

THE NATURAL HISTORY OF SOME ERODED SLOPES ON THE COMPTON DUNDON ESCARPMENT

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INTRODUCTION

The slopes (Fig. 1) all lie within the 200 ft to 300 ft contour line which embraces the steepest slopes of the escarpment (sometimes known as the Kingweston Escarpment). All the large slopes (part of Gilling Down is shown in Pl. 1) can be seen from the village of Compton Dundon.

The rock formation of the slopes (Avery, 1955) is that of Keuper marl (Hurcot Series), part of a 600 ft deposit of calcareous mudstone laid down during the Triassic Epoch. This grey and red marl deposit consists of alternating layers of varying thickness. The two marls differ in weathering properties, the grey marl being more resistant to erosion and in places forming low vertical cliffs. The grey marl fractures into angular, plate-like structures, whilst the red marl breaks into prism-like structures. Both rocks, on eroding, break down into a 'gravel-like' talus. The marls contain 45% clay and have a pH of between 8 and 8.5.

Topsoil, where present, is shallow, ranging from 5-20 cms in depth. It is a dark greyish-brown stoneless clay, granular in structure with abundant fibrous roots. It is also highly calcareous.

The physical effect of the climate on rocks was observed during the study. Freezing temperatures at night followed by warmer days, with the resulting alternating expansion and contraction of the clay fraction within the rock, dislodged rock particles on the steep slopes. Some of the less steep areas had a 'heaved' appearance following frosts.

The prolonged dry spell during the study period produced shrinkage fissures in the rock, but these fissures were much larger (up to 5 cms in width) in the topsoil of the less eroded areas.

Table 1. General aspect and approximate dimensions of the slopes studied.

Site	General Aspect	Approximate Dimensions (metres)	
		Across the Slope	Up the Slope
Windmill Hill	W	60	20
Hatch Hill	W	100	50
Combe Hill	W to SW	140	35
Combe Hollow	NW	20	40
Gilling Down	SW	300	80
Tannager	SSW	several small areas	
Worley	W	400	50

The question of aspect (Table 1) is complex for, with the exception of Windmill Hill and Combe Hollow, the physical appearance of the slopes is one of alternating ridge and gully. The gullies in the less eroded areas are usually more vegetated. The aspect of one side of each ridge is different from that of the other side, but the overall aspect of all the slopes is to the west.

The Combe Hollow slope differs noticeably from the other sites in that it is a small, steep-sided valley from which the top soil has completely disappeared, leaving successional shrubs and trees rather than turf on its periphery. The continuation of the erosion process is seen by the accumulation of eroded talus to a depth of more than 0.5 m against a wire netting fence (erected in 1955) at the lower end of the valley.

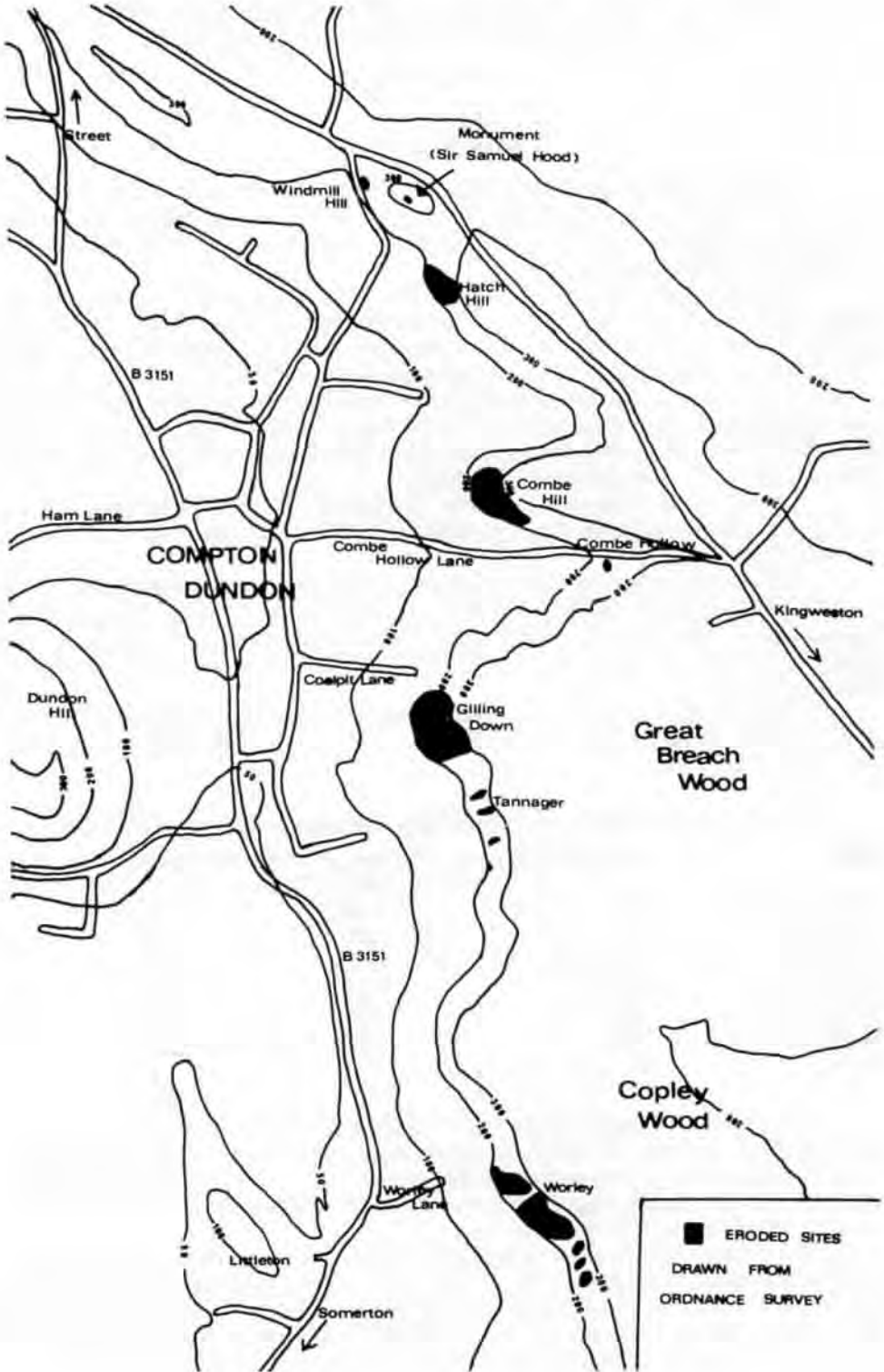




Plate 1. Part of Gilling Down slope.

Plate 2. An almost continuous turf with many hummocks.

The Windmill Hill site, also a small one, is semi-circular and steep, lying within the bend of a road.

The steepness of the slopes ranges from vertical to the more general 1 in 2 or 1 in 3. The steeper the slope the more eroded it is.

The earliest land map of the area that could be found was the 1797-1803 Inclosure Award map of Compton Dundon. All the slopes, with the exception of Windmill Hill, were at that date common land. Worley was in the Littleton sub-division of Compton Dundon, and the remaining slopes were in the Compton South-field sub-division. In the 1842 Tithe Apportionment for the parish of Compton Dundon all the slopes, then enclosed land, were classed as pasture.

The 1885-1886 6 in map, the 1930 6 in map and the 1930 Land Utilization Survey revealed the following land use changes.

Windmill Hill was rough pasture in 1885. The road which at present ascends from Compton Dundon and is bordered, in part, by the eroded area was built between 1842 and 1885. Local legend claims that the erosion on this slope was caused in the building of the road. The area in 1930 was classed as deciduous woodland.

Hatch Hill was open land in 1885, but had reverted to rough pasture and deciduous woodland by 1930.

The Combe Hill erosion is shown on the 1885 map, but the area of erosion was larger and more complex by 1930. In 1885 the field, in part, was rough pasture.

The Combe Hollow area in 1885 was an open field, showing no erosion. In 1930 the area was classed as rough pasture.

The Gilling Down erosion is shown on the 1885 map when the field, in part, was classed as rough pasture. By 1930 the eroded area was larger and the whole area classed as rough pasture.

The Tannager complex of small eroded areas was classed as open field in both 1885 and 1930.

Finally, the Worley area in 1885 was open field but in 1930 showed erosion amongst mixed deciduous woods.

According to Mr. Napper of Ham Lane, Compton Dundon, the eroded areas were grazed by sheep until the 1920s. The hillsides then reverted to scrub until 1955 when Scots Pine (*Pinus sylvestris*) was planted on the escarpment in the area from Combe Hill south to the Worley area. A small section of the Worley eroded area was planted with *Alnus incana*. Gilling Down however, has remained pasture and has been grazed by cattle since the sheep left the escarpment.

Some names of the slopes have changed with time and are worthy of mention:-

<i>Tithe Record 1842</i>	<i>1962 Ordnance Survey</i>	<i>Local Name</i>
North Hill	Hatch Hill	_____
Allotment	Combe Hill	Fore Hill
Hewlett's Hill	No name given, but is the hill south of Combe Hollow	Blind Hill
Gilling's Down	Gilling Down	Scree or Skur
Tunniger	Tannager	_____

Collectively, the eroded slopes are locally referred to as the 'Red Hills'.

VEGETATION AND FLORA

The habitat for plants on the slopes ranges from the steep bare rock, through occasional hummocks with bare soil or rock talus (broken turf), to a continuous turf with almost full ground cover (Pl. 2). The region of continuous turf is rarely more than 10-20 m wide, and surrounding the continuous turf is either the dense successional vegetation typical of calcareous soils or the plantations of *Pinus sylvestris*.

On the eroded slopes some species are relics of the previous more stable community and other species are colonisers or pioneers of the now disturbed habitat.

Colonisers of the barest, steepest slopes (Pl. 1) include Creeping Fescue (*Festuca rubra*), there often being loose patches of this rhizomatous grass. Thinly scattered on these slopes are sometimes found tussocks of Tall or False Oat Grass (*Arrhenatherum elatius*). Small colonies of Mouse-ear Hawkweed (*Pilosella officinarum*) and Lesser Bindweed (*Convolvulus arvensis*) largely make up this restricted ground flora. An occasional Common Hawthorn (*Crataegus monogyna*) or Old Man's Beard (*Clematis vitalba*), perhaps relics of a more stable habitat, also grace these slopes.

The less steep slopes commonly have hummocks on them. The hummocks, roundish or sometimes extended along the slope, are dominated by the Common Rockrose (*Helianthemum nummularium*) and the moss *Camptothecium lutescens*. *H. nummularium* is found abundantly, even in a continuous turf, whereas *C. lutescens* is only found in the broken turf. The loose tufts of *C. lutescens* fall apart readily especially when subjected to rabbit (*Oryctolagus cuniculus*) disturbance. Scattered fragments of *C. lutescens* are found all over the area. Other species commonly found on the hummocks are Sheep Fescue (*Festuca ovina*), Bird's-Foot Trefoil (*Lotus corniculatus*), and Salad Burnet (*Sanguisorba minor* subsp. *minor*). All these species (with the exceptions of *C. lutescens* and *L. corniculatus*), being relatively deep-rooted, are occasionally found growing on the rock slopes.

The hummocks rising above the surrounding eroded area are flattish topped and drop away sharply on the lower side. This lower side can rise up to 30 cms from the rock face and is gradually being eroded away.

In continuous turf outside the eroded areas, there are sometimes active ant hills occupied by the yellow field ant (*Lasius flavus*), and their occupation could often be recognized by the workings of the Green Woodpecker (*Picus viridis*). These occupied ant hills are dominated by several grass species, *H. nummularium* and the mosses *Brachythecium purum* and *Rhytidiadelphus triquetrus*.

On the less steep slopes, especially where there is talus, *P. officinarum* is abundant with the Lesser Hawkbit (*Leontodon taraxacoides*) less common. The Lesser Dandelion (*Taraxacum laevigatum*) is common in this habitat.

A number of other species are found in the patches of continuous turf found in the gullies or close to the periphery of the eroded areas. Some of these species are of the more mature successional vegetation:

Privet	<i>Ligustrum vulgare</i>
Old Man's Beard	<i>Clematis vitalba</i>
Common Hawthorn	<i>Crataegus monogyna</i>
Blackthorn	<i>Prunus spinosa</i>
Dog Rose	<i>Rosa canina</i>
Ivy	<i>Hedera helix</i>
Common Gorse	<i>Ulex europaeus</i>
Hazel	<i>Corylus avellana</i>
Ash	<i>Fraxinus excelsior</i>
Wayfaring Tree	<i>Viburnum lantana</i>

The Hatch Hill and Windmill Hill sites have an occasional small Turkey Oak (*Quercus cerris*), under 2 m in height, on the slopes, there being mature trees of this species in the nearby woodland.

The relative abundance of the vascular plants of the eroded slopes is shown in Table 2.

Table 2. Vascular plants of the eroded slopes.

	D = Dominant		A = Abundant		F = Frequent	
	O = Occasional		R = Rare		L (prefix) = Local	
	Rock	Talus	Broken Turf	Continuous Turf		
<i>Achillea millefolium</i> . Yarrow	—	—	O	O		
<i>Anacamptis pyramidalis</i> . Pyramidal orchid	—	—	LR	LR		
<i>Arrhenatherum elatius</i> . Tall or False Oat Grass	O	O	O	—		
<i>Asperula cynanchica</i> . Squinancy Wort	—	—	O	O		
<i>Bellis perennis</i> . Daisy	—	O	F	A		
<i>Blackstonia perfoliata</i> . Yellow-wort	—	—	—	R		
<i>Brachypodium sylvaticum</i> . Slender Brome	—	—	R	O		
<i>Briza media</i> . Common Quaking Grass	—	—	F	A		
<i>Carex caryophyllea</i> . Spring Sedge	—	—	O	O		
<i>C. flacca</i> . Glaucous Sedge	—	O	A	D		
<i>Carlina vulgaris</i> . Carlina Thistle	—	—	F	F		
<i>Centaurea nemoralis</i> . Brown Knapweed	—	O	F	f		
<i>Centaureum erythraea</i> . Common Centaury	—	—	—	R		
<i>Cirsium acaule</i> . Ground Thistle	—	—	F	F		
<i>Clematis vitalba</i> . Old Man's Beard	R	—	R	R		
<i>Convolvulus arvensis</i> . Lesser Bindweed	O	—	—	—		
<i>Crataegus monogyna</i> . Common Hawthorn	R	—	R	R		
<i>Crepis vesicaria</i> . Beaked Hawk's Beard	—	—	—	LO		
<i>Dactylis glomerata</i> . Cocksfoot	—	—	O	O		
<i>Euphrasia nemorosa</i> . Common Eyebright	—	—	—	O		
<i>Festuca ovina</i> . Sheep's Fescue	—	—	D	D		
<i>F. rubra</i> . Creeping or Red Fescue	O	O	F	F		
<i>Galium verum</i> . Ladies Bedstraw	O	—	A	A		
<i>Helianthemum nummularium</i> . Common Rockrose	O	—	D	D		
<i>Helictotrichon pratense</i> . Meadow Oat Grass	—	—	LF	LF		
<i>H. pubescens</i> . Downy Oat	—	—	LF	LF		
<i>Hippocrepis comosa</i> . Horseshoe Vetch	—	—	—	LF		
<i>Hypericum perforatum</i> . Perforate St. John's Wort	—	—	—	LF		
<i>Leontodon hispidus</i> . Rough Hawkbit	—	F	F	F		
<i>L. taraxacoides</i> . Lesser Hawkbit	—	—	F	F		
<i>Ligustrum vulgare</i> . Privet	—	—	R	R		
<i>Linum catharticum</i> . White or Purging Flax	—	—	—	LF		
<i>Lotus corniculatus</i> . Bird's-Foot Trefoil	—	—	A	A		
<i>Ononis repens</i> . Restharrow	LO	—	LF	LF		
<i>Ophrys apifera</i> . Bee orchid	—	—	—	LR		
<i>Pastinaca sativa</i> . Wild Parsnip	—	—	—	O		
<i>Pilosella officinarum</i> . Mouse-ear Hawkweed	O	A	A	F		
<i>Plantago lanceolata</i> . Ribwort Plantain	—	—	A	A		
<i>P. Major</i> . Great Plantain	—	—	O	O		
<i>Poa angustifolia</i> . Narrow-leaved Meadow Grass	—	—	—	O		
<i>Polygala vulgaris</i> . Common Milkwort	—	—	R	O		
<i>Potentilla sterilis</i> . Barren Strawberry	—	—	—	O		
<i>Prunella vulgaris</i> . Self-Heal	—	—	—	R		
<i>Prunus spinosa</i> . Blackthorn	LR	—	—	—		
<i>Quercus cerris</i> . Turkey Oak	LR	—	LR	LR		
<i>Ranunculus bulbosus</i> . Bulbous Buttercup	—	—	—	LF		

<i>Rosa canina</i> . Dog Rose	R	—	O	O
<i>Sanguisorba minor</i> subsp. <i>minor</i> . Salad Burnet	O	O	A	A
<i>Senecio jacobaea</i> . Ragwort	O	O	O	—
<i>Taraxacum laevigatum</i> . Lesser Dandelion	—	O	F	F
<i>Teucrium scorodonia</i> . Wood Sage	—	—	—	R
<i>Thymus serpyllum</i> . Wild Thyme	O	O	A	A
<i>Trifolium pratense</i> . Red Clover	—	—	—	O
<i>Vicia sativa</i> . Common Vetch	—	—	—	R
<i>Viola canina</i> . Dog Violet	—	—	R	O

The bryophytes and lichens are important plants in these communities. *C. lutescens*, as previously mentioned, is abundant in the hummock community. The only other moss species on the eroded slopes are *Barbula* spp. and *Weissia* spp. They colonise the areas of talus with the following lichens:

Toxinia aromatica

Cladonia pocillum

Collema spp. and other lichens unidentified by the author.

Where the turf is continuous, several species of bryophytes are commonly found, their presence or absence depending on the aspect of the slope and the degree of shade:

Pseudoscleropodium purum

Rhytidiadelphus triquetrus

R. squarrosus

Thuidium philibertii

Hylocomium splendens

Acrocladium cuspidatum

Campylium chrysophyllum

Ctenidium molluscum

The following species are found in shade at Combe Hollow:

Fissidens taxifolius

Scapania spp.

The rare moss species *Entodon concinnus* is found at Worley.

Lichen species found in the same continuous turf are:

Peltigera canina

Cladonia spp. (probably *C. rangiformis*)

A filamentous green alga grows on the white rocks of Hatch Hill slope.

FAUNA

Animals have played, and continue to play, a profound part in the creating and maintaining of the eroded slopes. Man himself, with the manipulation of domestic animals and with his own social activities, is still the dominating animal.

The Windmill Hill and Hatch Hill slopes are used for motor cycle 'scrambles' and both sites are used by the public, especially young people, for other recreational activities such as climbing the slopes.

Gilling Down has been grazed continuously since before the Enclosures, and cattle and horses were pastured there during the 1975-1976 winter. Its eroded slopes are universally disturbed by the hooves of these animals.

All the slopes, with the exception of Windmill Hill and Combe Hollow (with virtually no turf), are grazed, sometimes heavily, by rabbits. Dense secondary growth, surrounding the slopes, provides shelter for them. There are signs of rabbit grazing on *Festuca* spp. and in the gnawing of Hawthorn (*C. monogyna*) bark. Vegetation not grazed is easily recognizable. Tansley (1949) in his chapter on basic grasslands considers the selective effect of rabbit grazing. Two flowering plant species commonly

seen on the ungrazed Windmill Hill turf and virtually absent elsewhere are Meadow Oat Grass (*H. pratense*) and White or Purging Flax (*L. catharticum*).

The many hummocks are used extensively by the rabbits to defecate upon, this probably affecting the species composition of the hummock flora. Scratch marks and blind tunnels are often seen on the bare rock surface as are distinct trails across the eroded slopes. The rabbit population is still infected with the disease Myxamotosis and dead or dying rabbits can sometimes be seen on or close to the slopes.

Fox (*Vulpes canis*) droppings, and rabbit fur and the remains of dead birds, were seen several times, mainly on the Worley slope. On the Combe Hollow and Worley slopes deer tracks were seen during the winter, although deer droppings were not noticed. Roe Deer (*Capreolus caprea*) and Muntjac Deer (*Muntiacus* spp.) are reputed to be in the area.

Here and there on the slopes can be found small collections of the broken shells of *Cepaea nemoralis*, the Brown-lipped Snail, indicating the 'anvil' of the Song Thrush (*Turdus musicus*).

DISCUSSION

There is no visible evidence of the original climax forest and historical evidence suggests that these eroded slopes were grazed by domestic animals from at least the end of the 18th century until the 1920s. This domestic animal grazing was probably completed during this time, and continued since then, by rabbit grazing.

This grazing pressure linked with the soil characteristics of a shallow soil profile on a clay marl rock has caused erosion on the steepest slopes of the escarpment, a steep part of the Tannager slope giving the only indication of a recent downhill slipping of the topsoil. Tansley (1949) refers to the steep chalk grassland as tending to 'creep' downhill.

The erosion may have been accelerated at any time in the past by a particular combination of climatic factors such as a dry spell causing roots to die back followed by heavy rains to facilitate downhill movement of topsoil. According to Mr. D. C. Keef of Wineberry Cottage, Compton Dundon, a cold winter in 1929 was followed by a dry summer and then a very wet autumn. Mr. Keef considers that these climatic factors may have caused further erosion on the escarpment.

The eroded slopes constitute a harsh environment for both the germination and the growth of plants. Absence of a vegetated topsoil means that run off and evaporation are rapid and consequently little moisture is available for plant establishment. The few colonising vascular plants on the slopes consist almost entirely of perennial species. This contrasts sharply with the pioneer annual or biennial species normally found on disturbed sites in basic soils such as Viper's Bugloss (*Echium vulgare*) and Annual Meadow Grass (*Poa annua*).

The flora of the slopes contains many species characteristic of basic grasslands, the species list being very similar to those compiled by Tansley (1949). Tansley, however, never observed succession from bare chalk or marl and therein may lie the reason for his not referring to such species as Lesser Bindweed (*C. arvensis*).

The severe rabbit grazing undoubtedly affected the species composition of the slopes and may have accounted for the near absence or absence respectively of such species as Yarrow (*A. millefolium*) and Scabious (*Scabiosa columbaria*), both these species being commonly found in basic grasslands.

The hummocks and isolated woody plants are seemingly relics of the previous stable vegetation. It is a matter of conjecture as to whether the hummocks are the remains of sheep or cattle trails that straddled the slopes or whether they are the remains of former ant hills.

On the bare rock and talus colonisation is slow and precarious. It is very noticeable that there is virtually no lichen or moss colonization of those slopes subject to human and cattle disturbance. The rate of primary succession is notoriously slow and these slopes are no exception to that fact. How long the slopes, if freed from animal disturbance, would take to return to full ground cover is not predictable. The setting up of permanent quadrats of transects in the future would give objective data.

(This study was made between December, 1975 and June, 1976 whilst the author was on study leave in Somerset.)

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