of which would be beyond our capacity. Nevertheless, the method suffices to give a general picture of the extent to which xerophytes constitute a proportion of the Dernford flora. Of the 233 types recorded by us, 100 qualify on this basis to be regarded as xerophytes, i.e. 43%. In 1904 Wallis gave the proportion of xerophytes in the flora of the whole of Cambridgeshire as 21%.

Where known, the affinity of each plant for the presence of calcium is also given in the flora-list. There appear to be at least 60 calcicoles (calcium-loving species) on Dernford, and the proportion of these to the neutrals and calcifuges combined is approximately 26%, itself a further sign of the adaptation of the flora to local edaphic conditions.

SYSTEMATIC LIST OF VASCULAR PLANTS

Distribution: G, general; L, local.
Frequency: A, abundant; C, common; S, scarce; R, rare.
Water affinities: × xerophytes; O, others.
Calcium affinities: +, calcicoles; O, neutrals; −, calcifuges.
Numbers indicate species represented in fig. 6, page 11.

Name	Distribution & Frequency	Affinities: H_2O	Affinities: Ca	Main Localities
Pteridophyta, Ferns and Horsetails				
Ophioglossum vulgatum L., Adder's Tongue	LC	O	O	Carr Meadow.
Dryopteris sp., fern	LS	O	O	Carr Meadow.
Thelypteris palustris Schott, Marsh fern	LR	O	+	Carr.
Equisetum palustre L., Marsh Horsetail	LS	O	O	Carr.
E. arvense L., Common Horsetail ...	GC	×	O	Railway.
Gymnospermae, Conifers				
Picea sp., a spruce	LC	×	O	Home Scrub.

Ranunculaceae, Buttercup Family				
Caltha palustris L., Marsh Marigold	LA	O	O	Dern. Railway ditch.
Clematis vitalba L., Traveller's Joy ...	LS	O	+	Nine Wells Scrub.
Ranunculus repens L., Creeping Buttercup	LA	O	O	Carr Meadow. Fen Marsh.
R. bulbosus L., Bulbous B.	GA	×	O	Chalk Meadow. Grazings.
R. parviflorus L., Small-flowered B.	LS	×	+	Chalk Meadow.
R. flammula L., Lesser Spearwort ...	LC	O	O	Fen Marsh.
R. sceleratus L., Celery-leaved Buttercup	LC	O	O	Fen Marsh. Carr.
R. aquatilis L., Water Crowfoot ...	LC	O	O	Dern. Railway ditch.
R. ficaria L., Lesser Celandine ...	LC	O	O	Carr. Hedges.
Papaveraceae, Poppy Family				
Papaver rhoeas L., Corn Poppy ...	LA	×	O	Arable. Home Meadow.
P. hybridum L., Bristly P.	LS	×	+	Arable.
P. argemone L., Pale P.	LC	×	O	Arable.
Chelidonium majus L., Greater Celandine	LR	×	O	Buildings.
Fumariaceae, Fumitory Family ...				
Fumaria officinalis L., Fumitory ...	LA	O	O	Arable.
Cruciferae, Cabbage Family				
Sinapis arvensis L., Charlock ...	LA	×	O	Orchard. Buildings.
S. alba L., White Mustard	LA	×	+	Arable. Orchard.
Thlaspi arvense L., Common Penny-cress	LC	O	O	Arable. Orchard.
Capsella bursa-pastoris (L.) Med., Shepherd's Purse	GA	×	O	Disturbed ground.
Cardamine pratensis L., Lady's Smock	LC	O	O	Carr Meadow. Fen Marsh.
1. *Rorippa nasturtium-aquaticum* (L.) Hayek, Watercress	LA	O	O	Dern.
R. islandica (Oeder) Borb., Marsh Yellow Cress	LC	O	O	Cattle Wade.
Alliaria petiolata (Bieb.) Cav. & Grande, Garlic Mustard	LC	×	O	Orchard.
Sisymbrium officinale (L.) Scop., Hedge M.	LC	×	O	Orchard. Buildings.
Resedaceae, Mignonette Family				
Reseda lutea L., Wild Mignonette ...	LC	O	+	Chalk Meadow.
Violaceae, Violet Family				
Viola hirta L., Hairy Violet	GA	×	+	Most grassland.
V. riviniana Reich., Common Dog V.	GA	O	O	Most grassland.
V. tricolor L., Heartsease	LC	O	O	Arable.
Polygalaceae, Milkwort Family				
Polygala vulgaris L., Common Milkwort	LA	O	+	Chalk Meadow.
P. calcarea Schultz, Chalk Milkwort	LS	O	+	Chalk Meadow.
Hypericaceae, St. John's Wort Family				
Hypericum perforatum L., Common St. John's Wort	GC	O	+	Scrub. Railway ditch.
H. tetrapterum Fries, Square St. J. ...	LC	O	O	Wet pasture.
Cistaceae, Rock-rose Family				
Helianthemum chamaecistus Miller, Common Rock-rose	LC	×	+	Chalk Meadow.

Caryophyllaceae, Pink Family				
Silene vulgaris (Moench) Garcke, Bladder Campion	LC	O	O	Nine Wells Scrub.
Melanbrium album (Miller) Garcke, White C.	LA	×	O	Disturbed ground.
M. dioicum (L.) Coss. & Ger., Red C	LS	×	O	Nine Wells Scrub.
Lychnis flos-cuculi L., Ragged Robin	LR	O	O	Railway ditch.
Cerastium holosteoides Fries, Common Mouse-ear	GA	×	O	Disturbed ground.
Stellaria media (L.) Vill., Common Chickweed	GA	×	O	Disturbed ground.
S. palustris Retzius, Marsh Stichwort	LC	O	+	Fen Marsh.
Chenopodiaceae, Goosefoot Family				
Chenopodium spp., goosefoots ...	LA	O	O	Arable.
Malvaceae, Mallow Family				
Malva sylvestris L., Common Mallow	LC	×	O	Buildings.
M. neglecta Wallroth, Dwarf M. ...	LC	×	O	Buildings.
Linaceae, Flax Family				
Linum anglicum Mill., Perennial Flax	LR	O	+	Chalk Meadow.
L. catharticum L., Fairy F.	LS	O	+	Chalk Meadow.
Geraniaceae, Cranesbill Family				
Geranium dissectum L., Cut-leaved Cranesbill	GC	×	O	Arable. Buildings.
G. molle L., Dove's-foot C. ...	LC	×	O	Buildings.
G. robertianum L., Herb Robert ...	LA	×	O	Buildings. Hedges.
Aceraceae, Maple Family				
Acer campestre L., Maple	LS	O	+	Nine Wells Scrub.
Celastraceae, Spindle-tree Family				
Euonymus europaeus L., Spindle-tree	LR	O	+	Railway.
Rhamnaceae, Buckthorn Family				
Rhamnus cathartica L., Common Buckthorn	LS	O	+	Scrub. Hedges.
Papilionaceae, Peaflower Family				
Ononis repens L., Rest-harrow ...	LC	×	O	Nine Wells Scrub.
Medicago sativa L., Lucerne	LC	×	+	Arable. Home Meadow.
M. lupulina L., Black Medick ...	LS	O	O	Dry grassland.
Trifolium pratense L., Red Clover ...	GA	×	O	Most grassland.
T. repens L., White C.	GO	O	O	Most grassland.
T. campestra Schreber, Hop Trefoil	LC	×	O	Hoardings.
T. dubium Sibthorp, Lesser Yellow T.	GC	×	O	Most dry grassland.
Anthyllis vulneraria L., Kidney Vetch	LC	×	+	Chalk Meadow.
Lotus corniculatus L., Common Birds-foot Trefoil	GA	O	O	Most dry grassland.
Onobrychis viciifolia Scop., Sanfoin	LS	×	+	Arable.
Vicia cracca L., Tufted Vetch ...	LC	×	O	Hedges. Scrub.
V. sativa L., Common V.	LA	×	O	Grassland.
V. sepium L., Bush V.	LC	×	O	Hedges. Scrub.
Lathyrus pratensis L., Meadow Pea	LC	×	O	Hedges. Grassland.
Rosaceae, Rose Family				
2. *Filipendula ulmaria* (L.) Max., Meadowsweet	LA	O	O	Dern. Fen Marsh.
Rubus fruticosus L., Bramble ...	LA	O	O	Scrub.
R. caesius L., Dewberry	LA	×	+	Scrub. Dry Grass. Carr.

Potentilla palustris (L.) Scop., Marsh Cinquefoil	LC	O	O	Fen Marsh.
P. anserina L., Silverweed	LA	×	O	Wet and dry grassland.
P. erecta (L.) Räusch., Tomentil ...	LC	×	—	Wet and dry grassland.
P. reptans L., Creeping Cinquefoil ...	LC	×	+	Hedges. Dry grassland.
Fragaria vesca L., Wild Strawberry ...	LC	×	+	Hedges. Scrub.
Geum urbanum L., Herb Bennet ...	LC	×	O	Hedges. Scrub.
Agrimonia eupatoria L., Agrimony ...	LC	×	O	Dry grassland.
Poterium sanguisorba L., Salad Burnet	LC	×	+	Chalk & Carr Meadows.
Rosa spp., roses	GC	O	O	Hedges. Scrub.
Prunus spinosa L., Blackthorn ...	LA	O	O	Hedges. Scrub.
Crataegus monogyna Jac., Hawthorn	LA	O	O	Hedges. Scrub.
Sorbus aucuparia L., Rowan ...	LR	O	O	Home Scrub.
Malus sylvestris Miller, Crab Apple	LS	O	O	Hedges.
Crassulaceae, Stonecrop Family				
Sedum acre L., Wall-pepper ...	GC	×	+	Many dry places.
Lythraceae, Loosestrife Family				
3. *Lythrum salicaria* L., Purple Loosestrife	LC	O	O	Dern. Fen Marsh.
Onagraceae, Willow-herb Family				
4. *Epilobium hirsutum* L., Great Willow-herb	LC	×	O	Drier parts of Dern margin.
E. montanum L., Broad-leaved W. ...	GC	×	O	Hedges. Arable.
5. *E. parviflorum* Schr., Hoary W. ...	LC	×	O	Dern.
Callitrichaceae, Water - starwort Family				
6. *Callitriche palustris* L., Common Water-starwort	LA	O	O	Dern.
Cornaceae, Cornel Family				
Thelycrania sanguinea (L.), Dogwood	LC	O	+	Hedges. Railway ditch.
Umbelliferae, Umbellifer Family				
Anthriscus sylvestris (L.) Bernh., Cow Parsley	LA	O	O	Many shady places.
7. *Apium nodiflorum* (L.) Reich., Fool's Water-Cress	LC	O	O	Dern margins.
Pimpinella saxifraga L., Burnet-saxifrage	LC	×	+	Dry grassland.
Aethusa cynapium L., Fool's Parsley	LC	O	O	Arable.
Angelica sylvestris L., Wild Angelica	LC	O	O	Nine Wells Scrub.
Peucedanum palustre (L.), Moench Milk Parsley	?	O	O	Data inadequate.
Heracleum sphondylium L., Cow Parsley	LA	×	O	Nine Wells Scrub.
Daucus carota L., Wild Carrot ...	LC	×	+	Dry grassland.
Cucurbitaceae, Melon Family				
Bryonia dioica Jac., White Bryony ...	LS	×	O	Nine Wells Scrub.
Euphorbiaceae, Spurge Family				
Euphorbia helioscopia L., Sun Spurge	LA	O	O	Arable. Buildings.
E. peplus L., Petty S.	LA	O	O	Arable. Buildings.
Polygonaceae, Dock Family				
Polygonum aviculare L., Knotgrass	LC	O	O	Arable. Buildings.
Rumex acetosa L., Common Sorrel ...	GA	O	O	Most grassland.

R. crispus L., Curled Dock	GA	O	O	Widespread.
R. obtusifolius L., Broad D.	LA	×	O	Arable. Buildings.
R. conglomeratus Murr., Clustered D.	LS	O	O	Carr Meadow.
Urticaceae, Nettle Family				
Urtica urens L., Small Nettle ...	LC	×	O	Near fowl-houses.
U. dioica L., Stinging Nettle ...	LA	×	O	Buildings. Carr.
Cannabinaceae, Hemp Family				
Humulus lupulus L., Hop	LR	×	O	Roadside near farm.
Betulaceae, Birch Family				
Betula verrucosa Ehrh., Silver Birch	LC	O	O	Home Scrub.
Alnus glutinosa (L.) Gaertner, Alder	LA	O	O	Carr.
Salicaceae, Willow Family				
Salix fagilis L., Crack Willow ...	LC	O	O	Lower Dern.
S. viminalis L., Osier	LC	O	O	Moist places.
S. atrocinerea Brotero, Common Sallow	LC	O	O	Moist places.
S. caprea L., Pussy Willow ...	LS	O	O	Between Chalk & Carr Meadows.
Primulaceae, Primrose Family				
Primula veris L., Cowslip	GA	×	+	All dry grassland.
Anagallis tenella (L.), L., Bog Pimpernel	LB	O	O	Fen Marsh.
A. arvensis L., Scarlet P.	LS	O	O	Arable.
Oleaceae, Olive Family				
Fraxinus excelsior L., Ash	LC	O	+	Nine Wells Scrub.
Ligustrum vulgare L., Common Privet	LC	O	+	Hedges.
Gentianaceae, Gentian Family				
Centaurium erythraea Rafn., Common Centaury	LC	O	O	Dry grassland.
Blackstonia perfoliata (L.), Hudson, Yellow-wort	LC	O	+	Chalk Meadow.
Boraginaceae, Borage Family				
Cynoglossum officinale L., Hounds-tongue	LS	×	+	Chalk Meadow.
Symphytum officinale L., Comfrey ...	LC	×	O	Dern. Railway ditch.
8. *Myosotis scorpioides* L., Water Forgetmenot	LA	O	O	Dern.
M. arvensis (L.) Hill, Common Forgetmenot	LA	×	O	Dry, disturbed ground.
Solanaceae, Nightshade Family				
9. *Solanum dulcamara* L., Bittersweet	LA	O	O	Dern. Scrub. Carr.
Scrophulariaceae, Figwort Family				
Linaria vulgaris Miller, Common Toadflax	GC	O	O	Most grassland.
Scrophularia nodosa L., Figwort ...	LC	O	O	Dern. Railway ditch.
10. *S. aquatica* L., Water Betony ...	LC	O	O	Dern. Railway ditch.
Veronica beccabunga L., Brooklime ...	LC	O	O	Cattle wade.
11. *V. anagallis-aquatica* L., Water-Speedwell	LC	O	O	Dern. Fen Marsh.

V. persica Poir., Common Field S. ...	LC	×	O	Arable. Disturbed soil.
Melampyrum pratense L., Common Cow-wheat	LS	O	O	Nine Wells Scrub.
Orobanchaceae, Broomrape Family				
Lathraea squamaria L., Toothwort	LR	×	O	Edge of Carr.
Orobanche elatior Sutton, Knapweed Broomrape	LR	×	+	Chalk Meadow.
Verbenaceae, Vervain Family				
Verbena officinalis L., Vervain ...	LS	×	+	Buildings.
Labiatae, Mint Family				
Mentha aquatica L., Water Mint ...	LC	O	O	Dern. Fen Marsh.
Thymus drucei Ronn., Wild Thyme	LC	×	+	Anthills in dry grassland.
Clinopodium vulgare L., Wild Basil	LC	×	+	Home Scrub.
Prunella vulgaris L., Self-heal ...	GC	×	O	Most moist grassland.
Stachys sylvatica L., Hedge Woundwort	LC	×	O	Hedges.
Lamium album L., White Deadnettle	LA	×	O	Buildings. Hedges.
L. purpureum L., Red Deadnettle ...	LA	×	O	Buildings. Arable.
Glechoma hederacea L., Ground Ivy	LC	×	O	Nine Wells Scrub.
Scutellaria galericulata L., Common Skullcap	LS	O	O	Edge of Carr.
Ajuga reptans L., Bugle	LC	O	O	Carr Meadow. Fen Marsh.
Plantaginaceae, Plantain Family				
Plantago major L., Ratstail Plantain	LA	O	O	Tracks near buildings.
P. lanceolata L., Ribwort P. ...	LA	×	O	As *P. major;* also grassland.
Rubiaceae, Bedstraw Family				
Galium verum L., Lady's Bedstraw ...	GC	O	O	Most dry grassland.
G. palustre L., Marsh B.	LC	O	O	Fen Marsh.
G. aparine L., Goosegrass	GA	×	O	Ubiquitous, except open situations.
Caprifoliaceae, Honeysuckle Family				
Sambucus nigra L., Elder	GC	O	O	Carr. Hedges. Scrub.
Viburnum lantana L., Wayfaring Tree	LR	×	+	Railway embankment.
V. opulus L., Guelder Rose	LS	O	O	Railway ditch. Scrub.
Dipsacaceae, Teasel Family				
Dipsacus fullonum L., Wild Teasel ...	LC	O	O	Edge of railway ditch.
Knautia arvensis (L.) Coulter, Field Scabious	LC	×	O	Dry grassland.
Scabiosa columbaria L., Small S. ...	LC	×	+	Dry grassland.
Succisa pratensis Moench, Devil's-bit S.	GS	×	O	Widespread, damp and dry places.
Compositae, Daisy Family				
Senecio jacobaea L., Common Ragwort	GA	O	O	Most grassland.
S. erucifolius L., Hoary R.	LC	×	+	Home Meadow. Hoardings.
S. vulgaris L., Groundsel	GA	×	O	Arable. Disturbed ground.
Tussilago farfara L., Coltsfoot	GC	×	O	Arable. Near buildings.
12. *Pulicaria dysenterica* (L.) Bernh., Common Fleabane	LC	×	O	Carr Meadow. Dern.
Bellis perennis L., Daisy	GA	×	O	Trodden grassland.

Eupatorium cannabinum L., Hemp Agrimony	LS	×	O	Carr Meadow. Fen Marsh.
Tripleurospermum maritimum (L.) Koch, Scentless Mayweed	LA	O	O	Tracks near farm.
Achillea millefolium L., Yarrow ...	GA	×	O	Most grassland.
Chrysanthemum leucanthemum L., Ox-eye Daisy	GA	×	O	Most grassland.
Carduus nutans L., Musk Thistle ...	LC	×	+	Chalk Meadow.
Cirsium palustre (L.) Scop., Marsh T.	LC	×	O	Carr Meadow. Camp Field.
C. arvense (L.) Scop., Creeping T. ...	GC	×	O	Ubiquitous.
C. acaulon (L.) Scop., Dwarf T. ...	GS	×	+	Grazings. Hoardings. Chalk Meadow.
Centaurea scabiosa L., Greater Knapweed	LC	×	+	Grazings.
C. nigra L., Hardhead	LC	×	O	Much as *C. scabiosa.*
Hypochaeris radicata L., Cat's Ear ...	GC	×	O	Most grassland.
Leontodon hispidus L., Greater Hawkbit	GC	×	+	Most grassland.
Tragopogon pratensis L., Goatsbeard	GC	O	O	Most grassland.
Sonchus arvensis L., Corn Sow-thistle	LC	×	O	Buildings. Arable.
Hieracium pilosella L., Mouse-ear Hawkweed	GC	×	O	Most dry grassland.
Crepis capillaris (L.) Wallroth, Smooth Hawksbeard	GC	O	O	Most grassland.
Taraxacum officinale Weber., Dandelion	GA	O	O	Most grassland.
Alismataceae, Water-plantain Family				
Alisma plantago-aquatica L., Common Water-plantain	LC	O	O	Railway ditch. Dern.
Potamogetonaceae, Pondweed Family				
Potamogeton sp., pondweed	LA	O	O	Upper Dern.
Juncaceae, Rush Family				
13. *Juncus inflexus* L., Hard Rush ...	LA	O	+	Dern. Carr Meadow.
J. effusa L., Soft R.	GA	O	O	Moist grassland.
Luzula campestris (L.) DC, Good Friday Grass	LA	O	O	Most dry grassland.
Iridaceae, Iris Family				
Iris pseudacorus L., Yellow Flag ...	LS	O	O	Dern. Railway ditch.
Diascoreaceae, Yam Family				
Tamus communis L., Black Bryony ...	LR	O	O	Nine Wells Scrub. Carr.
Orchidaceae, Orchid Family				
Epipactis palustris (L.) Crantz, Marsh Helleborine	LC	O	+	Fen Marsh.
Listera ovata (L.) R. Br., Twayblade	LA	O	+	Carr Meadow. Fen Marsh.
Plantanthera chlorantha (Cust.) Rchb., Greater Butterfly Orchid	LS	O	+	Carr Meadow.
Ophrys apifera Huds., Bee O. ...	GS	O	+	Everywhere except Carr.
Dactylorchis incarnata (L.) Verm., Early Marsh O.	LS	O	+	Fen Marsh.
D. fuchsii (Druce) Verm., Common Spotted O.	LC	O	+	Most damp grassland.
Gymnadenia conopsea (L.) Brown, Scented O.	GR	O	+	Most grassland.

Anacamptis pyramidalis (L.) Rich., Pyramidal O.	GS	O	+	Most dry grassland.
Araceae, Arum Family				
Arum maculatum L., Lords and Ladies	LC	O	+	Hedges.
Lemnaceae, Duckweed Family				
Lemna minor L., Common Duckweed	LA	O	O	Still water.
Cyperaceae, Sedge Family				
Schoenus nigricans L., Bog-rush ...	LC	O	+	Fen Marsh.
Cladium mariscus (L.) Pohl, Sedge ...	LA	O	+	Fen Marsh.
Carex flacca Schreber, Glaucous S. ...	LC	O	+	Dern. Fen marsh.
C. versicaria L., Bladder S.	LC	O	O	Railway ditch. Dern.
C. nigra (L.) Reich., Common S. ...	LC	O	—	Wet grassland. Dern.
14. *C. riparia* Curtis, Great Pond S.	LC	O	O	Dern.

GRAMINEAE, Grass Family

Owing to difficulty of identification, our knowledge of the relative abundance of most species is scant. The information below is summarised on a simple presence (+) or absence (−) basis.

NAME	Affinities H	Affinities Ca	Moisture: Arable Bldgs.	Moisture: Dry Grass	Moisture: Wet Grass	Moisture: Water Chann.	Moisture: Marsh	Shade: Scrub Hedge	Shade: Carr
15. *Phragmites communis* Trin., Reed ...	O	O	—	—	—	+	+	—	—
Molinia caerulea (L.) Moench, Purple Moorgrass	O	O	—	—	+	+	+	+	—
Glyceria fluitans (L.) Brown, Flote-g.	O	O	—	—	—	+	+	—	+
Festuca pratensis Hudson, Meadow Fescue ...	O	O	—	—	+	—	+	+	—
F. rubra L., Red F.	×	O	—	+	—	—	—	—	—
F. ovina L., Sheep's F.	O	O	—	+	—	—	—	—	—
Poa annua L., Annual Meadow-grass	O	O	+	+	+	+	—	+	—
P. pratensis L., Smooth Meadow-g.	O	O	—	+	+	—	—	—	—
Dactylis glomerata L., Cocksfoot	O	O	+	+	—	—	—	—	—
Cynosurus cristatus L., Crested Dogstail ...	O	O	+	+	—	—	—	—	—
16. *Briza media* L., Quaking-grass	O	O	—	+	+	—	—	—	—
17. *Bromus erectus* Hudson, Upright Brome ...	×	+	+	+	—	—	—	—	—
Hordeum murinum L., Wall Barley	×	O	+	+	—	—	—	—	—
Koeleria gracilis Pers., Crested Hair-grass ...	×	+	—	+	—	—	—	—	—
Avena fatua L., Wild Oat	×	O	+	—	—	—	—	—	—
Agrostis sp.	O	O	—	—	—	—	+	+	—
Helictotrichon pratense (L.) Pilger, Meadow O.	O	+	—	+	—	—	—	—	—
Arrhenatherum elatius (L.) Presl., False O. ...	O	O	+	+	—	—	—	—	—
18. *Holcus lanatus* L., Yorkshire Fog ...	O	O	—	+	+	+	+	+	+
Phleum pratense L., Timothy	O	O	+	+	+	—	—	—	—
Alopecurus myosuroides Hudson, Slender Foxtail	O	O	+	+	—	—	—	—	—
A. pratensis L., Meadow F.	O	O	—	+	+	—	—	—	—
Anthoxanthum odoratum L., Sweet Vernal Grass	×	O	+	+	+	—	—	—	—
Phalaris arundinacea L., Reed-g.	O	O	—	—	—	+	—	—	—
P. canariensis L., Canary-g.	O	O	+	—	—	—	—	—	—

(Bibliography: 2, 17, 27, 32, 34.)

G. S. BELL.

NOTES ON THE ECOLOGY OF THE BRYOPHYTA OF DERNFORD FEN

Dernford Fen beyond the immediate locality of the farm-buildings provides habitats for at least 18 species of *Bryophyta,* this number being made up of two species of *Hepaticae* (Liverworts) and 16 of *Musci* (Mosses). All the mosses fall into the sub-class *Bryales,* which is not surprising as the members of the other sub-class, the *Sphagnales,* all require acid conditions and could not, therefore, be expected to tolerate the alkaline soil of the fen.

Except where certain foreign objects have been introduced into the area, the species are all found in damp or submerged habitats which may conveniently be divided into the following groups :

(a) Submerged in shallow pools.
(b) Extremely damp areas, usually with numerous small pools, and with a carpet flora of grass tussocks.
(c) Damp grassland.
(d) Thick, clay-like soil under bushes or along the banks of the R. Dern, very damp and, apart from *Bryophyta,* having no carpet flora.
(e) Living tree-trunks.
(f) Dead tree-trunks, which in the main are fallen and in an advanced stage of decay.

The most notable example of material introduced from outside forming a habitat is to be found in the heaps of broken-up concrete scattered around the fen. These furnish dry conditions, in which occur two species of the genus *Tortula,* which normally flourish on old stonework. It must be borne in mind that such species are probably not native to the fen. Other man-made habitats, such as fences, wooden bridges and gates, support the same species as those found on naturally fallen wood, and which may, therefore, be regarded as true natives.

In the following section, the various species will be considered in relation to the habitats in which they grow.

DISTRIBUTION OF DERNFORD BRYOPHYTA IN HABITATS

A. NATIVES.

(a) **Permanently submerged in water.**

1. *Fontinalis antipyretica* Hedw., Willow Moss. A very beautiful moss; on Dernford growing extensively in established pools, but it is more usual to find it in running water,

(b) **Swampy areas.**

2. *Hypnum cupressiforme* Hedw., Cypress-leaved Feather Moss.
3. *H. fluitans* (Hedw.). Warnst., a feather moss.
4. *H. cuspidatum* Schp., Pointed Bog Feather Moss.
5. *Brachythecium rutabulum* (Hedw.) B. & S., Rough-stalked Feather Moss.

These four feather mosses occur in extremely damp areas, among tussocks of grass. In January '58, some were actually submerged, but in places this may have been due to the seasonal rise in the water-table. *H. fluitans* is normally submerged, however, and is remarkable on Dernford as it appears to be a calcifuge.

6. *Mnium undulatum* Hedw., Palm Tree Moss. Small tufts in shaded areas : essentially a woodland type.

(c) **Damp grassland.**

2 and 5 above, both species abundant in areas of transition from swamp to drier grassland.

(d) **Thick, clay-like soil.**

7. *Fissidens bryoides* Hedw., Common Flat Fork Moss. Grows extensively where soil is heavy, deep shade prevents drying out, and there is no ground cover : conditions particularly favourable on banks of Dern near alder-carr.

8. *Pellia epiphylla* (L.) Corda, Wide-nerved Liverwort. Larger of the two liverworts : very common in association with *Fissidens* (above) on banks of R. Dern particularly where there is a constant seepage of water through the soil.

(e) **Living tree-trunks.**

9. *Lophocolea cuspidata* Limpr., a leafy liverwort.
10. *Dicranella heteromalla* (Hedw.) Schp., Silky Fork Moss.
11. *Tetraphis pellucida* Hedw., Translucent Four-toothed Moss.

These three species grow in association, forming a belt 18 ins. to 2 ft. above the water-line around the trunks of trees projecting out of pools. The liverwort is usually nearer the water than the two mosses, and the Fork Moss is rather uncommon. The same three species also occur on the trunks of trees growing in the deeper thickets.

(f) **Dead tree-trunks.**

12. *Amblystegium serpens* (Hedw.) B. & S., a feather moss.
13. *Dicranoweissia cirrata* (Hedw.) Lindb., Curly Thatch Moss.
14. *Aulacomnium androgynum* (Hedw.) Schwaegr., Blue-headed Thread Moss.

Also 9 and 11. These species are all more or less abundant on the extensive deposits of fallen timber, much of it brought to a state of decay by the damp surroundings. Although this does not apply to Dernford, the liverwort *Lophocolea* is usually commoner on dead wood than on living trees.

B. SPECIES GROWING ON INTRODUCED MATTER.

Broken concrete.

15. *Tortula muralis* Hedw., Wall Screw Moss.
16. *T. ruralis* (Hedw.) Crome, Hairy Screw Moss.
17. *Bryum argenteum* Hedw., Silvery Thread Moss.
18. *B. caespiticium* Hedw., a thread moss.

All widely distributed on large lumps of smashed-up concrete; but information on the relative abundance of the four species is, as yet, inadequate.

These notes, although of necessity limited in scope, give some idea of the nature and distribution of the more conspicuous *Bryophyta* growing on the fen itself. No work has yet been attempted around the farm-buldings, and the present survey can only be considered as a preliminary one.

(Bibliography: 4, 11, 21.)

P. H. KING.

A NOTE ON THE FUNGI OF DERNFORD FEN

The following 13 species are the only fungi which have been reported so far from Dernford Fen. All are conspicuous and likely to attract the attention of a visitor who is observant but not necessarily searching particularly for fungi.

The order is that given in the classified list in Step (29).

Lepiota procera, Parasol Mushroom. In pasture near scrub, 20/10/57 (DEP).

Tricholoma nudum, Naked Toadstool. In grass near scrub, 20/10/57 (DEP).

Collybia radicata, Rooting Shank. Rotting branch-debris at edge of Fen Marsh, 10/8/55 (AD, RGO, PER).

Mycena galericulata, Bonneted Toadstool. Tree stumps, 11/5/58 (MJD, DWN).

Panus torulosus, Hairy Panus. Rotting willow-stump, Camp Field, 2/7/54 (DO).

Claudopus variabilis, Lame-foot. Fallen log in alder-carr, 2/7/54 (DJC).

Paxillus involutus, Paxil. In pasture near scrub, 20/10/57 (DEP).

Coprinus truncorum, Willow-trunk Toadstool. Decaying stump, 5/6/57 (NVH).

C. comatus, Lawyer's Wig. Refuse near fowl-houses, 10/8/55 (PER).

Annelaria separata, Ringed Longshank. Dung near cattle-wade, 20/10/57 (DEP).

Stereum hirsutum, Hairy Stereum. Dead tree-stump, 13/10/57 (RGM).

Polyporus betulinus, Birch Bracket. Living birch-tree, Home Scrub, 5/6/57 (AD, NVH).

Bovista nigrescens, Small Round Puff-ball. Home Meadow, in grass, 27/10/57 (AD).

(Bibliography: 29.)

J. W. E. NEAL.

THE AQUATIC LIFE OF THE RIVER DERN

Foreword by AD.—During the four summers of 1953-56, several boys working on Dernford Fen collected material from the R. Dern and its immediate fringes, but to PER must go the chief credit for the most intensive study of this stream as a habitat. Reavell's personal investigations were conducted mainly during two visits, the first in August '55 and the second at the end of the following May, and in the paper which follows he bases his conclusions largely upon his own observations while also taking account of all the significant discoveries of other workers.

Edaphic features of the R. Dern. A narrow, shallow, somewhat fast-flowing chalk stream: maximum width c.1·7 metres, greatest depth c.0·8 metres, no figures available for velocity of water-flow. Water cold and extremely clear, the bottom rarely being occluded by suspended matter even after heavy rain. Bed superficially of recent alluvium in the form of fine, peaty silt: this overlies deeper gravel which, in the more rapid stretches, projects at the surface as coarse stones. The stream rises at Nine Wells and, after flowing northwards through the eastern third of the area, crosses to the west side of the railway track to join the R. Cam. There are several backwaters which are virtually stagnant, particularly near the alder-swamp, and other recesses along the banks and at the trampled cattle-wade also bring about local reductions in the rate-of-flow. Accumulated organic debris reaches a climax in the channels by the alder-carr, which itself represents the climatic climax in the succession to woodland from true fen.

Non-vascular vegetation. *Algae:* no free-swmiming or floating filamentous types discovered in the main stream (where their absence partly accounts for the clarity of the water), but diatoms plentiful among the submerged parts of vascular aquatic plants, dominant genera being *Navicula* and *Pinnularia.* The largest alga in fast-flowing stretches is *Batrachospermum,* growing in tufts on starwort. Backwaters with accumulated organic debris yield *Euglena viridis* and *E. spirogyra,* and also the desmid *Closterium,* and here the water is more turbid and contains an abundance of *spirillum*-type bacteria. *Bryophyta:* liverworts and mosses grow on the earth walls of the Dern channel, but tend to be localised. They are covered in the special paper by PHK.

Vascular vegetation. The full range of higher plants noted in and along the Dern is included in the flora list on pages 14-21. It is sufficient merely to mention here that *Callitriche* and *Potamogeton* are the two dominant submerged aquatics, particularly in well-lit reaches, the latter tending to occur further upstream than starwort. Both grow in dense masses in the centres of which the water must be relatively still (even in the main current) and which provide suitable shelter for many small animals. A clearly defined succession can be traced in the vegetation, from the submerged aquatics, through the marginal emergent forms and the much taller species at the land/water interface, to the low-growing plants in the adjacent damp meadows.

The fauna in general. The first impression is one of scarcity, but this is largely an illusion due to the small size and retiring habits of most of the species. For convenience, it is proposed to omit from

the systematic list which follows certain animals whose association with the river is a loose one and which are noted elsewhere in this issue. These include two mammals, a few birds, one reptile and three amphibians, besides those moths which feed as larvae on or within the marginal vegetation. The eight aquatic molluscs noted in the area have all been found in the Dern, but these are also omitted since all the molluscs have been considered together in a special paper. With the exception of five species of fish, the remainder are all invertebrates, mostly insects: some 50 types have been discovered, of which only seven have not been satisfactorily relegated to a named genus or species.

It is certain that a protracted study of the Dern would yield a much longer fauna-list; but it is unlikely that we have overlooked any abundant macroscopic animal, and the list, as it stands, is sufficient to reveal a good cross-section of the forms frequenting this habitat.

FAUNA OF RIVER DERN AND ASSOCIATED CHANNELS

Frequency:

A, Abundant; C. Common; S, Scarce; R, Rare (with actual numbers found).

	Fauna	Velocity of Flow: Main Stream	Marginal Recesses	Backwaters	Remarks
FISHES	*Cobitis barbatula*, Stone Loach ...	S	—	—	Very local under bridges and boulders.
	Anguilla vulgaris, Common Eel ...	S	S	—	None over 8 ins. Occurrence very irregular.
	Cottus gobio, Miller's Thumb ...	R2	—	—	Only found July '54.
	Gasterosteus aculeatus, Three-spined Stickleback	C	S	—	Commoner downstream than Ten-spined, especially in winter.
	G. pungitius, Ten-spined Stickleback	C	C	—	Occurs more in shallows among Callitriche than Three-spined.
INSECTS	**Diptera**, Two-winged Flies.				
	Dicranota bimaculata, a crane-fly	—	S	S	Larvae crawling through mud and feeding on aquatic worms.
	Tanytarsus sp., a non-biting midge ...	C	C	—	Larvae in silt at varying depths.
	Chaoborus crystallinus, a midge	—	—	A	"Phantom larvae" present July '56.
	Simulium sp., a black fly	C	—	—	Larvae attached by suckers to stones.
	Coleoptera, Beetles				
	Anacoena, 2 spp. ...	C	—	—	Under floating *Callitriche* leaves near surface. Not amphibious.
	Philhydrus bicolor ...	—	R1	—	Under emergent boulder. Amphibious.
	Palpicorn beetles (2 unidentified spp.) ...	—	R4	R1	Under moss. Amphibious.
	Helmis sp.	R3	—	—	On submerged *Callitriche* leaves.

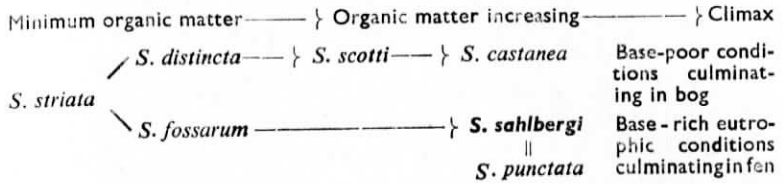
INSECTS	*Helophorus* sp. ...	R2	—	—	Under floating *Callitriche* leaves.
	Colymbetes fuscus, a dytiscid beetle ...	—	R1	—	Male in *Callitriche* in cattle-wade.
	Stenus sp.	—	—	R1	Crawling over black mud.
	Blue chrysomelid beetle	—	R4	—	Under stones just above water-level.
	Trichoptera, Caddis-flies.				
	Anabolia nervosa	C	A	—	Larvae and imagines plentiful. Larval case of *Callitriche* segments.
	Goera pilosa, Medium Sedge Caddis	A	C	—	Dominant species under stones. Larval case of fine gravel.
	Silo pallipes	A	S	—	Under stones in rapid stretches. Second most abundant caddis.
	Odontocerum albicorne, Grey Sedge c. ...	A	S	—	Under stones in swifter stretches. Larval case curved, of sand.
	Sericostoma personatum, Welshman's Button c.	C	—	—	Under stones, often in communities. Larval cases of minute stones.
	Caddis-flies (2 spp. represented only by empty cases) ...	—	C	—	(a) Larval case curved, of fine sand. (b) Larval case straight, of grey sand finer than in (a).
	Megaloptera, Alder-flies.				
	Sialis fuliginosus	C	—	—	Larvae in silt at varying depths.
	Odonata, Dragonflies.				
	Sympetrum striolatum Common Sympetrum	—	—	—	Imagines '55. No nymphs.
	Agrion splendens, Banded Agrion ...	—	—	—	One imago, August '55. No nymphs.
	Ischnura elegans, Common Ischnura ...	C	C	—	Commonest dragonfly, season May-September. Breeds.
	Coenagrion puella, Common Coenagrion	C	C	—	Second commonest dragonfly, esp. June-July. Breeds.
	Ephemeroptera, Fishing-flies.				
	Baëtis sp., Mayfly	C	—	—	Nymphs under stones. Sub-imagines ("Duns") observed July '54.
	Plecoptera, Stone-flies.				
	Nemoura variegata ...	—	C	R3	Nymphs still-water forms, almost confined to cattle-wade.
	Hemiptera-Heteroptera, Bugs.				
	Velia currens, Water Cricket ...	C	C	—	Nymphs and adults. Predominant aquatic bug. Runs on surface against current: retires when alarmed into recesses.
	Sigara (=*Corixa*) *striata* ...	—	S	—	Among *Callitriche* in clear water with little organic debris.
	S. punctata	R4	C	—	In cattle-wade with high organic deposit, chiefly among *Carex*.
	S. sahlbergi	—	C	R2	Confined to near-stagnant water with accumulated organic matter.

CRUSTACEANS	**Malacostraca.**				
	Asellus aquaticus, Water Louse ...	A	A	S	On bottom, esp. in organic debris, and among *Callitriche*.
	Isopod (unidentified)...	—	R1	—	Small pink form in moss on marginal boulders.
	Gammarus pulex, Freshwater Shrimp...	A	C	—	Very plentiful among *Callitriche* in swifter-flowing regions.
	Copepoda.				
	Cyclops sp.	—	—	C	Most specimens covered with epiphytic *Vorticella*, May '56.
	Cladocera.				
	Simocephalus expinosus	—	—	C	Specimens infested as above.
	Ostracoda.				
	Cypris sp.	—	C	A	In dense masses, May '56.
Arachnids	**Hydracarina**, Watermites.				
	3 unidentified spp. ...	C	C	C	Widespread, in every kind of situation.
Annelids	*Glossosiphonia complanata*, Flat Leach.	S	—	—	Anchored to base of *Callitriche* stems.
	Tubificid Worms ...	—	C	C	In mud. Attacked by *Dicranota* larvae.
Turbellarians	*Polycelis nigra* ...	C	R1	—	Stones in swifter-flowing regions.
	Dendrocoelum lacteum	C	C	—	Commonest flatworm in near-stagnant water, August '55.
	Planaria alpina ...	C	—	—	Mainly well upstream in colder water.
Ciliates	*Vorticella* sp.	—	C	A	Chiefly on submerged sticks and on exoskeletons of small crustaceans, May '56.
	Paramecium sp. ...	—	—	A	Exceedingly abundant in warm weather, August '57.

Correlation with fluviatile conditions. Many of the animals found here typify a fauna representative of moving water. Four of the eight aquatic molluscs are fluviatile forms, and so are all five fishes. The insects show good correlation. All the caddis-flies are fluviatile, the larvae generally sheltering beneath heavy stones in the most rapid reaches. The larvae of *Simulium* are protected from being swept downstream by their attachment by suckers to stones, and the bug *Velia* gains similar protection by running on the surface upstream. The presence of mayfly nymphs is indicative of flowing water, as is the abundance of *Gammarus* " shrimps " : the latter also point to the comparative purity of the stream water. The three turbellarian worms are essentially stream-living kinds, and lurk beneath stones. The leech *Glossosiphonia*, although capable of swimming against the flow for a short time, normally remains anchored to a support.

Correlation with fen conditions. From the standpoint of correlation with true fen conditions, probably the most significant animals

are the three corixid water-bugs, *Sigara* (=*Corixa*) *striata*, *S. punctata* and *S. sahlbergi*. The first (*striata*) is limited in its distribution to shallow recesses in the banks of the Dern where the water is almost stagnant but where organic matter is low. The other two occur in the cattle-wade, *punctata* among marginal *Carex* and *sahlbergi* in *Callitriche*, in swamp conditions with abundant organic debris and considerable pollution from dung. Macan (15) emphasises the presence of *sahlbergi* as an indicator of lime-rich conditions culminating in fen : he also mentions *punctata* as showing a closer association with *sahlbergi* than with any other corixid. The position of *sahlbergi* in the succession of corixids with the progressive accumulation of organic matter is represented in the following schema.



Because these bugs do not feed on plant or animal juices after the manner of most other members of the order, but sweep up small particles from the bottom, rather like a vacuum cleaner, they are naturally sensitive to the nature of the accumulated organic matter.

Correlation with former glacial conditions. The presence of the stream-dwelling flatworm, *Planaria alpina*, is of particular interest in view of the suggestion that Dernford represents the head of a former glacial river valley. *P. alpina* is often referred to as an " Ice Age Relict," and is known to be physiologically restricted to relatively cold water, rarely surviving for long at temperatures above 13°C. (=55°F.). The highest temperature ever recorded by us from the main stream of the Dern was only 11·5°C. (TJCH on 3/7/55); and the water is generally colder than this and uncomfortable to work in, especially in the shaded stretches near the source where the flow is rapid. This is the region where all the specimens of *alpina* have been found. Breeding normally occurs at a temperature of 10°C. or less and, at Dernford, is probably a winter phenomenon in the main. It seems likely that, in the Ice Age, *P. alpina* was much more widespread than it is today.

(Bibliography: 10, 14, 15, 16, 19, 20, 23, 35.)

P. E. REAVELL.

THE AQUATIC AND TERRESTRIAL MOLLUSCA OF DERNFORD FEN

Comparatively little routine collecting of molluscs has been attempted at Dernford Fen. In 1950, the first records of terrestrial snails were obtained by JND, assisted by EAS; and in 1955-56, PER concentrated particularly on aquatic forms but, at the same time, also noted any land-living species he met. Useful additions to the list have been made at various times by visitors from the Society, notably DJC, AD, TJCH and JFS. On 10/8/55, PER made a special study of fragmented, sun-bleached shells of dead molluscs lying in deposits along the course of the R. Dern; a particularly profitable investigation since it revealed the presence of six species which have not yet been found in the living state in the area. From all sources, a total of 25 species has been compiled; and although this seems very small compared with the 143 or so British species 101 of which are listed by Brindley (1) as occurring in Cambridgeshire, it covers a good range and, within its obvious limitations, can be regarded as representative.

In order to gain some comparison between the molluscs of Dernford with those inhabiting the peat fens in North Cambridgeshire, a collection of shell fragments from deposits along the banks of the New Bedford River at Mepal was made on 14/2/58 by PBF and several other members of the Society. Fifteen species were identified from the Mepal material, of which 10 are known to occur also at Dernford. When due allowance has been made for the restricted nature of such a survey, the results suggest an affinity between the two fenland areas, particularly when it is remembered that certain of the Dernford molluscs (e.g. slugs and the delicate *Vitrina* and *Hyalina* snails) do not leave recognisable remains.

The systematic list of molluscs known to occur at Dernford is arranged after the classification adopted by the Rev. A. H. Cooke (3). Apart from the likelihood of many species having been missed, the numbers given can only be regarded, in most cases, as a very rough indication of relative abundance. Collecting has been essentially on a small scale, and the whole subject requires further study and would repay a painstaking enthusiast prepared to undertake a serious investigation. The marine omissions are more probably among the terrestrial than the aquatic species.

SYSTEMATIC LIST OF MOLLUSCA FROM DERNFORD FEN

Habitat Type: F, Fluviatile; L, Lacustrine; T, Terrestrial.
Frequency: A, Abundant; C, Common; S, Scarce; R, Rare (with actual number found). * Indicates species also found in shell deposits at Mepal, Cambs.

Species	Habitat Type	Frequency: Living	Frequency: Shell Deposits	Remarks
**Sphaerium corneum* (L.), Horny Orb-shell	F	C	C	Widespread.
**Pisidium amnicum* (Müll.), River Pea-shell	F	A	A	Dominant in silt-pockets.
**Hydrobia jenkinsii* Smith, Jenkins' Spire-snail	F	A	A	Comprises ⅔ of shell deposits.
Ancylastrum fluviatile (Müll.), Freshwater Limpet	F	R3	R4	Beneath stones in fast-flowing water.
**Valvata piscinalis* (Müll.), Valve-shell	L	—	S	By open part of Dern.
Ancylus lacustris (L.), Lake Limpet ...	L	—	R1	Exceptional for lake-dwelling form.
**Limnaea palustris* (Müll.), Marsh Limnaea	LT	—	R2	Near cattle-wade.
**L. peregra* (Müll.), Wandering Pond-snail	FLT	A	A	Subdominant in shell deposits.
**Planorbis vortex* (L.), Whirlpool Trumpet	F	C	R3	Living on *Callitriche*.
Vitrina pellucida (Müll.), Pellucid Glass-snail	T	C	—	Beneath rotten wood in alder-swamp.
Hyalinia nitida (Müll.), Shining Snail ...	T	R2	—	Stones by shaded part of Dern.
H. crystallina (Müll.), Crystalline Snail ...	T	R3	—	Dead vegetation by railway ditches.
H. cellaria (Müll.), Cellar Glass-snail ...	T	C	—	Mossy wood and broken concrete.
Arion ater (L.), Black Slug	T	A	—	Abundant in marsh.
A. intermedius Norm., Intermediate Slug ...	T	S	—	Bases of willows. Brindley notes presence at Whittlesford.
A. hortensis Fér., Garden Slug ...	T	A	—	Bases of walls near farmhouse.
Helix pulchella Müll., Beautiful Snail ...	T	—	R1	By open part of Dern.
H. hispida L., Bristly Snail ...	T	—	R3	By shaded part of Dern.
**H. fusca* Mont., Dusky Snail ...	T	—	C	Widespread.
H. cantiana Mont., Kentish Snail ...	T	C	R2	Common in one field.
H. ericetorum Müll., Heath Snail ...	T	R4	—	In dry chalkland pasture.
**H. nemoralis* (L.), Brown-lipped Snail...	T	A	C	Abundant marsh.
**H. aspersa* Müll., Garden Snail ...	T	A	R1	Mainly near farmhouse.
Succinia putris (L.), Large Amber Snail...	T	C	—	Aerial shoots at land/water interface.
S. elegans Risso., Graceful Amber Snail	LT	3R	S	Marginal vegetation by Dern.

Shell fragments from the Mepal Washes included the remains of five aquatic species (three bivalves among them) not found in the Dernford deposits. These were: *Sphaerium lacustre* (Müll.) Lake Orb-shell, *Unio pictorum* (L.) Painter's Mussel, *Anodonta cygnea* (L.) Swan Mussel, *Limnaea truncatula* (Müll.) Dwarfed Limnaea, and *Planorbis spirorbis* Müll. Round-spired Trumpet.

Although the systematic list is far from exhaustive, several species warrant further comment. The abundance of Jenkins' Spire-snail is noteworthy as the animal is said to have invaded fresh water from estuarine conditions within the last century. The record of the Lake Limpet is remarkable for a species normally confined to still water and slow rivers, but suitable conditions probably obtain in the cattle-wade. Several forms are typical of the various micro-habits found in the area, among them the Pellucid Glass-snail from the alder-carr, the Crystalline Snail from beneath decaying vegetation, and the two Amber Snails (*Succinia* spp.) from marginal vegetation at the land/water interface. It is interesting to note that one xerophilous species, the Heath Snail, is characteristic of dry pastures, and at Dernford it occurs on the chalk grassland.

Probably the most conspicuous land mollusc on the true fen itself (particularly after prolonged rain in summer) is the Brown-lipped Snail. On a wet day in June '50, JND collected 147 specimens from a patch of marsh c.50 square-metres in area. Of these, 122 were adults, and only 18 were without some trace of the banding characteristic of the species. The general tendency throughout the sample was for the ground-colour to be red-brown and for all five bands to be strongly developed. Probably deep colouring of this kind has a survival value in dark reed-swamp vegetation with its overall effect of brown, tawny and green stripes. There was a noticeable scarcity of the pale yellow varieties so often picked up in more open situations. Brindley, commenting on the distribution of the Brown-lipped Snail in Cambridgeshire, refers to the fact that it tends to follow the course of the Cam. No trace has been discovered of the allied *Helix* (=*Cepaea*) *hortensis* (L.) White-lipped Snail, although careful searches have been made for it.

The Dwarfed Limnaea, intermediate host of the sheep fluke *Distomum hepaticum* (=*Fasciola hepatica*), has not been found on Dernford; but several specimens of the Large Amber Snail collected in '56 by AD were seen to have the tentacles distended by the sporocysts of the fluke *D. macrostomum*. The principal host in this case is a bird (usually one of the *Turdidae* or a wagtail) which preys upon the Amber Snail.

(Bibliography: 1, 3, 8, 16, 28, 35.)

P. E. REAVELL.

THE LEPIDOPTERA OF DERNFORD FEN

Much of our information has come from casual records on the part of many boys, particularly during week-end camps. The most sustained efforts have been made by AD (beating), DO (sugaring for moths), and NCB and DEP (netting).

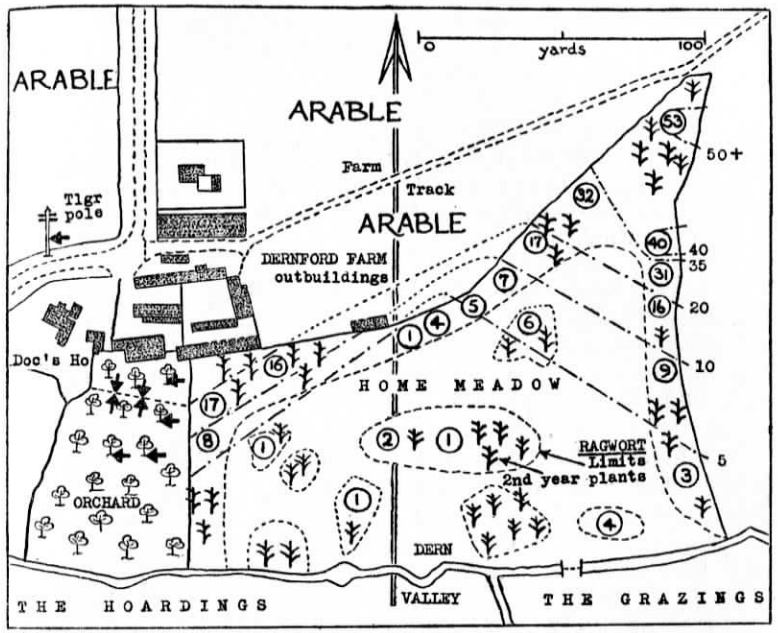


Fig. 7.—Distribution of Cinnabar-moth caterpillars, Home Meadow, 10/8/55. Figure in circle indicates number of larvae collected from area covered by the circle. Long arrow shows flow of air in prevailing wind, from S.W. to N.E.

Note tendency for larvae to be zoned with shelter provided by hedges. Black arrows mark positions of sugared patches which successfully attracted night-flying moths, summer 1955.

Drawn by J. S. W. HINCH.

A. RHOPALOCERA (BUTTERFLIES)

Species 28, families 5. List incomplete, but more representative than in the case of the moths. Farren (5) in 1904 suggested that a total might be compiled for the whole of Cambridgeshire of c.60 species (i.e. within six of the complete British list), but that not more than 35 of these could then easily be found. The chief features of the Dernford butterfly fauna, as they appear to us, are outlined below.

1. Pieridae (Whites). Periodically abundant: *Pieris brassicae* L. Large White, *P. rapae* L. Small W., *P. napi* L. Green-veined W., *Euchloe cardamines* L. Orange-tip, and *Gonepteryx rhamni* L. Brimstone. Larvae of all except Orange-tip found in area. Migrants may

supplement numbers of Large W. in some years. Several specimens of *Colias croceus* Four. Clouded Yellow have been netted, and one (Aug. '53) of *C. hyale* L. Pale Clouded Y. Farren refers to chalkland in this part of Cambs as a favoured locality for the two migrant *Colias* spp.

2. Nymphalidae (Fritillaries etc.) Abundant, *Aglais urticae* L. Small Tortoiseshell; common, *Nymphalis io* L. Peacock: larvae of both collected. A few specimens of the following: *Polygonia c-album* L. Comma, *Vanessa atalanta* L. Red Admiral, and *V. cardui* L. Painted Lady (migrant). Two fritillaries are *Argynnis charlotta* Haw. Dark Green F. and *Euphydryas aurinea* Rott. Marsh F. No one has succeeded in netting one of the former, but on 15/5/56, RJD obtained a fine Marsh F. here and, a week or so later, NCB and DEP saw another. The insect appears to be rare in Cambs: here it may breed in Spicer's area, although its food-plant (Devil's-bit Scabious) occurs on the main part of Dernford.

3. Satyridae (Browns). Five species, all more or less abundant in season: *Pararge megera* L. Wall, *Maniola jurtina* L. Meadow Brown, *M. tithonus* L. Gatekeeper, *Coenonympha pamphilus* L. Small Heath, and *Aphantopus hyperantus* L. Ringlet. All are associated with grassland and all probably breed.

4. Lycaenidae (Blues etc.). Two of the most characteristic butterflies of Dernford are *Lycaena phloeas* L. Small Copper and *Polyommatus icarus* Rott. Common Blue. Interesting colour variations of both occur, possibly due to the comparative isolation of the breeding stocks and the failure of fresh breeding material to arrive from outside. (Colour varieties are similarly found here in some of the Arctiid moths). On 10/8/55, AD, RGO and PER added *Lysandra coridon* Poda. Chalkill B. and *Celastrina argiolus* L. Holly B. to the Dernford list: Farren refers to the latter as being almost unknown in Cambs before 1900, when it appeared at Shelford and the Gogs uplands, both close by Dernford. Several captures of *Cupido minimus* Fues. Small B. were made by boys in the summers of '55 and '56.

5. Hesperidae (Skippers). Four species: *Pyrgus malvae* L. Grizzled Skipper, *Erynnis tages* L. Dingy S., *Thymelicus lineola* Ochs. Essex S. and *Hesperia comma* L., Silver-spotted S. Only a few isolated specimens of each have been netted (chiefly by DO), and information about relative numbers is lacking. All four are typical of open, grassy slopes: it is probable that the two Silver-spotteds obtained had flown in from outside.

B. HETEROCERA (MOTHS)

Species 150, families 12. The whole subject needs further investigation, and, for the benefit of future workers, we are setting out here a full list, in systematic order, of the species so far discovered by the Society.

SYSTEMATIC LIST OF MOTHS, 1950-57

Abbreviations

Food-plants: Omn, general; herb, herbaceous species; arb, woody species; aqua, aquatic species. [–] moths considered not to have bred in Dernford area.

Stages: O, egg; L, caterpillar; P, chrysalis; I, adult insect.
Specimens obtained by: bt, beating; lt, at light; n, netting; sg, at sugar; st, sight record only.

Species	Food-Plants	Stages	Remarks
1. Sphingidae: (4).			
Laothoë populi L., Poplar Hawk	*Salicaceae*	L	4/7/54, willow.
Sphinx ligustri L., Privet H.	Privet	L	3/7/55, 10/8/55.
Deilephila porcellus L., Small Elephant H.	[Bedstraws]	I(n)	25/5/54, ?migrant
Macroglossum stellatarum L., Humming-bird H.	[Bedstraws]	I(st)	10/8/55, migrant.
2. Notodontidae: (2).			
Cerura bermelina Göze, Poplar Kitten	Poplars	L	4/7/54, sallow.
C. vinula L., Puss M.	*Salicaceae*	L	4/7/54, sallow.
3. Lymantriidae: (2).			
Orgyia antiqua L., Vapourer	Omn arb	L	June '53, blackthorn.
Euproctis similis Fues., Yellowtail	Omn arb	LI(n)	Common every year.
4. Lasiocampidae: (5).			
Malacosoma neustria L., Lackey	Omn arb	L	May-June, hedges.
Poecilocampa populi L., December M.	Omn arb	I(lt)	Cycle lamp, 30/10/54.
Macrothylacia rubi L., Fox M.	Bramble	L	Commonest on heaths.
Philudoria potatoria L., Drinker M.	Grasses	L	Commonest wet grass.
Gastropacha quercifolia L., Lappet	Fruit-trees	L	Commonest Cambs fens.
5. Saturniidae: (1).			
Saturnia pavonia L., Emperor M.	Meadowsweet	LI(n)	Commonest on heaths.
6. Sarrothripinae: (1).			
Sarrothripus revayana Scop., Large Marbled Tortrix ...	Sallows?	I(n)	Usually oak-wood sp.
7. Arctiidae—(a) Arctiinae: (10).			
Spilosoma lubricipeda L., White Ermine	Omn herb	LI(n)	Common.
S. urticae Esp., Water E.	Aqua herb	L	Typical fenland sp.
S. lutea Hufn., Buff E.	Omn herb	LI(n)	Abundant. Colour varieties.
Cycnia mendica Cl., Muslin M.	Omn herb	LI(n)	Common on nettles.

Species	Food-Plants	Stages	Remarks
Phragmatobia fuliginosa L., Ruby Tiger	Omn herb	I(n)	Occasional July.
Parasemia plantaginis L., Wood T.	Omn herb	I(n)	Chalkland sp.
Arctia caja L., Garden T.	Omn herb/arb	OLPI(n)	Colour varieties.
A. villica L., Cream-spot T.	Omn herb	L	Two larvae, April '54.
Panaxia dominula L., Scarlet T.	Comfrey	L	Typical marsh sp., now rare Cambs.
Callimorpha jacobaeae L., Cinnabar	Ragwort	LI(n)	Abundant.
(b) Lithosiinae: (2).			
Comacla senex Hb., Round-winged Muslin Footman ...	Moss/Lichen	I(n)	Typical fenland sp.
Eilema griseola Hb., Dingy F.	Moss/Lichen	I(n)	August '55 only. Typical fenland sp.
8. Agrotidae—(a) Acronictinae: (3).			
Apatele aceris L., Sycamore	Maple	L(bt)	One, 14/9/54.
A. strigosa Schif., Marsh Dagger	Hawthorn	I(n)	Not since '33 (AD).
A. rumicis L., Knot Grass	Sallow	L(bt)	Probably common.
(b) Agrotinae: (75).			
Agrotis segetum Schif., Turnip M.	Charlock	I(sg)	2-3/7/55, one.
A. exclamationis L., Heart and Dart	Omn herb	I(sg)	3-4/7/54, two.
Euxoa nigricans Schif., Garden Dart	Clovers	I(n)	Commonest E. counties.
Peridroma saucia Hb., Pearly Underwing	[Clovers]	I(n)	? migrant.
Graphiphora augur Fab., Double Dart	Hawthorn	I(sg)	3-4/7/54, two.
Diarsia festiva Hb., Ingrailed Clay	Hawthorn	I(n)	Two colour varieties.
D. rubi View., Small Square-spot	Dandelion	I(n)	Autumn only.
Amathes c-nigrum L., Setaceous Hebrew Character ...	Omn herb	I(sg)	Common.
A. sexstrigata Haw., Six-striped Rustic	Bramble	I(sg)	Marshy ground.
A. xanthographa Schif., Square-spot R.	Hawthorn	L(bt)	May '56, three.
Ochropleura plecta L., Flame Shoulder	Omn herb	I(sg)	2-3/7/55, one.
Axylia putris L., Flame	Omn herb	L(bt)	Nettles and docks.
Triphaena comes Hb., Lesser Yellow Underwing	Hawthorn	L(bt)	Probably abundant.
T. pronuba L., Large Yellow U.	Omn herb	LI(nsg)	Abundant every July.
Polia advena Schif., Pale Shining Brown	Omn herb	I(sg)	3-4/7/54, one.
Melanchra persicariae L., Dot M.	Omn herb	I(nsg)	Probably common.
Diataraxia oleracea L., Bright-line Brown-eye	Goosefoot?	I(sg)	2-3/7/55, abundant.
Hadena thalassina Hufn., Pale-shouldered Brocade ...	Sallow	L(bt)	Aug. '55, four.
Hada nana Hufn., Shears	Dandelion	L	July '54, two.
Cerapteryx graminis L., Antler M.	Grasses	I(n)	One. *Casual S. counties.*

Episema caeruleocephala L., Figure of Eight M.	Hawthorn	L(bt)	June '55, 20 plus.
Luperina testacea Schif., Flounced Rustic	Grasses	I(lt)	Cycle lamp, 31/8/55.
Thalpophila matura Hufn., Straw Underwing	Grasses	I(n)	Typical dry grass sp.
Apamea obscura Haw., Dusky Brocade	Grasses	I(n)	Prefers wet places.
A. unanimis Hb., Small Clouded Brindle	Grass/Sedge	I(n)	Prefers wet places.
A. secalis L., Common Rustic	Grasses	I(n)	Drier grassland sp.
A. ophiogramma Esp., Double Lobed	Grasses	I(n)	Marsh sp.
A. crenata Hufn., Clouded Bordered Brindle	Cowslip	L	Sept. '54, two.
A. lithoxylaea Schif., Light Arches	Grasses	I(sg)	Common July.
A. monoglypha Hufn., Dark A.	Grasses	I(sg)	2-3/7/55, five.
A. characterea Hb., Clouded Brindle	Grasses	L	Sept. '54, five.
Procus strigilis Cl., Marbled Minor	Grasses	I(sg)	2-3/7/55, abundant.
P. fasciuncula Haw., Middle-barred M.	Grasses	I(sg)	2-3/7/55, five.
Dypterygia scabriuscula L., Bird's Wing	Sorrel/Dock	I(sg)	3-4/7/54, one.
Allophyes oxyacanthae L., Green-brindled Crescent ...	Hawthorn	L(bt)	May '56, two.
Euplexia lucipata L., Small Angle Shades	Birch/Sallow	I(sg)	2-3/7/55, one.
Phlogophora meticulosa L. Angle Shades	Groundsel	I(n)	10/8/55, three.
Phalaena typica L., Gothic	Omn herb/arb	L(bt)	Sept. '54, 20 plus.
Celaena leucostrigma Hb., Crescent	Sedge/Flag	I(n)	Fen/marsh sp.
Hydraecia oculea L., Ear M.	Grasses	O	Marsh sp.
Gortyna flavago Schif., Frosted Orange	Thistles	I(n)	Marsh sp.
Coenobia rufa Haw., Small Rufous	Jointed Rush	I(n)	10/8/55, one. Fen sp.
Arenostola pygmina Haw., Small Wainscot	Grass/Sedge	I(n)	Fen/marsh sp.
A. phragmitidis Hb., Fen W.	Reed	L	Fen sp.
Leucania pallens L., Common W.	Grasses	P	April '56, four.
L. comma L., Shoulder-striped W.	Grass/Sorrel	I(nsg)	Grassland sp.
L. conigera Schif., Brown-line Bright-eye	Grasses	I(sg)	Common July.
Meristis trigammica Hufn., Treble Lines	Plantain	I(sg)	2-3/7/55, one.
Caradrina morpheus Hufn., Mottled Rustic	Omn herb	P	May '56, two.
C. clavipalpis Scop., Pale Mottled Willow	Seeds	I(n)	10/8/55, common.
Rusina umbratica Göze, Brown Rustic	Violet	I(sg)	2-3/7/55, one.
Amphipyra tragopoginis Cl., Mouse M.	Hawthorn	I(sg)	2-3/7/55, one.
Orthosia gothica L., Hebrew Character	Hawthorn	L(bt)	May '56, eight.
O. stabilis Schif., Common Quaker	Omn arb	I(n)	Very common.
O. cruda Schif., Small Q.	Omn arb	I(n)	Probably common.
O. incerta Hufn., Clouded Drab	Omn arb	PI(n)	Common.
Cosmia pyralina Schif., Lunar Spotted Pinion	Omn arb	L(bt)	May '56, one Orchard.
Omphaloscelis lunosa Haw., Lunar Underwing	Grasses	I(n)	Infrequent E. England.

Species	Food-Plants	Stages	Remarks
Plemyria bicolorata Hufn., Blue-bordered C.	Alder	I(n)	Damp places, August.
Agrochola circellaris Hufn., Brick	Elm/Ash	I(sg)	2-3/7/55, one.
A. lychnidis Schiff., Beaded Chestnut	Omn herb	I(lt)	Cycle lamp, 30/10/54.
Tiliacea aurago Schif., Barred Sallow	[Beech]	I(sg)	One. Chalkland sp.
Citria lutea Ström., Pink-Barred S.	Sallows	L(bt)	Common.
Cirrhia icteritia Hufn., Sallow	Sallows	L(bt)	Common.
Lithophane semibrunnea Haw., Tawny Pinion	Ash/Privet	I(sg)	3-4/7/54, one.
Graptolitha ornitopus Hufn., Grey Shoulder-knot ...	[Oak]	I(lt)	Cycle lamp, 30/10/54.
Cucullia verbasci L., Mullein	Figworts?	I(n)	May '56, one.
C. umbratica L., Shark	Sow-thistle	I(n)	2-3/7/55, one on tent.
Scoliopteryx libatrix L., Herald	Sallows	I(n)	Hibernating in farm.
Plusia chrysitis L., Burnished Brass	Nettles	I(n)	Aug. '55, several.
P. festucae L., Gold Spot	Aqua herb	I(n)	June '54, one. Marsh sp.
P. jota L., Plain Golden Y	*Labiatae*	I(n)	June '54 three.
P. gamma L., Silver Y	Omn herb	I(nlt)	Common, inc. migrants.
Euclidimera mi Cl., Mother Shipton	Clovers	I(sg)	3-4/7/54, three.
Ectypa glyphica L., Burnet Companion	Clovers	I(sg)	2-3/7/55, one.
Lygephila pastinum Tr., Blackneck	Tufted Vetch	LI(n)	Abundant June-July.
(c) Hypeninae: (2).			
Zanclognatha cribrumalis Hb., Dotted Fanfoot	Grass/Sedge	I(n)	Fen/marsh sp.
Hypena proboscidalis L., Snout	Nettle	I(n)	Common June-July.
9. Geometridae—(a) Hemitheinae: (2).			
Hemistola immaculata Thunb., Small Emerald	[*Clematis*]	I(n)	Common Aug. Chalk sp.
Iodis lactearia L., Little E.	Sallow/Birch	L(bt)	Aug. '55, 14.
(b) Sterrhinae: (2).			
Scopula immutata L., Lesser Cream Wave	Meadowsweet	I(n)	Occasional July. Fen/marsh sp.
Calothysanis amata L., Blood-vein	Sorrel/Dock	LI(n)	Occasional.
(c) Larentiinae: (24).			
Ortholitha chenopodiata L., Shaded Broad-bar	Clover/Grass	I(n)	Abundant July-Aug.
Operophtera brumata L., Winter M.	Omn arb	I(lt)	Cycle lamp, 30/10/54.
Calocalpe undulata L., Scallop Shell	Sallows	I(n)	Common. Marsh sp.
Cidaria fulvata Forst., Barred Yellow	*Rosa* spp.	I(n)	Common June-July.
Electrophaes corylata Thunb., Broken-barred Carpet ...	Omn arb	I(n)	Common May-June.
Dysstroma truncata Hufn., Common Marbled C.	Sallows	L(bt)	3/7/55, four.
Lampropteryx suffumata Schif., Water C.	Bedstraws	I(n)	Damp places.
Xanthorhoe spadicearia Schif., Red Twin-spot C.	Omn herb	I(n)	Common all summer.
X. montanata Schif., Silver-ground C.	Omn herb	I(sg)	2-3/7/55, abundant.

Mesoleuca albicillata L., Beautiful C.	*Rosaceae*	I(n)	May-June. Woodland sp.
Melanthia procellata Schif., Pretty Chalk C.	[*Clematis*]	I(nlt)	Plentiful. Chalk sp.
Euphyia bilineata L., Yellow Shell	Omn herb	I(sg)	2-3/7/55, common.
Hydriomena coerulata May Highflyer	Alder	I(n)	Only three.
Euphyia rubidata Schif., Flame	Bedstraws	I(n)	Chalk sp.
Coenotephria derivata Schif., Streamer	Dog-rose	L(bt)	June '53, plentiful.
Eupithecia linariata Schif., Toadflax Pug	Yellow Toadflax	I(n)	Abundant.
E. distinctaria H-S., Thyme P.	Thyme	I(n)	June '53, seven.
E. vulgata Haw., Common P.	Sallows	L(bt)	Plentiful.
E. castigata Hb., Grey P.	Omn herb/arb	I(n)	Plentiful May-June.
E. haworthiata Doubld., Haworth's P.	[*Clematis* buds]	I(n)	Chalk sp.
E. tenuiata Hb., Slender P.	Sallows	L(bt)	Fen/marsh sp.
Horisme tersata Schif., Fern M.	[*Clematis*]	I(n)	Chalk sp.
H. vitalbata Schif., Small Waved Umber	[*Clematis*]	I(n)	Chalk sp.
(d) Geometrinae: (10).			
Abraxas grossulariata L., Magpie M.	Hawthorn	L(bt)	Common hedges.
Campoea margaritata L., Light Emerald	Birch/Oak	I(sg)	3-4/7/54, one.
Gonodontis bidentata Cl., Scalloped Hazel	Birch/Oak	I(sg)	2-3/7/55, one.
Ourapteryx sambucaria L., Swallow-tailed M.	Omn herb/arb	I(n)	Common July.
Opisthograptis luteolata L., Brimstone M	Hawthorn	L(bt)	June '54, 17.
Erannis marginaria Fab., Dotted Border	Omn arb	I(n)	Plentiful spring.
Alsophila aescularia Schif., March M.	Omn arb	I(n)	A few, spring.
Phigalia pedaria Fab., Pale Brindled Beauty	Omn arb	L(bt)	May '54, two.
Biston betularia L., Peppered M.	Omn arb	L(bt)	10/8/55, one.
Chiasma clathrata L., Latticed Heath	Clovers	I(n)	Abundant. Chalk sp.
10. Zygaenidae: (2).			
Zygaena trifolii Esp., Five-spot Burnet	Trefoil/Vetch	I(n)	July '54, one.
Z. filipendulae L., Six-spot B.	Trefoil/Vetch	I(n)	Chalk/marsh sp. Yellow variety occurs.
11. Sesiidae: (1).			
Aegeria tipuliformis Cl., Currant Clearwing	Currants	I(n)	2/7/55, one.
12. Hepialidae: (2).			
Hepialus humuli L., Ghost Swift	Herb roots	I(n)	Common. Wet meadow sp.
H. lupulina L., Common S.	Grass roots	I(n)	Abundant. Grassland sp.

150 species.

Moth list—general conclusions. Although far from complete, the list as it stands serves to give a cross-section of the moth fauna of Dernford and the surrounding country. Nearly all the records have been obtained by beating food-plants for the caterpillars, and netting and sugaring for the adult insects; and the distance of the area from B.S.C. has made it impossible for us to undertake regular light-trap work. This has produced gaps in the records, particularly in the *Notodontidae* (Prominents) which fly neither by day nor come readily to sugar. In suitable weather, an m-v trap would bring in a rich haul of insects every night, and the actual number of species would probably be more than doubled in a single season. Groups which are well represented are the Tigers, Carpets and Pugs. No attempt has yet been made to investigate the *Micro-Lepidoptera.*

The systematic list shows that the moths fall into three main habitat types.

1. Fenland/marshland forms. Percentage probably higher than that usually found in a country district, and upwards of 30 are associated with wet habitats. Particularly rare species are the Scarlet Tiger and, before '33, the Marsh Dagger: specialised types include the Fen Wainscot, which feeds inside the stems of marginal reeds. The alder-swamp attracts such species as the May Highflyer and Blue-bordered Carpet.

2. Chalkland forms. Species normally most abundant in dry pastures on light soil are well represented, which is not surprising as much of Dernford is chalky and there are extensive chalk uplands to the north-east. One of Dernford's most characteristic day-flying moths, the Latticed Heath, belongs to this group. Several of the chalkland species, e.g. Small Emerald, Pretty Chalk Carpet, Fern and Small Waved Umber, are *Clematis*-feeders; but so little of this grows actually at Dernford that the moths have probably drifted in from hedgerows outside. The records of the Thyme Pug are noteworthy.

3. Universal forms. These are the moths which occur in a wide range of habitats, and over 50% of the Dernford species are of this type. On a larger fen, like Wicken, the percentage is lower because many cannot breed in true fenland; but Dernford is small and is surrounded by wooded land and meadows from which some of these moths fly in. The Blackneck, associated with margins of woodlands, certainly breeds in numbers on Dernford. Three woodland species which might have bred in the area, but more probably came from outside, are the Beautiful Carpet, Light Emerald and Scalloped Hazel. There are many grass-feeding species.

Finally, there are the migratory species to be considered. The Hummingbird Hawk and Silver Y are both migrants from Europe, although some of the latter may have been hatched at Dernford. Stokoe (31) suggests that the Pearly Underwing is also an immigrant in districts away from the south coast.

Zonation of Cinnabar larvae. On 10/8/55, AD and RGO plotted the distribution of Cinnabar caterpillars feeding on ragwort

in Home Meadow, and the results of the survey are represented in fig. 7, page 33. It was found that few caterpillars occurred on raised ground in the middle of the field, but that where the land dipped and hedgerows provided shelter, the larvae population rose sharply. This tendency on the part of Cinnabar larvae to occupy sheltered situations has been noted before by boys working under AD on marine islands (e.g. Skokholm and Great Saltee); but this is the first time confirmation has been obtained from an inland habitat.

(Bibliography: 5, 6, 7, 25, 26, 30, 31, 33.)

D. E. PRESSLAND.

NOTES ON THE HYMENOPTERA OF DERNFORD FEN

The following representatives of the insect order *Hymenoptera* have been noticed at Dernford in the five years 1951-55. The sequence follows the systematic arrangement in Step (27).

Bumble-bees (*Bombus*). *B. lapidarius,* Red-tailed B.; *B. terrestris,* Buff-tailed B.; *B. hortorum,* Small Garden B.; and *B. subterraneous,* Shorthaired B., all common. In July '54, *B. soroënsis,* Broken-belted B., reputed to be very local in distribution, was plentiful. Only Carder-bee obtained was *B. sylvarum,* Knapweed C., usually about in fair numbers.

Cuckoo-bees (*Psithyrus*). Only species netted was *P. campestris,* Field C-b., a parasite in Common and Moss Carder-bees.

Social Wasps (*Vespa*). *V. vulgaris,* Common W.; *germanica,* German W.; *V. rufa,* Red W.; and *V. sylvestris,* Tree W., all recognised from workers taken at flowers, etc. No nests located.

Mason Wasps (*Odynerus*). One male *O. spinipes,* Spiny M.W., caught Sept. '52.

Spider-hunting Wasps (*Pompilus-Psammochares*). Three unidentified species caught, one in the act of taking a Wolf Spider (*Trochosa* sp.).

Digger Wasps. Of the several species noticed, the following three were identified; *Harpactus tumidus,* Puffed-up Robber W.; *Crabro flavipes,* Club-footed D.W.; and *Chrysis viridula,* Ruby-tailed W., the last especially plentiful in late spring '52. Area would yield many types if properly studied.

Solitary Bees. *Prosopis brevicornis,* Short-horned Yellow-face, generally plentiful on bramble flowers in late summer.

Mining Bees. Five species of *Andrena* taken in spring, all on dandelion heads; *A. albicans,* Early M.; *A. cinerea,* Grey-haired M.; *A. fulva,* Tawny M.; *A. gwynana,* Gwynne's M.; and *A. trimmerana,* Trimmer's M. The last was exceedingly plentiful in '53.

Carpenter Bees. The work of *Megachile centuncularis,* Patchwork Leaf-cutting Bee, is often in evidence on briars near the farm-buildings at midsummer.

Homeless Bees. *Nomada solidaginis,* Golden-rod Nomad, was a common insect on ragwort in Home Meadow on 10/8/55.

Ants. Hills of *Acanthomyops flava,* Yellow A., are a conspicuous feature of the dry, chalky grassland.

Ichneumons. Numerous. *Ophion luteus,* Yellow O., is the one most easily identified.

Sawflies. The most abundant seems to be *Trichiosoma tibialis,* Hawthorn S., taken every year in the scrub. We have also found *Cimbex femorata,* Birch S., in Home Scrub and *Nematus vesicator,* Willow S., along the lower Dern. Larvae of *Eriocampa rosae,* Rose S. were found on dogrose in June '55.

Gall-flies. Little studied. *Rhodites rosae,* Robin's Pincushion, is very common on the roses here.

(Bibliography: 27.)

C. E. A. Burgess and D. R. How.

THE VERTEBRATES OF THE DERNFORD DISTRICT

Fishes and birds are excluded from the following account, as they are covered in special papers.

A. MAMMALS

Owing to their tendency to take to cover at the approach of man, and the nocturnal habits of some of the species, mammals are difficult to observe directly. In the circumstances, the Dernford list of 20 species is reasonably satisfactory: it includes three domesticated forms, but the remaining 17 are truly wild, and of these 11 have been seen on the fen in the living condition and six identified from remains dissected from owl pellets. In 1953-54, larders of both the tawny owl and barn owl were found in hollow trees on Dernford, and from these and the ground below we collected over 60 pellets which were analysed in the laboratory at B.S.C., the mammalian skulls being identified from the dental formulae given by L. Harrison Matthews (9). The obvious weakness of this procedure is that some of the prey may have been taken from places beyond the limits of the true fen, and for this reason the mammalian list is best described as referring to the Dernford *district.*

Domesticated mammals. Three species: cow, cat and dog. Cattle are permitted to graze in the drier pasture but are kept out of the more marshy areas by fences. Until '55, their influence in controlling the vegetation was probably less than that of the rabbits. We

estimated about half-a-dozen farm cats in '55, and these seemed to keep mainly to Home Meadow and to the immediate vicinity of the farm buildings. One would expect them to be important predators. The only two dogs noticed in '55 were those owned by the Doctor and the Whiterods, and they were never seen further south than Home Meadow and were probably unimportant as biotic factors.

Wild mammals: 1. Observed in living state. Eleven species.

Erinaceus europaeus L. Hedgehog. One seen in Camp Field, July 3rd, 1954 (DO) and another in Nine Wells Scrub on 10/8/55 (AD, RGO). Several boys have reported crushed remains from time to time on the roadway near the level-crossing.

Talpa europaea L. Mole. Mole-hills everywhere in dry ground.

Nyctalus noctula (Schr.) Noctule. Several seen on the late afternoon of 2/7/54 flying high over the fen (CEAB).

Pipstrellus pipstrellus (Schr.) Pipistrelle. The commonest bat. On the evening of 2/7/54, at least 20 were flying about the farm buildings, and several of these made incursions into the fen and Camp Field (CEAB).

Plecotus auritus (L.) Long-eared Bat. The second commonest bat, probably most in evidence among trees in alder-swamp during June and July.

Oryctolagus cuniculus (L.) Rabbit. Abundant up to '55, by which time myxomatosis had taken such a toll that only bleached bones and empty burrows could be found. The effect on the vegetation was very noticeable in this and the next two summers, grasses becoming lush and meadows colourful with flowers. In October '57, DHB, RGM, DEP and HWS all reported a gradual recovery of the population.

Lepus europaeus Pall. Brown Hare. Usually reported singly, but AD counted 17 together in The Hoardings on 8/4/58.

Arvicola amphibius (L.) Water-vole. Common along the Dern, where it breeds. In July '54, DJC and JFS captured an adult male here and brought it back to B.S.C.

Rattus norvegicus (Erx.) Brown Rat. Seen in numbers near the farm-buildings during every camp.

Vulpes vulpes (L.) Fox. Probably fairly common. AD and PER saw one in Chalk Meadow on 10/5/55, and bones collected from Fen Marsh in '54 by MGGC were found to be of this species.

Mustela nivalis L. Weasel. JND noticed a family party of seven in Carr Meadow in June '50.

2. Skulls extracted from owl pellets. Six additional species.

The laborious task of dissecting and analysing the 63 pellets was undertaken by PCC, FJWDD, JH, PGK, and DTLS. It is convenient to represent this material in tabular form. The asterisks indicate species also noted in the living state on the fen itself.

ANALYTICAL LIST OF MATERIAL FROM OWL PELLETS

Mammalian Species	*Tawny Owl* 38 pellets	*Barn Owl* 25 pellets
Sorex araneus L. Common Shrew ...	9	7
S. minutus L. Pygmy Shrew ...	2	0
Neomys fodiens Schr. Water Shrew	4	0
**Talpa europaea* L. Mole	11	7
Clethrionomys glareolus Schr. Bank-vole	6	3
Microtus agrestis (L.) Short-tailed Vole	10	5
Apodemus sylvaticus (L.) Long-tailed Field-mouse	12	9
**Rattus norvegicus* (Erx.) Brown Rat	2	11
**Mustela nivalis* L. Weasel	1	0
Totals of mammalian skulls ...	57	42

The tawny owl pellets also contained remains of two starlings, and beetles of the genera *Melolontha, Geotrupes* and *Aphodius*.

A feature of particular interest is the presence of water shrew remains. The R. Dern appears to be suitable as a habitat, but direct proof that the animal occurs here is lacking. The difference between the diet of the two owls is well shown in this analysis, the barn tending to take many more rats than does the tawny. A peculiar feature is the large proportion of moles in both types of pellet.

B. NON-MAMMALIAN VERTEBRATES

The remaining list is small, consisting of two reptiles and three amphibians. We have a few records of *Lacerta vivipara* Jac. Viviparous Lizard, mainly from broken concrete in the drier parts (CJG, RTL, HMR and RHDW). Probably *Natrix natrix* (L.) Ringed Snake is fairly common: at least six were seen on 11/5/58 (RJB, MJD and DWN). *Bufo bufo* (L.) Common Toad is easily overlooked: it seems to breed regularly in the slow-moving parts of the Dern. Specimens of various sizes of *Rana temporaria* L. Common Frog can usually be found in marshy areas in wet weather, but breeding has never been proved conclusively. *Triturus vulgaris* (L.) Smooth Newt is usually plentiful March-June in swampy ground and the backwaters of the Dern and probably breeds, but we have yet to find ova or tadpoles on the fen.

(Bibliography: 9, 22, 24, 37.)

J. F. SHARP.

THE BIRDS OF DERNFORD FEN, 1925-58

Foreword by AD.—The bird-list contains 90 species of 27 families, and most boys visiting the area have contributed to an understanding of their status. In 1950-51, the Society covered the upper Cam valley (including Dernford) as part of a survey of swift migration organised by H. G. Hurrell, Esq. for the British Trust for Ornithology. In 1952-55, week-end watches for autumn immigrants (mainly passerines) were conducted for the British Empire Naturalists' Association between Cambridge and the East Anglian Heights near Saffron Walden. Finally, particular attention was paid in the winters of 1955-58 to the flight-lines of gulls undergoing feeding-movements to the Herts-Essex border and the South Cambridgeshire Plain. All three surveys have helped us to assess the position of Dernford in bird ecology. Over 40 boys have taken part in this work at some time or other, but for the most energetic and sustained effort, the following seven are particularly to be commended: RJD, GEH, NVH, PHK, RGO, GDS and AMT.

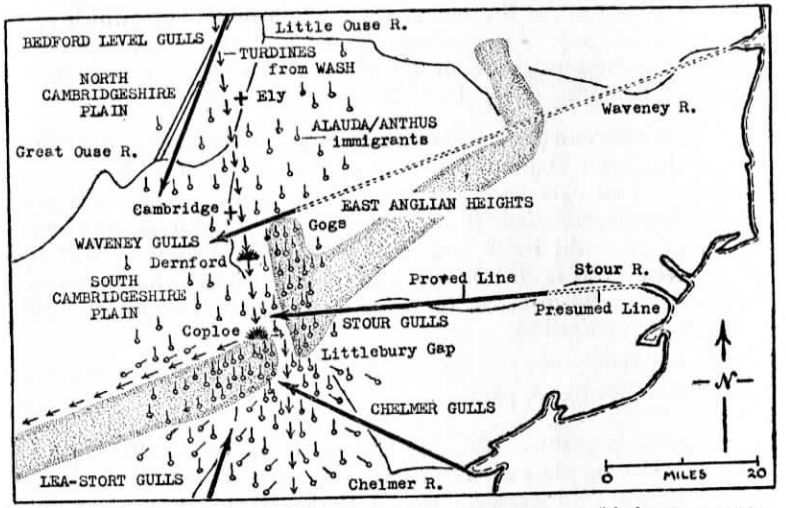


Fig. 8.—**Position of Dernford relative to certain known bird movements, mid-October.** Gull lines refer to daily feeding movements; others to true immigration. Larks and pipits travel in scattered parties and seem to concentrate on high ground; thrushes move in narrower lines connecting areas of scrubland. Littlebury Gap acts as "funnel", to some extent, for both types of migrant passing S. over East Anglian Heights.
Drawn by D. J. PEGRUM.

THE GENERAL POSITION

Status. The birds of Dernford Fen fall naturally into two main groups, breeders and non-breeding visitors. Both groups can be further subdivided; the breeders into those which nested in the past but do so no longer, and present-day breeders; and the visitors into autumn immigrants which winter here, and spring immigrants spending the summer with us. Some qualify for all four categories.

Autumn migrants. Dernford Fen is so placed geographically that one would expect it to be affected by passerine immigrants travelling inland in the autumn from the direction of the Wash towards

the East Anglian Heights. Coploe Hill, on the Essex-Cambridgeshire border, is one of the first pieces of high ground encountered by these migrants which, in this part of the country, tend to keep to the west of the Gogs near Cambridge city. Coploe is covered in thick scrub and attracts hordes of migrant thrushes and finches. If a straight line is drawn on a map from the Wash to Coploe, it passes close to Dernford which, on account of its scrubland, also serves to provide food and shelter for these particular families. On the hills adjoining Coploe, the open ploughed and stubble fields are covered with meadow-pipits and skylarks in autumn, travelling from the direction of the Wash; but at Dernford these birds are not so numerous.

At Coploe, the predominant movement of skylarks, meadow-pipits and chaffinches is southerly up to mid-October, when it changes to a westerly direction for the rest of the autumn migration (which ceases in late November). Observations made on and near Dernford show southerly movements most of the time, which suggests that there is some sort of deflection by the high ground of later migrants.

Gull movements. Dernford does not seem to lie directly on any of the major flight-lanes plotted by the Society, and although gulls sometimes pass over and occasionally come down in fair-sized flocks on to adjacent arable-land in winter, they occur in much greater numbers a few miles to the north and south of Dernford itself. The origin of the local gulls is still obscure: gulls appearing in the mornings in early winter seem to arrive from the north-east, and may be travellers from the Waveney line.

For details of the position of Dernford relative to the main autumn movements, see fig. 8, page 45.

Spring migrants. The area does not appear to be selected particularly as a halting-place for birds on spring passage; but in May '51, we found that, in cold weather, swifts travelled north very close to the R. Cam and its tributaries, including the Dern, possibly because insects were then difficult to find in exposed places away from water.

Breeding birds. The systematic list shows 53 known breeding species in the eight years 1950-57 compared with 55 in the 25 years 1925-49. Of these, 48 species which nested in the earlier period have continued to do so up to the present time, five of them diminishing and at least six increasing in numbers.

On the whole, the birds which seem to have gone down most of all are the semi-aquatic species (e.g. heron, snipe, reed-warbler) and those which have strengthened their hold the non-aquatic members of the finch family (e.g. goldfinch, linnet, yellow hammer). This probably reflects the slow drying-out of Dernford, with the shrinking of reed-swamp vegetation and open pools of water, and the increase in dry, rough ground with abundant seeding *Compositae*. The virtual disappearance of the corncrake is part of the great change which has occurred over the whole country. The decline in such species as the carrion-crow and jackdaw may be due, partly at least, to cleaner farming.

SYSTEMATIC LIST OF BIRDS, 1925-58

Arranged in the Wetmore order.

Information about the status of birds between 1925 and 1949 has come partly from AD, who visited the area frequently when a schoolboy and in later years, and from Whiterod Bros., the owners of Dernford Fen.

Key

\+ recorded for five or more consecutive years.
o recorded irregularly. · rare straggler.
* undertaking migration or feeding -movements in large parties.
? status uncertain. – no record.

Species	Known Status: Bred 1925-49	Known Status: Bred 1950 +	Known Status: Non-breeding Visitor Oct-Mar	Known Status: Non-breeding Visitor Apr-Sep	Remarks
Grebes					
Little Grebe (Dabchick)	—	—	·	—	Lower Dern, three records.
Herons					
Common Heron ...	+	—	o	o	Up to seven nests, Carr, '38-'45.
Ducks					
Mallard	o	o	+	+	Up to 30, hard weather.
Teal	—	—	·	—	Two records.
Mute Swan ...	—	—	·	·	Max. five juvs., Aug. '53.
Accipitrines					
Sparrow-hawk ...	o	—	+	+	Usually singly.
Harrier ?sp. ...	—	—	·	—	One record, Oct. '56 (NVH, RLM, GDS, AMT).
Hobby	—	—	—	·	One, 11/5/58 (RJD, AMT).
Merlin	—	—	o	+	Five records, single birds.
Kestrel	o	o	+	+	Usually one or two about.
Game-birds					
Red-legged Partridge	?	?	+	+	Uncertain. Scattered records.
Partridge	+	+	+	+	Autumn coveys up to 18.
Pheasant	+	+	+	+	Regular. Numbers small.
Rails					
Water-rail ...	?	—	·	—	One record, 28/1/58 (PHK).
Corncrake	+	—	—	·	Bred '20s: now very rare.
Moorhen	+	+	+	+	Decreasing slowly. ? six pairs '58.
Waders					
Lapwing	+	+	*	*	? Six breeding pairs. Large flocks arable, Aug.-Oct.
Common Snipe ...	+	o	+	o	Decreasing slowly.
Woodcock ...	—	—	o	—	Occasional, hard weather.
Common Sandpiper	—	—	·	·	Two records, Oct. and May.
Redshank	o	o	·	o	Bred early '40s, and again '58.
Gulls					
Herring-Gull ...	—	—	+	o	Occasionally down in adjoining arable. See fig. 8.
Common Gull ...	—	—	*	o	
Black-headed Gull	—	—	*	+	

Pigeons					
Stock-dove ...	—	—	+	+	Max. 17, Feb. '56.
Wood-pigeon ...	+	+	+	+	Increasing all seasons.
Turtle-dove ...	+	+	•	+	Up to five pairs have bred in a season.
Cuckoos					
Cuckoo	+	+	—	+	Hedge-sparrow only known fosterer.
Owls					
Barn-owl (White-breasted)	+	+	O	O	One pair, hollow tree, early '50s.
Little Owl ...	+	O	O	O	Has decreased.
Tawny Owl ...	+	+	O	O	Two resident pairs, early '50s.
Short-eared Owl ...	—	—	•	—	Three records.
Swifts					
Swift	?	?	—	+	Possibly breeds farm.
Kingfishers					
Kingfisher ...	+	+	—	—	One-two pairs breed Dern.
Woodpeckers					
Green Woodpecker	O	—	O	O	Probably breeds Spicer's.
Greater Spotted Woodpecker	—	—	O	—	Increasing.
Lesser Spotted Woodpecker	—	—	—	•	One, 4/5/58 (MJB, RGO).
Larks					
Skylark	+	+	*	O	Breeds arable, fen.
Swallows					
Swallow	+	O	—	+	Decreasing as breeding species.
House-martin ...	—	—	—	+	Small numbers on passage.
Sand-martin ...	—	—	—	+	Strong passage, April and again Sept.
Crows					
Carrion-crow ...	O	—	+	+	Usually one or two about.
Rook	—	—	+	+	Visitors from Shelford rookeries.
Jackdaw	O	—	+	+	Commonest in March.
Magpie	O	+	+	+	Increasing.
Jay	—	—	O	O	Probably breeds Spicer's.
Tits					
Great Tit	+	+	+	+	Breeds Orchard, hedges.
Blue Tit	+	+	+	+	Has bred Home Scrub.
Marsh-tit	+	+	+	+	Usually breeds Carr Meadow.
Long-tailed tit ...	+	+	+	+	Up to 40, hard weather.
Creepers					
Tree-creeper ...	?	O	+	—	Chiefly willows in hard weather. Bred '51, '53, '57.
Wrens					
Wren	+	+	+	O	Up to 25, hard weather.
Thrushes					
Mistle-thrush ...	+	+	+	+	Breeds Orchard, ?Spicers's.
Fieldfare	—	—	*	—	Large flocks scrub, Oct.
Song-thrush ...	+	+	+	+	Autumn immigrants few.
Redwing	—	—	*	—	Mainly hard weather.
Blackbird	+	+	+	+	Breeds Orchard, scrub.

Wheatear	—	—	•	+	Regular spring and autumn.
Whinchat	O	—	—	+	Bred '45. Regular April.
Nightingale ...	+	+	—	O	Usually two-three pairs.
Robin	+	+	—	O	Territories near farm.
Warblers					
Grasshopper-warbler	?	—	—	O	May '56 (AD, PER) and May '58 (MJB, RGO).
Reed-warbler ...	+	O	—	•	Railway ditch. Decreasing.
Sedge-warbler ...	+	+	—	O	Railway ditch, Fen Marsh.
Blackcap	+	+	—	O	Two-three breeding pairs.
Whitethroat ...	+	+	—	O	Scrub, railway ditch.
Lesser Whitethroat	?	O	—	+	?Three breeding pairs.
Willow-warbler ...	+	+	—	O	Probably increasing.
Chiffchaff	+	+	—	O	One-two breeding pairs.
Wood Warbler ...	—	—	—	•	One, 11/5/58 (RJD, AMT).
Flycatchers					
Spotted Flycatcher .	—	+	—	O	Buildings; once bred Carr.
Accentors					
Hedge-sparrow ...	+	+	—	—	Widely scattered.
Pipits—Wagtails					
Meadow-pipit ...	?	O	*	O	One breeding record, 3/5/56 (NCB).
Tree-pipit	O	O	—	O	Breeds railway. Decreasing.
Pied Wagtail ...	+	+	—	—	Buildings only.
Grey Wagtail ...	—	—	•	—	One, Oct. '55 (RJD, RLM, AMT).
Starlings					
Starling	+	*	*	+	Large flocks, hard weather.
Rose-coloured Starling	—	—	•	—	One, 22/10/44 (AD).
Finches					
Greenfinch ...	+	+	*	+	Abundant hard weather. Increasing.
Goldfinch	O	+	+	+	Increasing.
Siskin	—	—	O	—	Irregular. Carr.
Linnet	+	+	*	+	Breeders and visitors increasing.
Redpoll	?	—	O	—	Small parties, hard weather.
Bullfinch	O	O	O	—	Breeds irregularly Orchard.
Chaffinch	+	+	*	+	Abundant autumn.
Yellow Hammer ...	+	+	+	—	Increasing as breeder.
Corn-bunting ...	—	O	+	—	Bred '57. Increasing in district.
Reed-bunting ...	+	+	O	—	Five territories '56. Decreasing.
House-sparrow ...	+	+	*	*	Large flocks Aug.-Feb.
Tree-sparrow ...	+	+	+	—	Breeds Orchard, Camp Field.

90 species.

It is almost certain that this list is deficient in migratory birds, the distance of Dernford from B.S.C. usually having made it impossible for adequate attention to be paid to the area when activity has been at a maximum.

(Bibliography: 12, 13, 37.)

R. G. OAKLEY.

CONCLUSION

By the Editor

Without seeking to represent our geese as swans, the claim can be substantiated that, for its size, Dernford provides an exceptionally wide habitat range which is vividly reflected in the variety of species found therein. The area is noteworthy on at least three counts.

1. Although 10 miles short of a line joining Over and Newmarket, which today marks the southern limit of the great Cambridgeshire-Lincolnshire fenland, Dernford shows true fen conditions. In this part of England, undrained river-valley fens are now rare. It seems likely from the flora (particularly the sedge *Cladium mariscus*, which can only spread vegetatively here) that Dernford is an isolated remnant of an elongated tract which formerly extended down the Cam valley and merged with the main fenland north of Cambridge.

2. Surrounding the little fen itself are scrub and meadows showing the transference zones between the extremes of marsh and dry chalkland. There are clear indications that the drier parts are increasing at the expense of the flooded areas.

3. The comparative isolation of Dernford seems to have produced an unusual range of colour-varieties in some animals already known to be subject to variation. This is well seen in certain of the *Lepidoptera*, notably in butterflies like the Common Blue and Small Copper and such moths as the Ermines and Tigers.

Hitherto, the tendency has been for naturalists to concentrate their attentions on the undrained remnants of fen beyond Cambridge (of which Wicken is the most important), and flora and fauna lists have been drawn up for such places which are more-or-less comprehensive. Nothing of the kind seems to have been achieved for Dernford, in spite of its proximity to a great university. The present Report is in no sense comprehensive. The survey carried out by the Natural History Society has been the work of boys residing at a school 20 miles distant by road from the area; and this, in turn, has meant long cycle rides, week-end camps, and visits during the holidays, to maintain a reasonable coverage. Inevitably there are omissions; but we believe, nevertheless, that the Report represents the first attempt to place on permanent record the main peculiarities of an area which cannot increase in size with the years and might eventually lose its identity altogether. We have noted a few species which are truly rare, but if any exists which is unique we have still to find it. Rarities have not been our chief concern —it is the variety, and above all the changing balance of the native species, which make Dernford a place of particular interest.

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June 21st, 1958.

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The following among the 67 visitors to the area have made the significant observations upon which the present Report has been based. Where appropriate, their initials appear in the text.

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