

## THE RABBIT WARREN AT WEST DEAN NEAR CHICHESTER

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*Rabbits were native to Britain in early post-glacial times but had become extinct by the Roman period. Their history in southern England from their reintroduction, through the establishment and decline of warrens, to the later formation of wild populations, is reviewed as background to the account of rabbits at West Dean in West Sussex. Rabbit warrens were present on all landforms in Sussex. A combination of archaeological, historical and ecological methods was used to trace the development and demise of the West Dean warren. Already well established by 1583, the warren existed until 1804 when it was dismantled; the area known as Ellingsdean may originally have been a separate, smaller warren, part of which became incorporated into West Dean. The warren contained about 900 a. in the 18th century, was well stocked with rabbits and was simultaneously used as common pasture for tenants' domestic stock. Although it was surrounded by a substantial fence-topped, flint-faced bank with inner ditch, escaping rabbits caused friction between warrener and farmers. There was some controversy over rights of free warren on the land and over ownership of fringe areas of the warren. Since the demise of the warren, the area has become progressively enclosed and wooded, so that now only two per cent of its former area has remnants of the original chalk downland and heath vegetation. The establishment of a 19th-century game warren for rabbit shooting, quite separate from the medieval warren, and the increasing abundance of wild rabbits in the area are described. Myxomatosis, which came here in 1954, almost eradicated rabbits from the area, demonstrating the full extent of their previous effect on the landscape. Rabbits are now re-established and causing problems again on the West Dean Estate.*

### INTRODUCTION

#### *Wild Rabbits*

European rabbits (*Oryctolagus cuniculus*) are small, grass-eating herbivores considered to be native to southern France, Iberia and north-west Africa. However, they have been introduced by man to other parts of Europe, where they can survive from the cold plains of the north to the semi-arid Mediterranean south, and to other continents. Wild rabbits are nocturnal, usually living socially in complex, communal burrow systems, and their ideal environment is provided by a mosaic of short grass for feeding interspersed with small patches of cover, such as rocks or scrub, for refuge.

All domesticated rabbits, including those reared in warrens, have been derived from this

European species. Populations of wild rabbits in Britain, now a major pest species, are feral derivatives from the domesticated rabbits farmed in the former warrens. The word *rabbit* is derived from medieval French *rabette* and was used to describe juveniles until the 18th century, while *coney* was used for adults. Nowadays *coney* is virtually obsolete, but 'coney' place names still exist as a reminder of the past usefulness of the species. A *coney garth* or *warren* was the name for an area of enclosed land specifically used for the commercial rearing of rabbits.

#### *Prehistory in Britain*

Bone remains of rabbits have been found from several interglacial periods in Britain

(Mayhew 1975), notably from the Hoxnian Interglacial at Swanscombe in Kent (Oakley 1964). The only authenticated early postglacial remains known are an incomplete pelvis and entire tibia from the Mesolithic site (dated c. 8000 B.C.) at Thatcham in Berkshire (King 1962; Mayhew 1975). Jarman (1972) listed 13 Mesolithic rabbit sites throughout France and single finds in both Italy and Spain. This all suggests that the species moved northwards and crossed the land bridge from Europe to Britain after the last ice sheets retreated, but it may not have survived the subsequent closed woodland period (Yalden 1982). Mayhew (1975) suggested that rabbits were extinct in Britain at least by Roman times, and most authors agree that our present rabbits result from subsequent re-introduction.

Varro, writing in Italy c. 30 B.C., described warrens or *leporaria* as appendages to villas, and mentioned rabbits or *cuniculi* as well as two species of hares in such warrens and in hutches (Hooper & Ash 1935). The subsequent spread of rabbits in captivity through Europe was described by Zeuner (1963). Lever (1977) suggested that the Romans may have introduced rabbits to Britain as they were such a notable delicacy, but no bone evidence is available. However, Barrett-Hamilton & Hinton (1910–21) pointed out that there are no known early Celtic, Old or Middle English names for rabbits, which suggests that the species did not survive prehistory in Britain.

#### *Introduction and Early Establishment in Southern England*

It has been generally accepted (Sheail 1971a) that rabbits were introduced to Britain by the Normans soon after the Conquest but there is no mention of rabbits in Domesday Book (1086). Lever (1977) suggested that they came here with the returning Plantagenet crusaders in the late 12th century. The earliest known written reference for rabbits in Britain relates to the Scilly Isles in 1176 (Veale 1957). The earliest good archaeological evidence is

several rabbit bones from a midden at Rayleigh Castle in Essex, occupied between the late 11th and the early 13th centuries (Hinton 1912–13), and some bones found below an early 12th-century piece of pottery at the Buttermarket in Ipswich (Spencer 1956). However, recently Sutermeister (1976) described a lower jaw from a 10th- or 11th-century rubbish pit at the Saxon site of Burpham in West Sussex; it is apparently possible that the pit was filled in during the immediate post-Conquest period. The difficulty in interpreting all bone evidence of rabbits is the possibility of later intrusion due to their burrowing habits, so it is vital to investigate the circumstances of any such find.

Rabbits were introduced and established on many English islands during the late 12th and early 13th centuries (Sheail 1971a), including the Isle of Wight where a coney custodian existed at Carisbrooke in 1225 (Veale 1957). From 1235 onwards there is written evidence of mainland rabbits; in that year Henry III had rabbits in his royal coneygarth at Guildford. The *Calendar of Liberate Rolls, 1240–5* shows that between 1240 and 1245 the sheriffs of Hampshire, Sussex, Surrey and Kent had to supply from 50 to 500 rabbits to the King's Christmas feast. Of specific interest are the 300 rabbits in 1244, and the 500 hares plus 200 rabbits in 1245, which were from 'the warrens and coneygarths (*cunigariis*) of the Bishopric' of Chichester, suggesting that the species was well established in Sussex by then. In 1244 the king stocked his new park at Windsor with rabbits from the bishopric of Chichester, as well as from his own coneygarth at Guildford (Veale 1957). There was a rapid spread of rabbits across the English mainland in the period 1230 to 1250; by the early 1300s rabbits were numerous, warrens were valuable and there was an export trade in skins (Veale 1957).

#### *Rabbit Warrens in Southern England*

Rabbit warrens were very large enclosures in which rabbits were kept as a valuable source of meat and fur. They were formed throughout

the country and many existed for several centuries. Trowlesworthy warren on Dartmoor existed from 1272 until 1955; 15 other warrens are known from Dartmoor (Linehan 1966; Hurrell 1971). They were enclosed by long perimeter banks of earth or grass sods (for instance Thetford warren in Suffolk had a perimeter of eight miles) or by stone walls; these were often capped with wooden palings, furze, blackthorn or reed, though in the 19th century wire netting became the common topping (Sheail 1971a). The enclosure walls had to be maintained regularly to prevent the escape of rabbits, a bank of sods needing replacement about every seven years (Young 1799). On Lundy Island in the 13th century rabbits were kept in caves rather than warrens (Veale 1957).

Each warren was in the charge of a *warrener* who was often the lessee of the landowner, paying a high annual rent in carcasses or money. The warrener lived in a *warren lodge*, often a tall building from which he could view the whole warren, and in which he hung the carcasses, nets, traps and other paraphernalia of the warren. His job was to tend the rabbits so as to maintain a minimum number; this task included additional feeding, control of vermin and diseases, catching poachers and preventing rabbits encroaching into cultivated land outside the warren. Numbers were kept at two to eight per acre, with one male for every four to six females. Rabbits were encouraged by planting gorse or furze (*Ulex europaeus*), juniper (*Juniperus communis*), bramble (*Rubus fruticosus*) and other prickly shrubs for food and shelter. Suitable breeding conditions were provided by breeding hutches or *clappers*, or by building superterranean hummocks and banks known as *pillow mounds* (Sheail 1978). For instance, the coney warren at Cold Ashton in Gloucestershire contained a pillow mound 255 ft. long, 3 to 4 ft. high, and 24 ft. wide, with side ditches parallel to the long axis (O'Neil 1969); Piggott (1930) described a pillow mound measuring 35 by 20 ft. on Butser Hill in Hampshire; and details of

numerous pillow mounds on Dartmoor in Devon were given by Linehan (1966). In addition Haynes (1970) described stone-built vermin traps associated with the Dartmoor warrens.

Apart from the familiar common-grey rabbits, several other colour varieties were used in warrens (Sheail 1971a). Black rabbits were reared in some medieval warrens and on islands. Silver-grey rabbits were particularly associated with east-coast warrens (Young 1799). Domesticated rabbits, including white and sandy coloured ones, were kept in hutches or pits and frequently escaped. In order to keep a check on poaching, warren keepers often released a few coloured rabbits and watched out for their sudden disappearance.

#### *Sussex Rabbit Warrens*

Place-name evidence for former warrens provides useful clues (e.g. Sheail 1971a) but should be treated with some caution because of changes in usage of words. Thus, for example, the word *warren* itself has changed successively from meaning 'an area for the commercial rearing of rabbits', through 'an area for encouraging wild rabbits for sport', to its modern use as 'an interconnecting system of rabbit burrows'. The area at West Dean now known as 'Rabbit Warren' is in fact a 19th-century game preserve for rabbit shooting by the gentry, and was never part of the medieval warren. Selected examples of Sussex rabbit warrens known from documentary sources are presented below.

On the coastal plain, the Bishop of Chichester had at least one warren somewhere on his lands providing rabbits for the King's feasts in the mid 13th century. In the Nonae Rolls of 1340 (Blaauw 1848) the Bishop's rabbits were described as already causing problems to farmers at West Wittering: 'the parishioners say that the wheats in the said parish have been devoured year after year by the rabbits of the Bishop of Chichester, and thereby lessened in value £7 6s. 8d.'. This could indicate a warren at

Cakeham manor, perhaps located on the sandy areas near East Head; a warren in a similar situation is known from Sinah Common on Hayling Island in Hampshire (Sheail 1971a). Recent work (Mr. M. Hall pers. comm.) has shown that in the manor of Bosham near Chichester in the late 16th to the late 17th centuries there were over 40 'Berry Workes' and 'Berry Mounds'; in 1685 the annual rental for them was £1 4s. These may indicate some form of rabbit warren on the Bosham peninsula of Chichester harbour.

Further east along the coast, the Earl de Warenne (Earl of Surrey and Strathearn) was causing similar problems in 1340 at Ovingdean: '100 acres arable, lying annihilated by the destruction of the rabbits of the Lord, Earl Warenne, valued at £1 5s.'. (Blaauw 1848). Hope (1915) mentioned that in 1333 the Earl de Warenne had engraved a seal, with the obverse showing the earl seated and rabbits feeding and sitting at the entrance to their burrows surrounding him. At Newhaven there was Meeching warren during the 15th century, which also appears to have belonged to the Earl de Warenne (Bridgeman 1915).

Away from the coast on the South Downs, there was a warren at Wolstonbury Hill near Pyecombe, included on a map of 1666 deposited in the East Sussex Record Office (E.S.R.O., DAN 2097); it shows the warrener shouldering a gun and looking at clusters of rabbits, pillow mounds and small clumps of bushes. Leconfield (1956) described a rabbit warren on the Goring estate between Sutton and Duncton manors near Petworth. In 1589-90 seven closes and Farm Down above the South Downs scarp at Duncton Hill were let to William Blundell of Madehurst on condition that the ground be 'planted and plenished with conies and so be reputed and called by the name of His Lordship's Warren of Conies . . .'. The rent was 200 couple of conies annually. In 1669 it was still a warren but its subsequent history is not known.

On the Lower Greensand, the area known

as Durford Heath in the parish of Rogate, on the Sussex-Hampshire border, was the warren of the former Abbey of Durford in 1632 (Yates 1972). It was used for common grazing as well as for rabbits, though in 1635 some of the tenants sold their common rights and part of the warren was enclosed. This warren appears to have been about 500 a. in area; large parts today are still unenclosed heathland.

In the Low Weald, there was a *Cunegeria* or Coney Park (later called 'Conyger') at Petworth House, possibly from the time of William de Percy in the early 13th century; it supplied meat to the kitchen. It was added to in the 1580s when new burrows were made; later it became incorporated into Petworth Park but it is not known when it became defunct (Leconfield 1954; Jerrome 1979).

In the High Weald, there was a warren on the sandstone behind Hastings (Sheail 1971a). Four groups of elongate banks and ditches found in Ashdown Forest around Wych Cross were interpreted as pillow mounds dating from the 14th century when there were several warrens in the forest, including a royal coney warren on Gardine Hill (Christian 1967; Tebbutt 1968). Parliamentary surveys between 1649 and 1658 of Ashdown Forest (Daniel-Tyssen 1871) mentioned a former empaled coney warren of 86 a. adjoining Warren Lodge, commonly known as Gardine Hill; the palings had been removed and taken away by 1658. They also mentioned the killing of conies in grounds adjoining Old Lodge. These areas coincide with two of Tebbutt's pillow mound sites.

In contrast to this probable decline of rabbit warrens in Ashdown Forest, warrens were increasing in St. Leonard's Forest near Horsham at this time; although rabbits had been introduced there early, the population remained fairly low due to consistent tree cover in the forest (Sheail 1971a). During the 17th century heathland gradually became dominant after a long period of clear-felling of trees and uncontrolled stock grazing. Much of Lower

Beeding parish was turned over to rabbit warrens, the first certainly existing by 1614; in 1787 there was one warren of 1598 a. In the early 19th century it was said that St. Leonard's Forest yielded only rabbits; after that, successful attempts were made to enclose and improve the warrens so that by 1875 some 2,000 a. of arable land existed in the parish (Hudson, forthcoming). Similarly Young (1813) described how the nearby Tilgate Forest had been recently 'no other than a rabbit warren' but was now being enclosed and converted to arable land.

These Sussex warrens fit into the general pattern of two main phases of warren formation: (i) the formation of warrens in the Middle Ages soon after the reintroduction of rabbits (Veale 1957), when rabbits were scarce and the establishment of breeding colonies was difficult, slow and costly; (ii) the expansion of existing warrens and the formation of new ones in the late 16th and early 17th centuries (Sheail 1978), when it was possible to provide more winter food (from arable fields inside the warrens) due to new crops and farming techniques, and when grain and wool prices were declining generally, making rabbit farming an attractive economic proposition.

#### *Decline of the Warrens: from Resource to Pest*

During the 18th and 19th centuries the value of warrens declined for a number of reasons including soil degradation, competition with sheep and cattle kept in common for grazing, and the high value of corn and wool associated with the changes of the agricultural revolution (Sheail 1971b). After two to five centuries of useful life, the warrens were gradually dismantled. Although a few survived in use into the present century, none appear to have done so in Sussex. Almost all were enclosed and improved, while the rabbits were killed or escaped to form the basis of feral populations in pockets local to the warrens.

Although some rabbits had escaped out of warrens from the time they were introduced (as

at West Wittering in 1340, described above), the small numbers concerned had not caused a national problem and rabbits were regarded as a major resource for fur and flesh up to the late 18th century. However, by then feral rabbits were being actively encouraged for their sporting value and were increasing as a consequence of more stringent control of their predators (for game-bird preservation) and of the increasing cover provided for game and amenity. Another reason for increase was that agricultural improvement was providing more harbourage with new enclosure hedges and more over-winter feed in the form of improved crops (Sheail 1971a). For instance, by the early 19th century rabbits were said to be a nuisance and flourishing in the 'wastes' of Sussex, particularly the High Weald (Young 1813). Changes in farming techniques and in prevailing social and economic conditions were thus the main causes of both the decline in commercial rabbit warrens and the gradual increase in feral rabbits around the end of the 18th century (Sheail 1978).

Rabbits were not abundant nationally in the feral state until about 1840, but in the latter half of the 19th century there was a rapid increase in both the distribution and numbers of rabbits, with a consequential increase in crop damage. Rabbits, however, were still regarded as a resource for sporting purposes, and game warrens were set aside where rabbits were encouraged for shooting (Simpson 1893; Sheail 1971a). Game bags can be used as a general guide to these trends in rabbit numbers. For instance Sheail (1971a) gave figures for an East Sussex estate from 1850 to 1879, and Middleton (1934) gave figures for four estates in Hertfordshire, Norfolk and Yorkshire from 1862 to 1933; numbers showed considerable fluctuation but generally an upward trend into the present century.

Until the Ground Game Act of 1880 any tenants or rabbit catchers who killed rabbits did so illegally because they were still by law the landlord's resource; many tenant farmers in

England suffered great distress due to increasing rabbit damage without redress (Sheail 1971a). But with the passing of the Ground Game Act tenants were at last allowed to kill rabbits on the land they occupied. Rabbit-trappers used gin traps and snares to kill wild rabbits for general sale (Tittensor & Lloyd 1983) and thus the era of profitable warrens, even on marginal soils, was coming to an end against such competition.

Page (1905) stated that rabbits in Sussex were then very abundant. Nationally, they continued to increase and reached peak numbers from about 1914 onwards; Crompton & Sheail (1975) gave details of rabbits killed on the 930-ha. Lakenheath warren in Suffolk between 1915 and 1940 which illustrate this superabundance. Farrow (1916; 1917) surveyed the effects of rabbits on vegetation and showed that in the Brecklands of Suffolk ling (*Calluna vulgaris*) was replaced by sand sedge (*Carex arenaria*) and grasses. Tansley & Adamson (1925), assessing the effects of rabbits on the chalk grasslands of the Hampshire-Sussex border, noted that rabbits reduce the vegetation to a height of under 2.5 cm., that mosses may become dominant, that establishment of woody species is impossible and that shrubs already present are 'topiaried' into neat, compact shapes.

By 1939 rabbits were such a major pest of farmland that the Prevention of Damage by Rabbits Act was passed to empower local authorities to serve notice on landowners or occupiers to destroy rabbits. In 1947 this authority was transferred by the Agriculture Act to the Ministry of Agriculture. Despite enforcement of control measures, farmers still suffered great deprivations as rabbits continued in major pest proportions to the middle of this century. Between 1950 and 1953, 40 million rabbits were killed annually for the meat and fur trade (Thompson & Worden 1956). Rabbits reached densities of 20 adults per acre, although on islands such as Skokholm off Pembrokeshire their peaks reached 40 per acre (Tittensor & Lloyd 1983).

### *Myxomatosis and Re-establishment*

Myxomatosis arrived in Britain in September 1953, reached West Sussex by autumn 1954 and had spread throughout the country by late 1955 (Thompson & Worden 1956). Over 99 per cent of rabbits were killed nationally, and numbers reached a trough in 1956, remaining low for the rest of the 1950s with rabbits widely separated from their neighbours (Lloyd 1970). The 1954 Pests Act made the deliberate spread of the disease illegal, and provided for the designation of 'Rabbit Clearance Areas' in an attempt to keep numbers low. However, during the 1960s rabbits were becoming gradually more evident nationally. The Sussex Mammal Reports (Taylor Page 1966-70) showed that they were slowly becoming re-established in the county, with some areas having quite strong populations. Rabbit Clearance Societies came into existence to try and prevent their increase on farmland. During the 1970s the recovery in numbers nationally was obvious in certain areas, notably south-east England including parts of Sussex (Lloyd 1981; Tittensor 1974).

## METHODS

### *Documentary Sources*

The documentary history of the West Dean warren was studied by both authors as part of the overall Chilgrove Valley Landscape Project, a long-term research project on the evolution of the landscape of the Chilgrove and Lavant valleys co-ordinated by Fred Aldsworth (archaeologist) and R.M.T. (historical ecologist). Sheail (1970) gave a useful review of the types of historical sources available for the study of rabbits, and many of these were used in the present work. Documentary and printed sources in the West Sussex Record Office (W.S.R.O.) were studied, particularly deposited documents of the West Dean Estate (WD plus catalogue number) referring to the warren, including a survey of the manor dated 1623 and records of game bags. Two detailed maps of the warren itself, dated 1685 and 1778, along with other

documents from the muniments of Arundel Castle (A.C.M. plus catalogue number) and manuscripts from the British Library (B.L. plus catalogue number) were used. Numerous other printed sources including maps were also consulted, as well as the memories of former local farmers, foresters, keepers and rabbit-catchers.

#### *Field Techniques*

Fieldwork on surviving features of the warren was carried out by both authors. From the detailed maps it was possible to locate the exact boundary of the warren on the ground; in January 1978 a group of evening class students and their tutors from Southampton University Department of Adult Education perambulated the boundary and noted its extant features. Subsequently, archaeological excavations by Fred Aldsworth of the warren boundary were carried out on Lodge Hill farm to determine the structure of the boundary features (Appendix 1). Archaeological analysis of subterranean

features of Lodge Hill Farmhouse and buildings were carried out during renovations, and field-walking identified surface features and crop marks. Excavations of a game larder at nearby Stapleash (Appendix 2), which may have been associated with the 19th-century game warren, were also undertaken. During an ecological appraisal by R.M.T. of the West Dean Estate, carried out in 1978-9, habitats in and around the area of the warren were studied and analysed to provide an ecological background for the development and demise of the warren. In the period 1971-82 part of the warren area was used as a site for detailed research by A.M.T. on trends in post-myxomatosis rabbit populations for the Worplesdon Laboratory of the Ministry of Agriculture.

#### WEST DEAN RABBIT WARREN

##### *General Features of the Warren*

The rabbit warren was situated on the chalk

### WEST DEAN & BINDERTON PARISHES

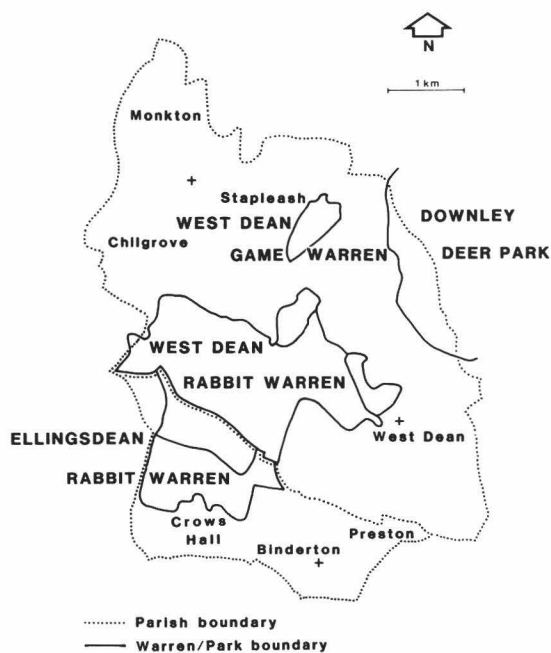


Fig. 1. Location of warrens and deer park sites mentioned.

# WEST DEAN RABBIT WARREN

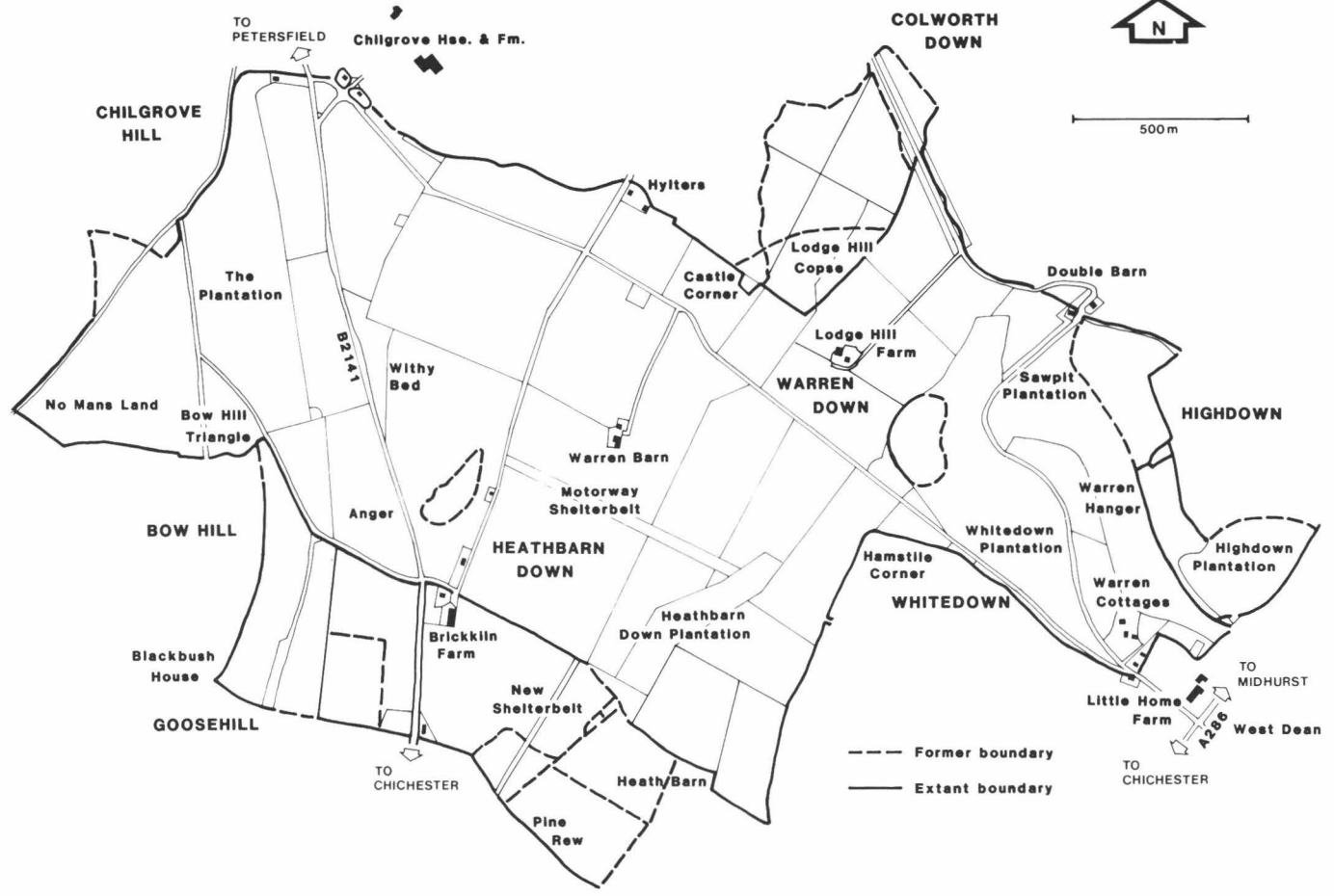


Fig. 2. West Dean warren today, showing modern boundaries and names mentioned.



bedrock of the South Downs in the manor and parish of West Dean in West Sussex, five miles north of Chichester (Figs. 1, 2). West Dean warren was well established by 1583, and throughout its recorded history the area was also used as common pasture for the domestic stock of the tenants of West Dean manor. As the 18th century progressed, arguments between tenants and landlord over the lack of sufficient food for both rabbits and stock on the warren, and over losses to crops outside the warren from escaped rabbits, became more frequent. Finally the warren was dismantled in 1804; subsequently parts were enclosed as fields or new plantations, and the new Lodge Hill, Brickkiln and Little Home farms came into being.

West Dean warren was about 900 a. during the 17th and 18th centuries (Fig. 3), but there is some confusion in the documents about the Two Whitleys (remnants now in Lodge Hill Copse) and Hayedown (now Highdown) which were disputed areas, sometimes included within the warren and sometimes not. This size was very comparable with some of the large Lincolnshire, Dartmoor and Yorkshire warrens (Young 1799; Haynes 1970; Harris 1971), but considerably smaller than the Suffolk Breckland warrens (Crompton & Sheail 1975).

There was a warren lodge on the site of the present (built c. 1813) Lodge Hill Farmhouse (Fig. 4, no. 1), a high windy point from which almost the whole of the warren was visible. An analysis of the farmhouse cellars showed that the only remaining signs of the earlier structure of the warren lodge were some rough chalk stonework and recesses in the cellar walls, which could have been for storage of carcasses (Fred Aldsworth pers. comm.). However, during excavations for the foundation of a new dairy in 1983 five large, coniferous post bases (up to 30 cm. diameter at base and up to 66 cm. long) were found in post pits 84 cm. deep into the chalk bedrock; these were under the present concrete floor of a 19th-century building. The size and position of these timbers (forming two lines 3.9 metres apart) suggests they could have

been foundations of a small but tall building such as a look-out tower, a common feature on many East Anglian warrens (Sheail 1971a). Further east was Warren Barn (now Double Barn), a double flint barn with thatched roof, which is still extant. A former well near Brickkiln farm buildings may have been associated with a dwelling at the gates on Farthings Lane.

The warren had a perimeter feature of  $8\frac{3}{4}$  miles (14 km.), in places coinciding with the boundaries of the medieval open fields of Monkton, West Dean and Binderton (Aldsworth 1979). Extant lengths of this perimeter feature (Fig. 4) still have a bank 30 to 200 cm. high with the internal ditch up to 4 metres wide; it survives particularly well on Lodge Hill farm where Fred Aldsworth carried out an archaeological excavation to determine its structure (Appendix 1; Fig. 8). The bank was topped by a fence and faced on the inner side with knapped flints. Although rabbits can jump or climb several feet, they would have had difficulty in getting up this smooth vertical surface and over the fence above from the bottom of the ditch. There are often large, sometimes pollarded, old trees of oak (*Quercus robur*), beech (*Fagus sylvaticus*) and ash (*Fraxinus excelsior*) on or near the boundary (Fig. 5). There is a line of large yew (*Taxus baccata*) trees up the slope of Bow Hill, along the boundary adjacent to Goosehill Camp, which may be the precursor of the extensive yew wood now clothing its slopes (Tittensor 1980). Along most of the boundary there are now hedges of varying richness (Fig. 5); most consist of few species, such as sycamore (*Acer pseudoplatanus*), hawthorn (*Crataegus monogyna*) or pine (*Pinus sylvestris*), suggesting that they postdate the warren. However, there is a particularly rich hedge along the northern boundary of the warren between Chilgrove and Hylters (an averaged 30-yd. shrub count of nine species; see Pollard & al. 1974), where it abutted the medieval open field; the bank and ditch feature here is particularly prominent. This hedge probably predates the medieval period,

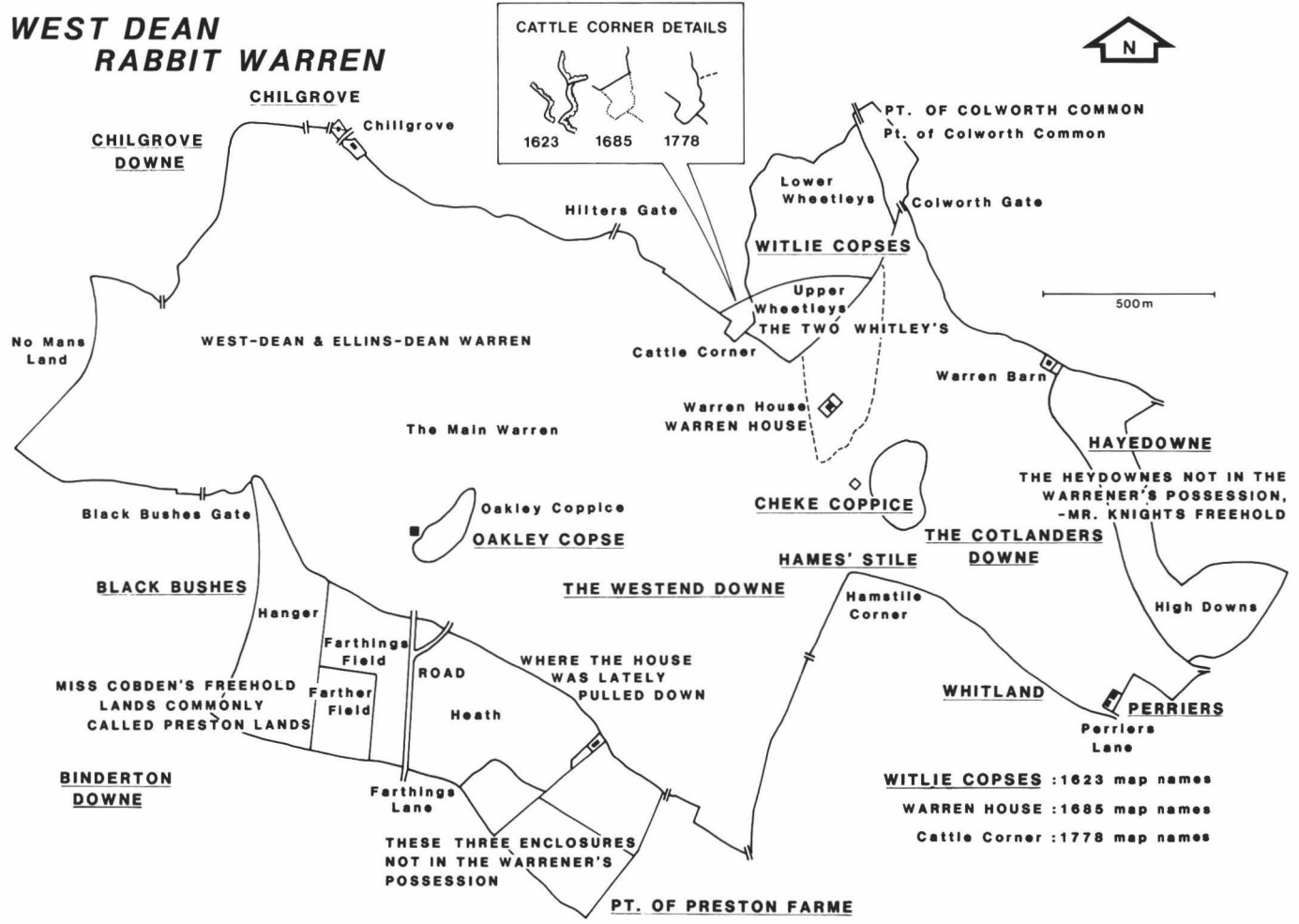


Fig. 3. West Dean warren in the 17th and 18th centuries. Map sources: W.S.R.O., WD 3151-2 (1623); A.C.M., PM 116 (1685) and RL 5 (1778).

having been planted on the bank to separate the large arable field of Monkton from stock on the common downland pasture of West Dean; it was probably inherited by the warren as a boundary feature. Much of the warren boundary, however, abutted common downland pasture rather than arable in medieval times (Aldsworth 1979).

Near the warren lodge the boundary of the warren makes a sharp detour round a square enclosure known as Cattle Corner (now Castle Corner or The Rookery); the warren bank and ditch carries round three sides of this enclosure but the northern side is not banked (Fig. 3, inset). It may have been the animal pound associated with common grazing of stock referred to first in the 17th century (W.S.R.O., WD 1315). Although Romano-British burials were found here in 1813 (Dallaway 1815), trenches dug by Fred Aldsworth recently showed no other features (Appendix 1; Fig. 8). However, there are several other possible sites for stock pounds. A narrow, 3-a. part of the adjoining Colworth Common (now part of Colworth farm), with a gate to the north opening onto the common proper and another to the south onto the warren, could also have been a stock-holding area. A former oval enclosure of uncertain date on Warren Down and a raised platform feature on Bow Hill bordering East Marden parish could also have been associated with stock. Crompton & Taylor (1971) found four much larger, rectangular earthwork enclosures of uncertain purpose within Lakenheath warren, Suffolk; it is possible that these were constructed for either sheltering or confining sheep and cattle (again there was common grazing of stock), but their lack of entrances and large size (11 to 15 a. each) suggest that they were used to exclude rabbits, perhaps serving as arable to provide extra winter feed for them. Thus they may be equivalent to the coppices and field enclosures shown by the maps to be on the edge of and within West Dean warren, rather than to the stock pound.

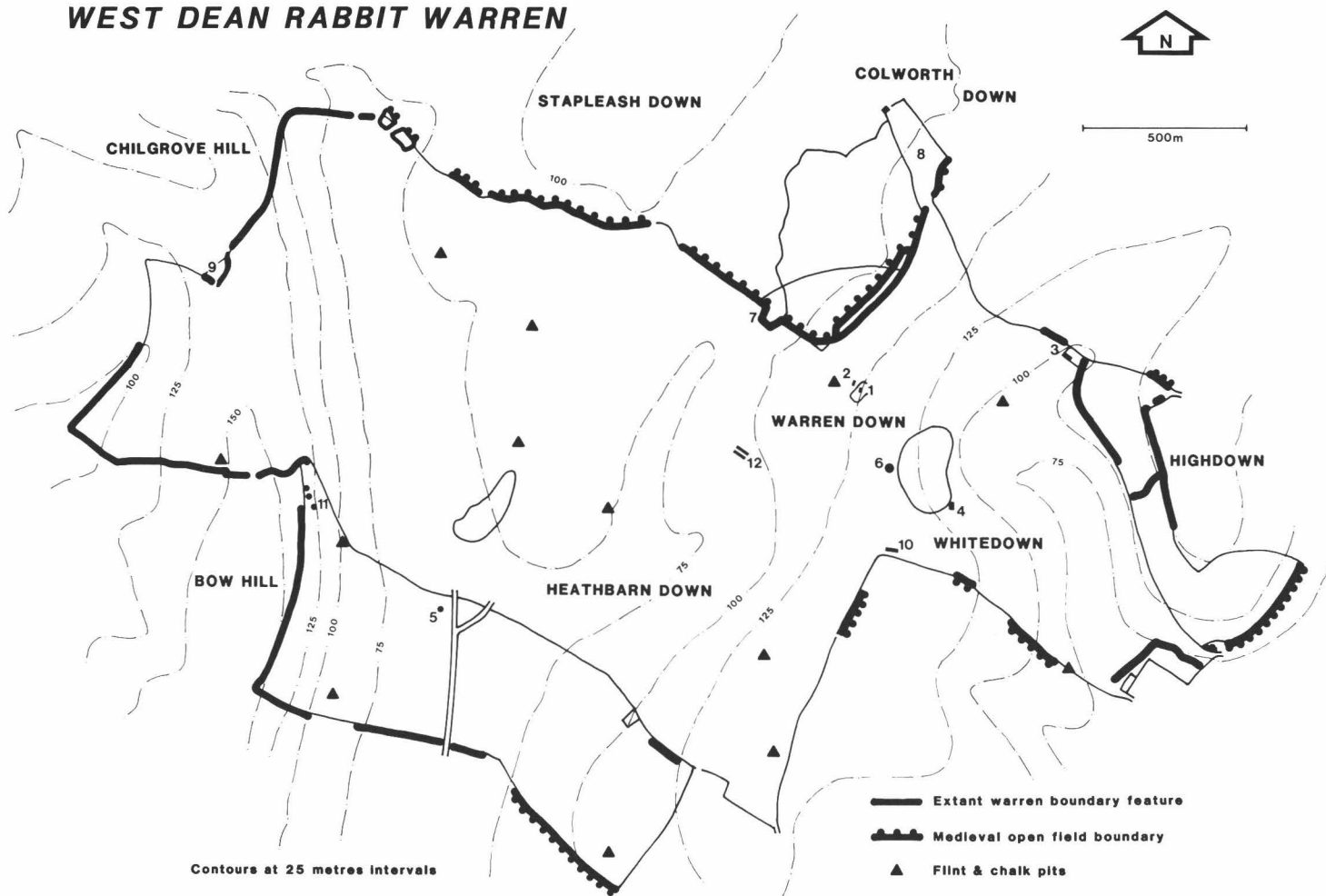
There was a two-piece woodland called the

Upper Whitley and Lower Whitley at the north-east point of West Dean warren (Fig. 3); the two Whitleys were enclosed by a deep ditch and high bank (W.S.R.O., WD 1290). These features still exist along the south-eastern end of the remaining woodland fragment (Fig. 4), adjacent to the warren boundary bank, thus producing a double bank and ditch feature. The Whitley Coppices survive only as part of the 6-a. Lodge Hill Copse (Fig. 5), a small remnant of this 16th-century woodland. Lodge Hill Copse is a diverse woodlot ecologically and contains lynchets (ancient field boundary banks). Big pollarded gean (*Prunus avium*), beech, oak and field maple (*Acer campestre*) trees occur on the double-banked boundary between copse and warren. The 8-a. woodland known as Oakley Coppice has disappeared without trace. The smaller Cheke Coppice, which had disappeared by 1778, was on an area which is now part of Whitedown Plantation.

Other earthworks within the warren could have been associated with the rabbits (Fig. 4); in 1983 Fred Aldsworth located possible pillow mounds on the western side of the warren on the slopes of Bow Hill. The main feature is a linear earthwork running south-west to north-east, with a ditch on its northern side; several hummocks pitted with burrows occur in the vicinity and these may also have been pillow mounds. In the centre of the warren, parallel bank features (now indistinct through ploughing) occurred on Heathbarn Down, crossing the former Roman road south-east to north-west across the contours, while a cross dyke occurs on Warren Down (Aldsworth 1979); these may also have been pillow mounds.

There are 13 known pits and hollows within the warren (Fig. 4), many near the warren boundary, some of which could have been the source of flints for the inner facing of the boundary bank; 12 of these pits occur on the flint-bearing Upper Chalk and clay-with-flints strata. There are patches of clay soil over chalk throughout the warren, particularly on Lodge Hill farm, where remnants of 'chalk heath'

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vegetation survive (Fig. 6). They contain species such as gorse, wood sage (*Teucrium scorodonia*), ling, and bracken (*Pteridium aquilinum*), and explain the name Heathbarn Down on the southern edge of the warren. Fragments of 'chalk downland' also survive within the boundaries (Fig. 6), suggesting that the original warren pasture was a mixture of chalk downland and chalk heath vegetation. Some large areas of this type of habitat survived until recently on Warren and Heathbarn Downs; they were shown as rough with invasive scrub on the 1910 revision of the Ordnance Survey 25-in. map (Fig. 6), but were subsequently cleared for cultivation.

Although the warren was usually known as West Dean warren, part or all of it was sometimes referred to as Ellingsdean warren (alternative spellings include Ellingdown, Ellensdeane, Ellendean, Ellesden). This name has not survived, so that the location it described is uncertain. One possible explanation of the confusing use of this name in the documents (see below) is that Ellingsdean was originally a smaller, but separate, adjoining warren in the manor of Preston and former parish of Binderton. A tentative reconstruction of its former extent based upon the small amount of available evidence including several 'dean' place names is presented in Fig. 7. 'Ellingsdeane' was referred to as being distant from West Dean bottom (i.e. valley) in c. 1590 (W.S.R.O., WD 1312). On the 1623 map this area is referred to as 'part of Preston Farme' (Fig. 3), but by the time of the 1685 map Ellingsdean warren appears to have been considerably reduced in size and to have been incorporated into the

larger West Dean warren (hence the use of 'West-Dean and Ellins-Dean Warren' on that map); the enclosures marked on the south-western edge of the warren, each side of Farthings Lane (Fig. 3), are probably the last remnants of the former Ellingsdean Warren, used for growing over-winter food for the rabbits on the main warren.

The surviving archaeological and landscape features of the former Ellingsdean warren are shown in Fig. 7; it was perhaps 450 a. in extent. The possible perimeter bank features are fragmentary, and a number of trackways (some sunken) of varying age cross the area. Seven pits and hollows occur within the reconstructed boundaries, and there is an earthwork feature running north-south near Dean Barn as well as the possible pillow mounds on the side of Bow Hill described above. There are some fragments of rich hedgerows remaining but there appear to be few pollards left; chalk downland and chalk heath remnants remain, indicating similar vegetation to West Dean warren.

#### *Early History of the Warren (1554-1612)*

In Norman and late medieval times the area north of Chichester on the South Downs was the property of the Earls of Arundel, who were also Dukes of Norfolk from 1604. In February 1554 Queen Mary granted to Henry Fitzalan, Earl of Arundel, and his heirs free warren in all his demesnes (W.S.R.O., WD 1291); 'free warren' referred to the right to hunt game over a specified piece of land. The person granted this franchise could prosecute anyone else hunting or killing the game animals concerned, which consisted of hares, rabbits, pheasants and

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Fig. 4. Archaeological sites on West Dean warren. Known sites associated with the former warren (reference to gazetteer indicates Down (1979)): 1. Warren Lodge: rough chalk stonework in Lodge Hill Farmhouse cellars. 2. Watch tower?: five timber foundations sunk into bedrock under flint barn on Lodge Hill farm. 3. Warren Barn: extant as Double Barn. 4. Unknown building: flint and tile remains in Whitetown Plantation. 5. Former well: now covered by arable at Brickkiln farm. 6. Stock enclosure?: oval bank and ditch earthwork c. 63 x 30 metres, extinct on Warren Down (gazetteer 50, SU 84841323). 7. Stock enclosure?: Cattle Corner boundary earthworks, now Castle Corner/The Rookery (Appendix 1; Fig. 8). 8. Stock enclosure?: double-gated narrow portion of Colworth Common (Fig. 3). 9. Stock enclosure?: raised platform feature on Chilgrove Hill. 10. Pillow mound?: linear bank and ditch earthwork c. 125 metres long on Warren Down (gazetteer 52, SU 84801297). 11. Pillow mounds?: linear bank and ditch earthwork c. 48 x 18 metres plus several hummocky areas, in Hanger. 12. Pillow mounds?: two linear bank and ditch earthworks c. 100 metres apart, one still extant, on Heathbarn Down.

## WEST DEAN RABBIT WARREN

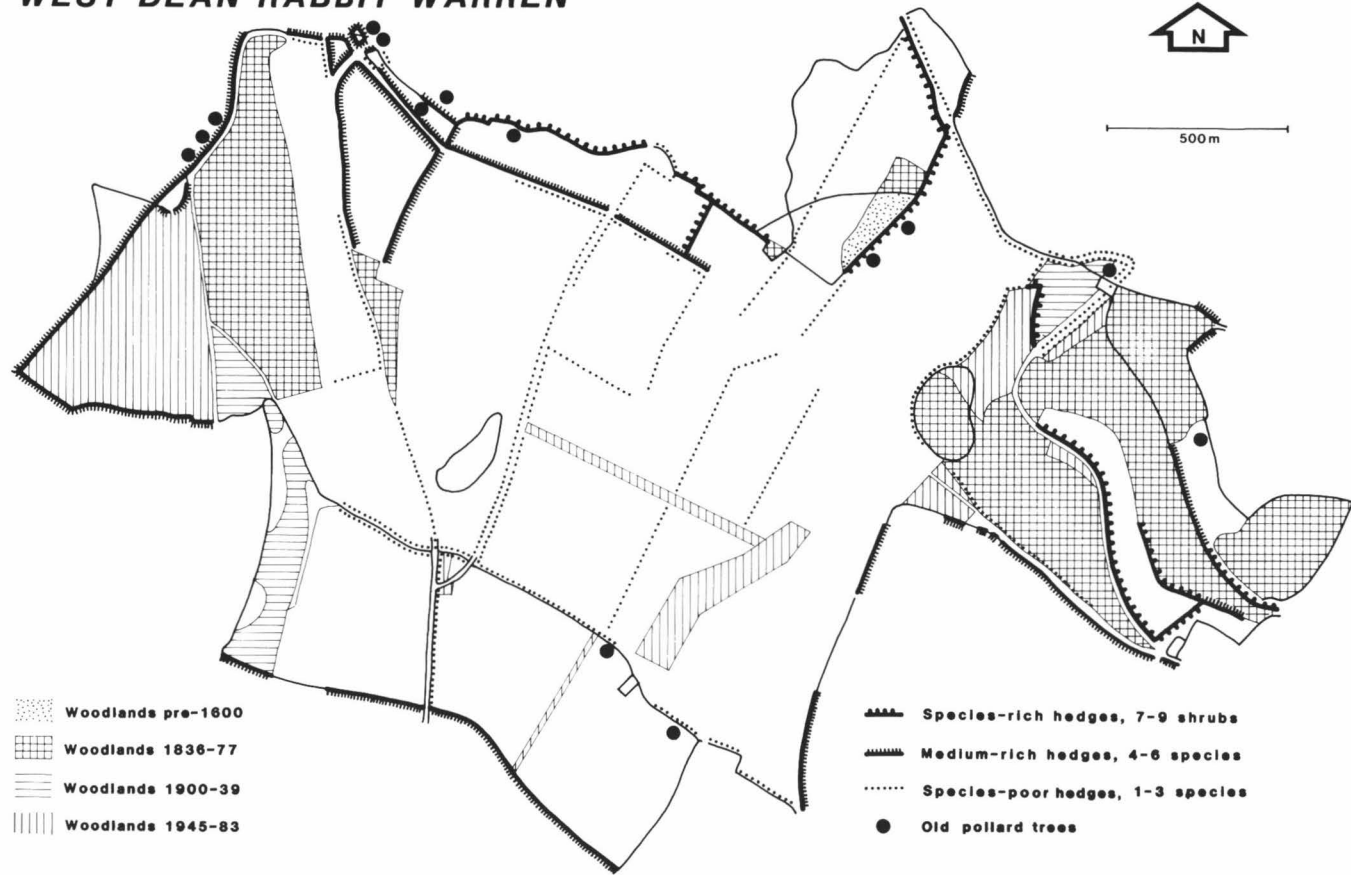


Fig. 5. Woodlands, hedges and trees on West Dean warren. Current status of habitats (I) within former warren.

partridges (Sheail 1971a). The term 'warren' when used in this context did not always indicate the physical presence of an enclosed warren but rather the sporting rights for particular species; these rights were to cause ownership disputes at a later date.

A 16th-century document, probably of c. 1570 (B.L., Add. MS. 5701), labelled 'The Warren of Ellesden' shows that Thomas Stoughton then farmed the warren for a rent of £30. A memorandum to the rental stated that the ground of the warren was very spacious, with one part abutting West Dean village, and another part abutting Downley Park (the site of a medieval deer park and hunting box of the Earls of Arundel on the border with Singleton parish) and extending up onto the downs of the manor of Preston, and that there was a 'little lodge for the warrener'. Although named as Ellingsdean Warren, the bounds described here appear to include both warrens, with specific reference to downland in Preston manor. Hayedowne (Highdown) in the east approached quite close to Downley deer park (Fig. 1), but the known boundaries of West Dean warren did not actually abut the park (W.S.R.O., Add. MS. 18014).

The earliest positively dated surviving document which refers to the warren is an indenture of 1583 between Philip Howard, Earl of Arundel, and Henry Hargrave, which provides a detailed picture of the 'Warren of Ellingsdean' at that time (W.S.R.O., WD 1086), and shows that the warren was already long established. The warren was let to Henry Hargrave for a period of 21 years, with all the conies and rabbits (i.e. adults and young) in the warren, together with the lodge and any profits or materials previous warreners had enjoyed. The Earl reserved wood, underwood and timber trees to himself and free access for cutting and taking them away. The accustomed feed of tenants' sheep on the common pasture of the warren was specifically excepted from the lease. The rent was £20 annually or the equivalent in rabbits supplied twice weekly to Arundel Castle; at 6*d.* a couple between Whitsun and St.

James's day (May to July), at 8*d.* a couple between St. James's day and Michaelmas (July to September), and at 9*d.* a couple from Michaelmas to early February. There appears to have been a closed season from February to May, which is the time of greatest reproduction by wild rabbits (Tittensor & Lloyd 1983).

Henry Hargrave was obliged to maintain the lodge, to fence out the Whitley Coppices, not to plough the warren or spoil it in any way, and to keep a breeding stock of 3,000 adult rabbits. This is a density of between three and four rabbits per acre, which was usual (Sheail 1971a), though of course tenants' domestic stock were grazing in common at the same time. Of particular interest is that Henry Hargrave was allowed not only 'firebote' (i.e. firewood), but also 'trapbote of beech underwoods and other trees which have been lopped', suggesting wood for the provision of artificial burrows, breeding clappers or rabbit traps. Henry Hargrave was also allowed 'bruse wood for the coneys' as often as needed, suggesting the cutting of twigs or branches for rabbits to browse or gnaw in times of food shortage; the feeding of livestock on twigs or foliage cut from pollards was practised elsewhere in the 16th century (Rackham 1980). The running of the warren was obviously a skilled task, and Henry Hargrave appears to have been the warrener until 1611 or 1612.

After the death of Philip Howard, Earl of Arundel, in 1589 the West Dean lands reverted to his brother-in-law John, Lord Lumley, who sold the manor of West Dean in 1590 to Richard Lewknor (W.S.R.O., WD 1291). Included in the sale was 'free liberty of Forest chase and warren' over all the ground excepting Downley Park, Winden Woods and the arable and sheep down of Singleton farm (adjoining lands outside the warren). Richard Lewknor thus seems to have assumed rights of free warren over the manor, which included the rabbit warren and the Whitley Coppices; the manor boundaries were shown on a map of 1623 (W.S.R.O., WD 3152).

Some rough notes on the problematical

**WEST DEAN RABBIT WARREN**

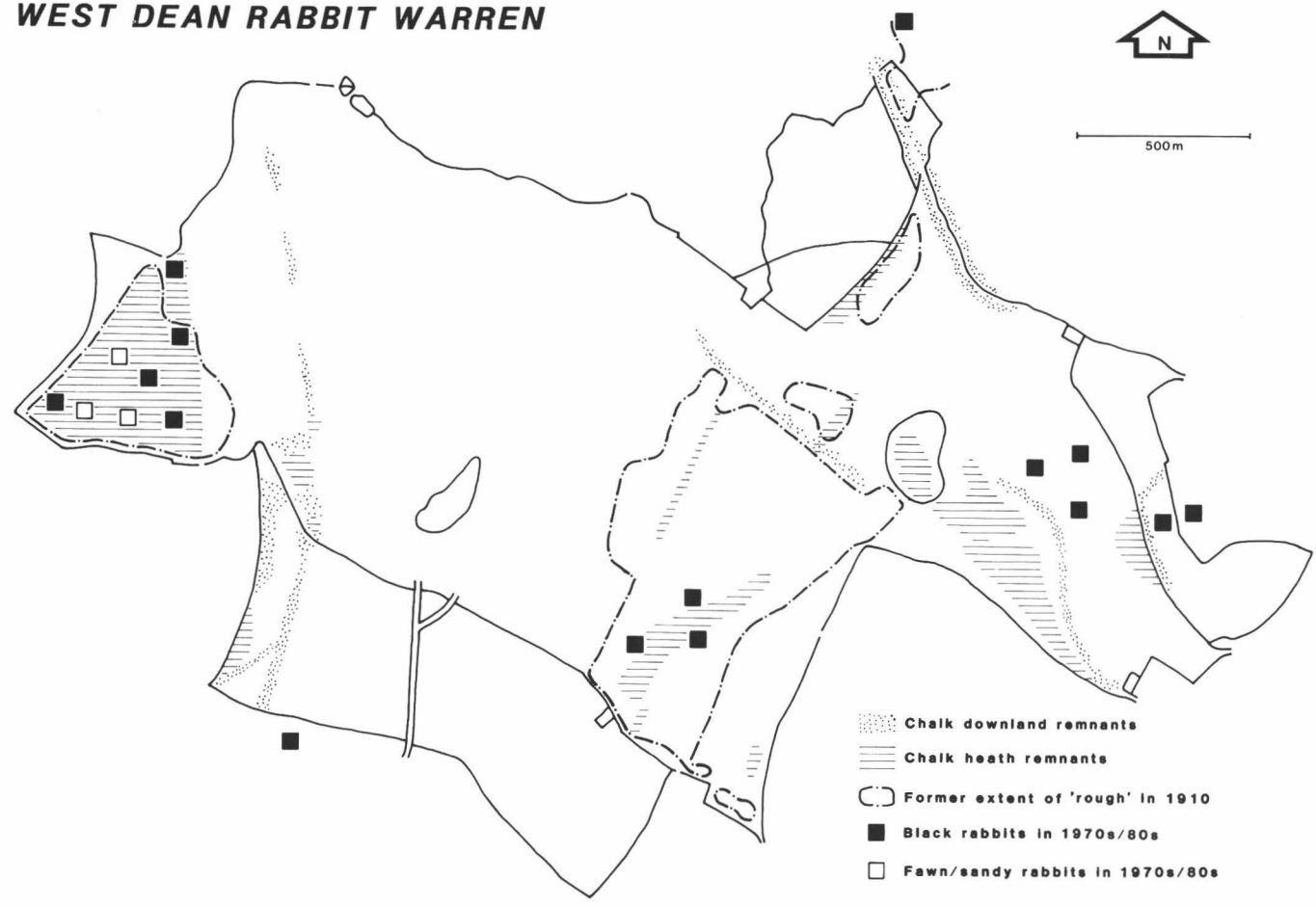


Fig. 6. Downland, heath and rabbits on West Dean warren. Current status of habitats (II) and rabbit colour variations within former warren. (Habitats not shown in Figs. 5 and 6 are cultivated fields or gardens.)



subject of free warren in the West Dean area were written by the Earl of Arundel himself c. 1590 (W.S.R.O., WD 1312). They suggest that the Earl was having second thoughts about the sale of his rights of free warren as an addition to the sale of the manor lands, and that he tried to terminate those rights. He now reserved to himself in Preston the privilege of warren and feed for conies, the liberty for conies to burrow, the liberty to dig the burrows, to hunt, and to take the conies, and free access to the down—rights that had obviously been enjoyed for some time. This document refers to the rabbit warren itself, in terms of the rights of free warren upon the ground. The status of the Whitley Coppices ('ye Lower Witle') was uncertain even at this time, a survey of 1587 having shown it as woodland *upon* the common (i.e. within the warren); two other surveys commissioned by the Earl himself showed it as part of the *adjacent* Woods farm (W.S.R.O., WD 1312). There was to be constant disagreement as to whether all the rights of free warren had indeed been sold with the manor to Richard Lewknor. In practice, however, the Earls of Arundel assumed free warren and let the tenancy of the rabbit warren at regular intervals for the next two centuries, while the Lewknor family retained free warren in the Whitley Coppices at least.

#### *The Warren in the 17th Century (1612–1706)*

A large-scale map and accompanying schedule of the manor of West Dean in 1623 (W.S.R.O., WD 3151–2) named the warren area as 'The Westend Downe' (the present Heathbarn and Warren Downs up to Blackbush) and 'The Cotlanders Downe' (the present Whitedown and Warren Hanger) (Fig. 3). 'Witlie Copses' were marked as two separate enclosures, together with the now extinct 'Oakley Cope' (in the Chilgrove Valley) and 'Cheke Coppice' (now in Whitedown Plantation). Hayedowne was marked as a separate enclosure. There were several trackways, and a building or enclosure (as a later pencil addition) on Warren Down corresponding with the oval enclosure mentioned above. The warren lodge

was not marked, and Upper Whitley was apparently more extensive than in later maps, though scheduled as 40 a.

Henry Hargrave's tenancy of the warren terminated by 1612 and Richard Lewknor 'took Ellingdeane Warren when Hargraves lease expired and continued in the occupation thereof till it was letten to Mr. Cobden' (W.S.R.O., WD 1291). In 1653 John Lewknor granted the Lower Whitley Coppice to William Hasler at an annual rent of £7 10s., so this woodland was by then being let separately from the warren (W.S.R.O., WD 1292). The Lewknor family appear to have continued as tenants of the warren until 1682, when it was again let by the Duke of Norfolk for 21 years at an annual rent of £45. Neither the contentious Whitley Coppices nor Highdown were included in the warren lease at this time. Nine hundred couple of coneys were to be maintained as stock in the warren (W.S.R.O., WD 1291).

In 1685–6 the Duke of Norfolk caused to be drawn up 'A Map of West-Dean and Ellins-Dean Warren' (A.C.M., PM 116) which showed 'The Heydownes', 'The Two Whitleys' (undivided), the adjoining narrow part of Colworth Common, and several enclosures on the southern edge not in the warren's possession ('Miss Cobden's freehold lands commonly called Preston lands') as separate entities within the warren boundary. Oakley and Cheke coppices were not shown, but as Oakley coppice reappears on a later map the status of both woods in 1685 is uncertain. The 'Warren House' and grounds were clearly marked, as was a house adjoining the southern enclosures 'lately pulled down' (Fig. 3).

Although few 17th-century documents concerning the warren survive, those extant do show that the warren continued in use throughout the century in the traditional manner of the previous century, despite disputes over rights of free warren and over the Whitleys and Highdown.

#### *The Warren in the 18th Century (1706–78)*

This century was dominated by three con-

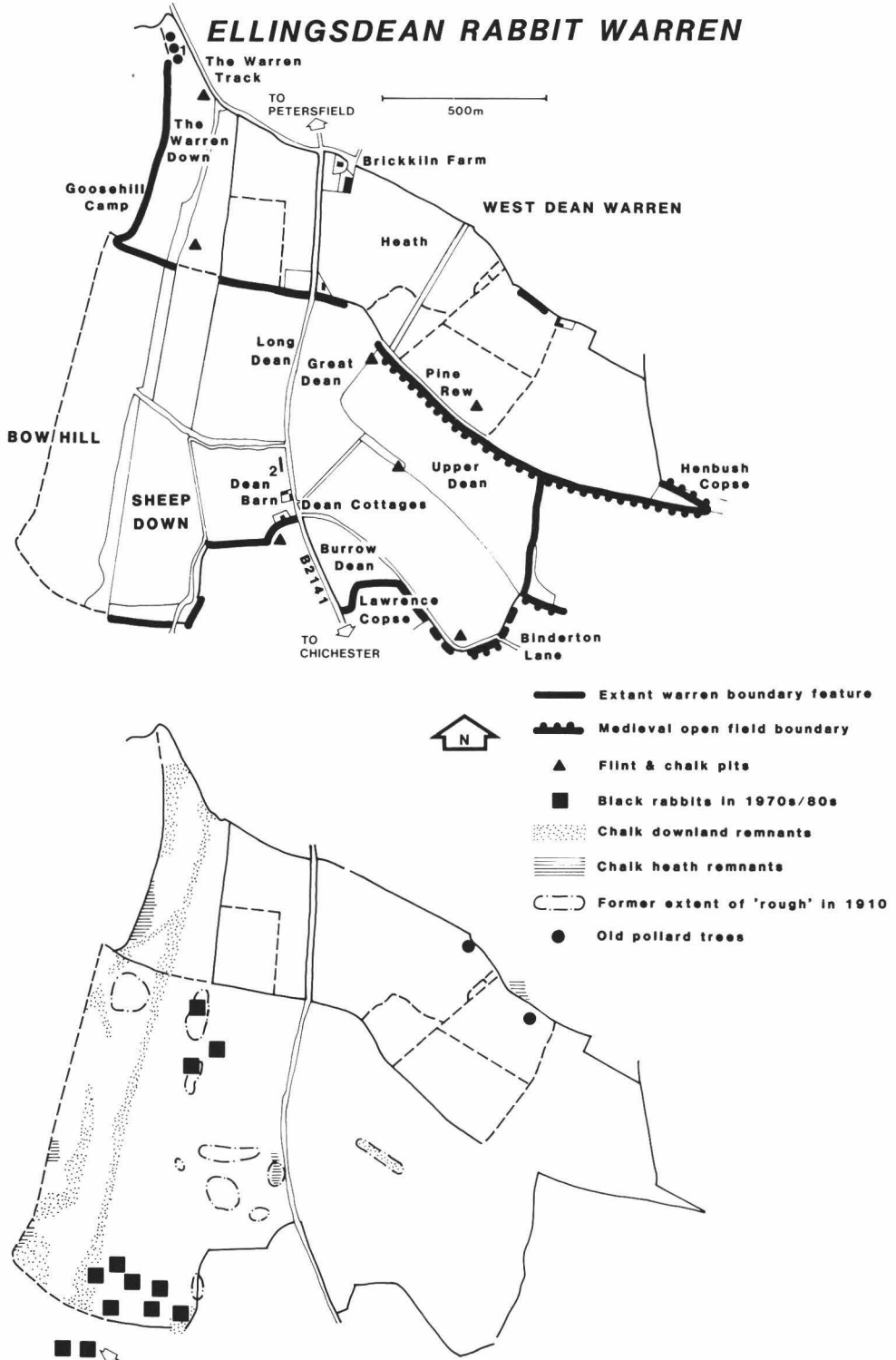


Fig. 7. Possible boundaries of Ellingsdean warren: a tentative reconstruction based upon available evidence. Map sources: W.S.R.O., WD 3156 (1771), 3316 (c. 1800), 3161 (1810) and TD/W 14 (1847). Known sites associated with the former warren: 1. Pillow mounds?: Fig. 4, no. 11. 2. Pillow mound?: linear bank and ditch earthwork c. 30 x 10 metres, by Dean Barn.

tinuing problems: (i) the status of the Whitleys and Highdown, (ii) the competition for food between rabbits and the tenants' domestic stock in what was both warren and common downland, and (iii) the question of who actually had the right of free warren on the land.

The manor of West Dean remained in the ownership of the Lewknor family until 1706 when, in the absence of an heir, it passed to Elizabeth Woodward Knight; she married Bulstrode Peachey, who then changed his surname to Peachey Knight. Early 18th-century documents show that the Bayton family had now become the regular lessees of the warren, with the traditional rights of making burrows, setting traps and providing feed for the agreed 900 couple of conies (e.g. W.S.R.O., WD 1286 of 1714). Highdown was still at this time reserved to Mr. Peachey Knight on a separate payment of rent to the Duke of Norfolk; the rent in 1714 was £50.

In the early decades of the century Peachey Knight was having problems with rabbits 'skagging' out from the warren into what he regarded as *his* Whitleys. The warrener, John Bayton, had made a private agreement with Peachey Knight's farm tenant adjoining the warren to allow the rabbits to feed on that extramural land, but Peachey Knight was worried that the Duke of Norfolk would in time claim right of free warren on these same extramural lands! Until the time of John Bayton people outside the warren had killed escaping conies 'without any molestation or hindrance from the then warrener', so that the coppices were thriving and regularly cut (W.S.R.O., WD 1291). However, during the time of John Bayton's lease, the Whitleys were deteriorating; 'it is most notorious that conies and a coppice are things inconsistent in nature and that the former will destroy the latter if frequently cut as is evident by the Upper Whitley which is now utterly destroyed as a coppice there remaining only here and there an unthriving shrubb in it' (W.S.R.O., WD 1291, written in 1729).

By 1729 there were already problems with high rabbit numbers (W.S.R.O., WD 1291).

The tenants with grazing stock on the common had previously stopped up burrows to the 1583 lease number of up to 1,500 breeding couple of conies, or the 1682 lease number of 900 breeding couple, but in 1729 it was estimated that 3,000 to 5,000 breeding couple were present. This represents *over-winter* numbers of seven to twelve rabbits per acre compared with the three to four per acre in 1583 or two per acre in 1682, and the mid 20th-century pre-myxomatosis *summer peak* level in England generally of four to twenty per acre (Tittensor & Lloyd 1983). There was now insufficient food on the warren for all the rabbits together with the allowable 2,500 tenants' stock. Peachey Knight intended to convert at least Upper Whitley to arable and, since the warren fences were strong, the extramural rabbits already there would be unable to return to the warren and would thus cause many problems. The Whitleys had not only harboured rabbits but provided 'loads of bruise wood for the conies' in winter (W.S.R.O., WD 1291).

Eventually Peachey Knight and the Duke of Norfolk went to court over the matter, and the evidence of one Edward Mumford in 1729 survives to give some further interesting information as follows (W.S.R.O., WD 1290). The Whitleys were enclosed then by a deep ditch and high bank. They had been regularly cut for coppice and faggots in the late 17th century but had since deteriorated because the warrener John Bayton molested people killing escaped rabbits there. The adjoining Woods farm, in the occupation of Thomas Knott, had recently had a 6-a. field of wheat totally eaten up by the conies so that it would not produce sufficient to pay for the seed and tillage. The Whitleys remained wooded until at least 1778, so the outcome of this court case is unclear.

In 1731 George Bayton, the warrener, was presented to the court baron of West Dean manor for a number of misdemeanours which included erecting a carthouse on the common, making extra coney traps, building a lodge in 'Ellendean' and 'digging of divers caves in the common', all of which upset the grazing tenants (W.S.R.O., WD 1303). In 1734 he was pre-

sented for the same reasons, though the extra lodge was now called a 'watch house' (W.S.R.O., WD 1302). The problems occurred still in 1745, three years before George Bayton died and was succeeded by his son John (W.S.R.O., WD 1321). Throughout the century the manor court proceedings mentioned that for each yardland with common rights the tenant could graze 60 sheep, and that a communal shepherd looked after them.

In 1737 West Dean manor, due to lack of an heir, passed to a distant relative Thomas May Knight, who exchanged it in 1745 with his cousin Sir John Peachey for a Hampshire property; the Peachey family were also Lords Selsey from 1794, and held West Dean until 1871. By 1748 the tenants were becoming desperate at the state of grazing in the warren, and three of their number, Richard Belchambers, Henry Cobden and Richard Hasler, entreated Sir John Peachey to ask the Duke of Norfolk to grant him the next lease of the warren at the expiry of George Bayton's lease (W.S.R.O., WD 1307). Their aim was to destroy the conies and improve the sheep down, with the tenants paying a good annual rent to Sir John to tempt him to try this action on their behalf. However, no agreement can have been forthcoming because a second John Bayton followed by a second George Bayton held the tenancy of the warren until it was dismantled early next century (A.C.M., MD 874; W.S.R.O., WD 1334).

An undated 18th-century document described part of Colworth Common (the north-east part of the warren) as 'no pasture but a trap', which may mean a stock pound or an area for trapping rabbits (W.S.R.O., WD 1311). This document also mentions 'berries' outside the warren in Highdown, Cannon Garden and Church Fields which were tolerated by the lord of the manor because both he and his tenants benefited from the free source of meat (which of course they were not allowed from the warren itself as only the Duke of Norfolk and his tenant had rights of warren there). Although the name 'Ellingsdeane' still occurs in 18th-century

documents and was obviously still in common use, it is stated in an undated document that the part of the warren properly known as Ellingsdean had been destroyed by a Mr. Cobden, lessee at the turn of the 17th and 18th centuries (W.S.R.O., WD 1291, 1315). Mr. Cobden appears to have occupied Crows Hall farm (Fig. 1).

#### *The Decline and Demise of the Warren (1778-1804)*

From the 1770s onwards there was increasing pressure to dismantle the warren; a document (W.S.R.O., WD 1310) described the intricate property rights as seen at that time. The rabbit warren was the Duke's property, while Sir James Peachey had rights to the mines, minerals and (as not previously) timber trees (the latter by now not of any worthwhile amount or value), and the tenants (in respect of their yardlands or cotlands) had common pasturing rights of sheep upon the warren. The documents suggested calculating the value of the land to the Duke in terms of the value of the sheepwalks, supposing the rabbits (first called so rather than 'conies') were destroyed. The author valued it at £100 but mentioned that there would be outgoings to put right rabbit damage to adjoining lands.

Subsequently a number of other measurements, surveys and valuations of the warren were made. Thus a map of 1778 (A.C.M., RL 5), providing a similar picture to the 1685 map, breaks down the total estimated acreage as follows:

No.	Field names	Acres	Roods	Perches
1.	The Main Warren	747	1	8
2.	Hanger	39	2	29
3.	Farther Field	15	1	28
4.	Farthings Field	22	2	14
5.	Heath	36	1	22
6.	Upper Wheetleys	15	3	00
7.	Lower Wheetleys	28	3	14
8.	Part of Colworth Common	3	3	34
Total		909	3	9

'High Downs' and the three enclosures south of the 'where the house was lately pulled down' on

the 1685 map were excluded from the warren on this map. Oakley Coppice was still present but Cheke Coppice had disappeared.

In the 1780s (W.S.R.O., WD 1308) there was an assessment of the number of sheep with rights of common upon the warren, at the rate of 60 to a yardland and 25 to a cotland. The total number was 1,865 sheep, a stocking rate of over two per acre, which was rather high; Young (1813) stated that this stocking rate was found under exceptionally well managed agricultural conditions in East Sussex. Thus to have 1,865 sheep as well as the 3,000 to 5,000 rabbits grazing in the warren must have depleted the grazing rapidly.

In February 1787 Messrs. Ibbetsen and Braithwaite carried out a superficial survey of the warren for the Duke of Norfolk (A.C.M., MD 874), which they valued at an average of 3s. 4d. per acre for the 909 a., giving a total value of £151 10s., plus the rights of pasture for 1,925 sheep estimated at £32 1s. 5d. This excluded the timber on the warren and copses which was already the property of the Peachey family; Oakley Copse and at least part of the Whitleys were still present at about this time. Another survey of the warren in the 1780s (A.C.M., MD 874) estimated its area at 846 a. 2 r. 20 p., with rights of pasture for 1,925 sheep, and with right of free warren to the Duke of Norfolk. Yet another statement by the Duke of Norfolk (A.C.M., MD 874) gave an area of 909 a. 3 r. 29 p. and stated that Hanger (today Anger!), Farther Field, Farthings Field and Heath (today Heathbarn Down) had been purchased recently as freehold land by Mr. Newland, who had enclosed them into his own lands; but that the warrener still claimed the rights of rabbits upon them.

Later in 1787 the lord of the manor of West Dean, Sir James Peachey, and tenants claiming right of common for sheep in the warren put to the Duke of Norfolk a proposal to destroy the rabbit warren (A.C.M., MD 874). It was suggested that the warren could then be enclosed and ploughed (despite the expense), which would double its value. The Duke of

Norfolk would be paid an annual quitrent of £41 5s. to compensate for his loss of free warren, or alternatively he would be bought out to the value of £101 5s. which was its current value enclosed. Another document (W.S.R.O., WD 1298) made similar proposals based on a different survey and valuation, with the annual payment to the Duke of Norfolk suggested as £80.

In 1789 it was estimated that the annual cost of making fences around the warren was £25. It appeared that there were 150 a. of the warren which contained no pasture 'being chalk hills and high roads' (W.S.R.O., WD 1304); enclosing the warren and improving it would therefore be beneficial. By now Sir James Peachey had bought the Hanger, Farther Field, Farthings Field and Heath from Mr. Newland, even though the warrener still claimed rabbit feed on those areas! Only the 750 a. of main warren now remained unenclosed; the southern enclosed fields, the Whitley Copses and High Downs were all the undisputed property of Sir James Peachey (W.S.R.O., WD 1297).

The naturalist Gilbert White (1789) on his journey from Selborne in Hampshire to Lewes in East Sussex stayed with his brother-in-law in the former dwelling called Chilgrove House, which was only 100 metres from the two northern enclosures guarding the warren gate at Chilgrove. He noted how the jackdaws (*Corvus monedula*) were nesting underground in the rabbit burrows of the adjoining warren, through lack of church towers or other suitable sites.

The latest use of 'Ellingsdean' occurs in documents of 1789-91. There was a portion of the rabbit warren left 'in Ellingdown Bottome worth per annum £15' (W.S.R.O., WD 1299). It was stated that 'the warrener of Ellinsdean' was a sober and industrious person, well versed in the business but hard put to obtain a living at the current annual rent of £60 (A.C.M., MD 773). The former document suggests a valley location, and a 1771 map of Crows Hall farm (W.S.R.O., WD 3156) includes several 'dean' field names (Fig. 7), suggesting that the north-

western extremity of Binderton parish was indeed the former Ellingsdean warren.

In 1791 the Duke of Norfolk finally sold Ellingsdeane alias West Dean warren to Sir James Peachey for £3,150 (W.S.R.O., WD 1322; A.C.M., A 1505), including the warrener's lodge, a house, stable and plot of land of about 1 a., some premises called Little Barradin by area 4 a. near Preston farm, plus the Whitleys and the enclosed fields already the property of Sir James! At that time John Bayton was still the Duke's tenant warrener; a lease dated 1773 with an annual rent of £60 still had two to three years to run.

Having acquired the warren, Sir James relet it to George Bayton in 1794, with the intention of gradually extinguishing common rights prior to its destruction (W.S.R.O., WD 1334). The lease was to run for only nine years at the increased annual rent of £105. After August 1803 George Bayton was given until 25 March 1804 to 'dispose of the coneyes on the said warrens'. Meanwhile, the warrener was subject to the same conditions as had existed for over two centuries, involving the maintenance of buildings, fences, hedges and ditches in and on the boundary of the warren, to stock it with 900 couple of good breeding conies for the use of his landlord and not to dig up or destroy any burrows. Sir James wished to use some of the land for planting trees and shrubs and for making new roads, so changes were already under way.

During and after that nine-year period Sir James, now Lord Selsey, periodically surveyed and valued the warren and its common grazing rights, and gradually bought out the tenants' rights. For instance in 1801 T. Rhoades gave up his rights of pasture for 590 sheep on 140 a. in the warren (W.S.R.O., WD 1345). In 1803 W. Cobden took possession of 141 a. of land on the side of Bow Hill adjacent to Bushy Pieces (now Blackbush Copse) in exchange for also surrendering his rights to pasture 590 sheep on the warren. The 141 a. concerned were to be enclosed and thereafter not considered part of the warren (W.S.R.O., WD 1347). T. Cobden

had already sold 13 yardlands with their rights of common pasture for 135 sheep to Sir James in 1786 (W.S.R.O., WD 1342). As late as 1812 and 1821 Lord Selsey was still buying out rights of pasture from W. Cobden for areas of the warren not made over to him in 1803 (W.S.R.O., WD 1161,1348).

The picture emerges of gradual removal of grazing rights and thus of sheep from successive parts of the rabbit warren, followed by the first enclosures within it for well over 200 years, and the consequent increase in control over land use there by the lord of the manor of West Dean. There are no documents relating to the presumed destruction of the rabbits in 1803-4 (as agreed in W.S.R.O., WD 1334), but it can reasonably be assumed that some survived. The burrows and pillow mounds were probably stopped up, and the traps and watch house removed; the warren lodge was replaced by a new building in 1813. The Bayton family, warreners there for at least 90 years, does not survive in the area today. The memory of the rabbit warren gradually faded, surviving only in a few site names, as great changes occurred in the 19th and 20th centuries.

#### THE POST-WARREN LANDSCAPE

##### *Agricultural Changes on the Warren Since 1804*

There have been considerable changes in the landscape of the area since the warren was disbanded in 1804 (Table 1). Most of the warren area, with much of the rest of West Dean parish and adjoining areas, remained in the Peachey family until 1871 when the line came to an end. After 20 years in the ownership of a wealthy China merchant, Frederick Bowyer, the estate more or less as it is now was sold to Mr. William James. Today the land concerned is owned by the Edward James Foundation, a charitable education organization set up by the late Mr. Edward James.

The new Brickkiln farm buildings were constructed in 1810 in the bottom of the Chilgrove valley, on the north-western corner of the enclosed field called 'Heath' (Fig. 3). Little

TABLE 1  
Ecological Changes on West Dean Warren since 1778

<i>Location</i>	<i>Date</i>							
	<i>1787</i>		<i>1804</i>		<i>1880</i>		<i>1983</i>	
	<i>ha.</i>		<i>ha.</i>		<i>ha.</i>		<i>ha.</i>	
Main warren (321 ha.)	W	0	W	0	W	46	W	108
	F	45	F	56	F	225	F	206
	C	276	C	265	C	50	C	7
Oakley coppice (3 ha.)	W	3	W	3	W	0	W	0
	F	0	F	0	F	3	F	3
	C	0	C	0	C	0	C	0
Whitley coppices (18 ha.)	W	18	W	4	W	2	W	2
	F	0	F	14	F	16	F	16
	C	0	C	0	C	0	C	0
Highdown (22 ha.)	W	0	W	0	W	12	W	12
	F	0	F	0	F	6	F	10
	C	22	C	22	C	4	C	<1
Total Area	364		364		364		364	
<i>Habitat Type</i>	<i>ha.</i>		<i>ha.</i>		<i>ha.</i>		<i>ha.</i>	
Total woodland (W)	21	(6%)	7	(2%)	60	(16%)	122	(33%)
Total enclosed fields (F)	45	(12%)	70	(19%)	250	(69%)	235	(65%)
Total chalk downland and chalk heath (C)	298	(82%)	287	(79%)	54	(15%)	7	(2%)
Total Area	364	(100%)	364	(100%)	364	(100%)	364	(100%)

Home farm buildings, just outside the extreme south-east boundary of the former warren, came into existence at about the same time; this farm had only a limited acreage of land, made up of small fields in areas of the warren left unplanted during large-scale 19th-century forestry operations in the vicinity (see below). The new Lodge Hill Farmhouse was built on the site of the former warren lodge in 1813.

The land of these three farms formed from the former warren has been variously let to tenants or managed in hand since 1804; since at least 1929 Lodge Hill and Little Home farms have been worked together as one tenancy of the West Dean Estate (Tittensor 1983), while Brick-kiln farm is now in hand, part of a large farming enterprise known as Karova Farms Ltd. The

north-western part of the warren, including two new woodlands called Withy Bed and The Plantation, are in the separate ownership of Chilgrove farm (known in the documents as Woods farm); Chilgrove House has replaced the earlier residence Gilbert White stayed in during the 1780s. The other woodlands now present have been managed in hand since 1804, although Goosehill yew wood on Bow Hill has been leased to the Nature Conservancy Council since 1967 as part of its Kingley Vale National Nature Reserve.

The previous Warren Barn is now called Double Barn, and due to its deteriorating condition will shortly be removed to the Weald and Downland Open Air Museum at Singleton. Since 1804 dwellings for the workers needed on

the newly-formed farms have appeared, including Warren cottages, Double Barn cottages (1808) and Hylters cottages; newly-needed barns have appeared at Heath Barn and Warren Barn, while Blackbush House has been used at least on some occasions as a pest house.

Associated with the formation of the new farms was the enclosure of the previous common downland pasture of the warren. Fig. 3 shows that during the 18th century there were only a few enclosed fields within the warren at the southern edge. By 1880 the Ordnance Survey 25-in. map shows that almost the whole of the former warren, apart from woodlands, had been enclosed as fields. The only areas not then enclosed from the common pasture were the slopes of Bow Hill, and parts of Warren Down, Heathbarn Down and Colworth Down; these areas were either too steep or flinty to cultivate at that time. Presumably as a result of a low intensity of sheep grazing, invasive scrub developed in these three areas and these were shown as 'rough' on the 1910 25-in. Ordnance Survey map (Fig. 6). Clearance on them was late compared with the enclosed fields, where the previous old warren pasture had been cultivated and replaced by arable crops and, latterly, short-term grass leys.

The eventual clearance and agricultural improvement of the four remaining rough areas started on Colworth Down during the 1930s, with the availability of ploughing grants. The further stimulus of wartime food shortages resulted in the scrub and flint clearance on Heathbarn and Warren Downs under Agricultural Executive Committee orders during the 1940s; huge flints were lifted by heavy machinery. On Bow Hill the abandonment of the sheep down without subsequent agricultural improvement also led to invasive thorn, juniper and yew scrub (Mr. A. H. Chitty pers. comm.; Tittensor 1980); however, during the 1940s and 1950s some areas on the lower slopes were gradually cleared and taken back into agricultural use with help from improved farm machinery (Mr. W. G. D. Cox pers. comm.).

Fig. 2 shows that today enclosure is complete; only tiny remnants of the previous 900-a. expanse of chalk downland and chalk heath pasture remain (Fig. 6). Thus the picture over the last two centuries is one of gradual blotting out of the previous overgrazed, open landscape by agricultural improvement and enclosure. The planting of large areas of woodland since 1804 has accelerated the loss of open pasture, though downland and heath species do survive on woodland edges and rides.

Large-scale tree planting took place soon after the abandonment of the warren, particularly on the east side near West Dean village (Table 2). Substantial areas of open warren pasture were planted between 1836 and 1877, using mixes of beech and conifers, or oak standards with hazel (*Corylus avellana*) coppice. In several cases the original trees still remain to form beech hangers of great beauty and apparent age, but natural regeneration has increased the diversity of tree and shrub species enormously. Between 1878 and 1938 there was no further planting, but from 1939 small areas of fields and chalk heath were incorporated into woodland. Recently large shelterbelts have been planted and it is interesting to see how fashions in silviculture change; today's choice of species is much greater, including very quick-growing species to provide shelter, and native hardwood shrubs to enhance their conservation value. Thus, apart from part of Lodge Hill Copse (remnant of the Whitleys), the present woodlands in this part of West Dean parish are all post-1804. They are still first-generation planted beech hangers and hazel coppice with standards, enhanced by natural seeding and some replanting, or naturally regenerated long-term seral yew scrub (Tittensor 1979, 1980).

#### *Ecological Changes within the Warren*

Samples of hedgerows in the warren area were assessed during an ecological survey, and are of three main types (Fig. 5). Firstly, the hedges within the old warren boundary are long, straight and consist predominantly of haw-



thorn, beech or hazel, with one or two early invasive species such as dog rose (*Rose canina*) and elder (*Sambucus nigra*) (Tittensor 1979). These are typical 19th- or 20th-century species-poor hedges, planted round gardens, fields and new plantations or along roads, and do not usually occur on a substantial bank; they have averaged 30-yd. counts (Pollard & al. 1974) of one to three woody species and date from after the disbandment of the warren in 1804. Secondly the hedges along parts of the warren boundary, especially where it adjoined downland pasture or formed the manor/parish boundary, follow the line of the bank feature and consist basically of hawthorn, hornbeam (*Carpinus betulus*), yew or another native species mixed with a few other shrub species. These medium-rich hedges are typical of late medieval enclosures (perhaps dating back about five centuries) and formed part of the warren boundary; they have averaged counts of four to six woody species and are contemporary with the warren. Parish boundary hedges in this vicinity are also medium-rich in species (Tittensor, R.M. 1981b). Thirdly the hedges elsewhere along the warren boundary, especially where it adjoined medieval open fields and now has a massive bank (as in the Hylters to Chilgrove stretch), plus the hedges along ancient trackways, which are on moderate banks (as along the track which leads north-west through Whitedown from West Dean to Old Monkton (Aldsworth 1979)), follow the feature concerned and consist of many species. These species-rich hedges are typical of early medieval land tenure boundaries (perhaps dating back to Saxon or Norman times). They were inherited by the warren, as part of its boundary or as a surviving feature within the warren itself; they have averaged counts of seven to nine woody species and have large trees along them.

As the warren is now totally enclosed, the common pasture habitat has become almost extinct (Table 1), with only tiny fragments of chalk downland and chalk heath remaining along field headlands, along trackways or under

woodland (Fig. 6). Where areas were not agriculturally improved, lack of grazing by sheep allowed natural regeneration as on the slopes of Bow Hill; the classic ecological succession which was initiated led through a hawthorn and juniper scrub stage to the development of yew-ash woodland, as has been seen elsewhere on the South Downs (Watt 1926; Tittensor 1980). Scrub development started on chalk downland at Chilgrove Hill slightly earlier (c. 1860) than at Goosehill, which went through the juniper stage between 1870 and 1920, and only reached the closed yew woodland stage in the last 60 years (Tittensor 1980). Juniper was commonly planted on warrens (Sheail 1971a). On Heathbarn and Warren Downs the process was initiated even later, due to longer use as sheep pasture, so these areas reached the hawthorn-juniper stage in the early part of this century (Fig. 6), within the memory of local people (Mr. W. G. D. Cox pers. comm.). Just before the Second World War these two areas were still rough grass with hawthorn, juniper, gorse and scattered trees, plus a wealth of stone curlews (*Burhinus oedicephalus*), nightingales (*Luscinia megarhynchos*), butterflies and glow worms (*Lampyrus noctiluca*). They were finally improved during and after the Second World War and such fauna no longer exist apart from small populations of common blue butterflies (*Polyommatus icarus*). Two areas of chalk heath in the process of ecological succession survived until recently. On the summit of Bow Hill, at the western extremity of the warren near No Mans Land, ling and dead juniper still existed under the developing yew scrub when the area was cleared of these, together with bramble, blackthorn (*Prunus spinosa*) and hawthorn, in 1966; some ling, gorse and bracken remnants of the chalk heath still survive under the young planted woodland which replaced the natural succession in 1967 (Table 2; Fig. 6). Similarly gorse, thorn scrub and bracken survived on a very flinty area of Heathbarn Down until it was incorporated into a plantation in 1980; roe deer (*Capreolus capreolus*)

TABLE 2  
Woodland History in West Dean Warren since 1804

<i>Woodland name</i>	<i>Planted</i>	<i>Approx. area in 1983 (ha.)</i>	<i>Management history</i>	<i>Present status</i>
Lodge Hill Copse	Pre 1600*/mid 1800s	2	Medieval coppice*; later mixed planting; game	Very mixed coppice with standards
Highdown Plantation	1836	6	Beech and larch; largely cleared/replanted	Young pine and Norway maple; natural regeneration
Warren Hanger	1840	14	Beech and larch; selective felling 1974	Much remains; natural regeneration
Castle Corner Clump	1840s	<1	Ash; open to cattle grazing	Sparse tree cover remnants
Whitedown Plantation (part)	1840/58	16	Mixed beech and conifers; some coppicing; selective felling	Some original trees, natural regeneration
Highdown	1858/77	6	Mixed beech and conifers; some coppicing; selective felling	Some original trees; natural regeneration
The Plantation	mid 1800s	14	Mixed high forest; some selective felling/planting	Many original trees; natural regeneration
Withy Bed	mid 1800s	2	Hazel coppice and oak standards	Derelict hazel coppice and oak
Bow Hill Triangle	(since 1900)	3	Natural succession to yew and ash scrub	Some mixed planting 1982; yew remains
Goosehill Yewwood	(since 1920s)	23	Natural succession to yew and ash scrub	Closed yew plus downland remnants
Double Barn Plantation	1939	3	Mixed beech and conifers; regular selective felling	Developing beech plantation
Sawpit Plantation	1945	1	Ash on previous scrub; selective felling	Ash and sycamore with hazel coppice
Whitedown Plantation (part)	1947/50	6	Beech and larch on scrub; regular thinning	Beech and larch with yew; natural regeneration
Hamstile Corner Plantation	1961	2	Spruce on previous scrub; thinning	Young spruce plantation
No Mans Land	1967	12	Mixed beech and conifers on previous yew scrub; thinning	Young mixed plantation; yew remains
Heathbarn Down Plantation	1980	6	Mixed conifer and hardwoods on previous scrub, some retained	Young plantation; natural regeneration
Brickkiln Farm Woodlot	1981/2	<1	Very mixed, replacing beech trees	Young amenity plantation
Motorway Shelterbelt	1982	4	Very mixed plantings	Young shelterbelt
New Shelterbelt	1983	2	Very mixed plantings	Young shelterbelt
Total Area 1983		122		

\*remnants of the former Whitley Coppices; all other plantings were on non-woodland areas

and sparrowhawks (*Accipiter nisus*) have replaced the stone curlews and nightingales.

Gorse, wood sage, ling and bracken indicate remnants of chalk heath vegetation in the former warren. In most cases they occur on a much deeper and obviously more clayey soil than that of the adjoining arable fields. A variety of typical species indicate remnants of chalk downland (minus the above 'calcifuge' species), such as fescue grasses (*Festuca rubra* and *F. ovina*), salad burnet (*Poterium sanguisorba*), stemless thistle (*Cirsium acaulon*) and cowslip (*Primula veris*). In addition, they may still have active hummocks of the yellow ant (*Lasius flavus*) or support species such as the common blue butterfly. Larger areas of chalk downland pasture still exist elsewhere on the West Dean Estate; the small warren fragments are being actively conserved in several different ways.

Chalk downland is a grazing-adapted ecosystem which probably started to form in the Neolithic period, when the forests were first cleared and increased grazing by domestic stock began. Its component species were derived from a variety of small natural open habitats. It is a low, species-rich vegetation in a fine grass matrix developed over basic, infertile soils; for a detailed account of its structure consult Smith (1980). Wells & al. (1976) tried to relate variation in the chalk downlands on the Porton Ranges in Wiltshire to past land use. In relation to rabbits, they could still recognise the previously heavily-grazed warren areas by their lichen-rich vegetation up to 20 years after myxomatosis. A new generation of juniper scrub was initiated in the reduced grazing of the post-myxomatosis period, and legume-rich vegetation also became established.

Chalk heath is an unusual ecosystem which develops where acid soils from periglacial conditions overlie the chalk. It contains the normal mixture of downland species but also characteristic acid soil species (see above). Grubb & al. (1969), in a study on Lullington Heath National Nature Reserve in East Sussex,

suggested that chalk heath formed there in medieval times when a millennium of ploughing (which had brought chalk to the surface and thus neutralized the acid soils) ceased, as sheep grazing and rabbits took over. At West Dean, however, Collins (1982) suggested that acid clay soils once covered the whole western South Downs, but were mainly ploughed away by the Roman period to end up in the valley bottoms. Acid soils thus occur here mainly under ancient woodland and long-established grassland, and in the vicinity of lynchets from which the prehistoric soils have not been eroded away.

After myxomatosis, Grubb & al. (1969) showed that in only 15 years red fescue grass (*Festuca rubra*) became dominant at Lullington Heath, with the associated herbaceous species becoming confined to anthills and bare patches. Gorse and ling grew taller, suppressed the plant life beneath their crowns and caused the soil below to become markedly more acid. Gorse and ling have also grown taller on the West Dean chalk heaths but the fragments left are too tiny to analyse other effects.

Woodlands planted at different periods on the former warren (Table 2) are shown in Fig. 5. Lodge Hill Copse contains the only ancient woodland remnant surviving from the period of the warren. Table 1 shows that woodland cover has increased rapidly since the warren was disbanded in 1804. Although recent plantings on former pasture, the high forest beech woods and the hazel coppices are rich in plant and animal species, have a complex ecological structure and contain some species generally accepted as indicators of ancient woodland such as birds nest orchid (*Neottia nidus-avis*) and pignut (*Conopodium majus*) (Tittensor, R. M. 1979, 1981a).

#### *Future Developments in the Warren Area*

The West Dean Estate is committed to ecological survey and nature conservation, and to archaeological survey and monument conservation. This will ensure the continued existence

of valuable habitats and sites which once were important parts of the warren.

#### THE RABBITS SINCE 1804

##### *Rabbits as Game in the 19th Century (1804–1914)*

No records remain as to the fate of the warren rabbits in 1803–4, when they were to be destroyed (W.S.R.O., WD 1334), and we can only surmise that some at least survived. In 1819 the will of John Peachey, Lord Selsey, was overturned by an Act of Parliament, in order to authorize the cutting down of a specified amount of woodland on his West Dean estates to pay his debts and taxes (Selsey Estate Act, 1819). Large numbers of timber trees, pollards, other trees, top and lop, branches and bark were to be sold, except from ornamental woodlands. Such large-scale clearance, probably followed by gradual natural regeneration of shrubs and trees, would have made these areas more suitable for rabbits. New enclosure hedgerows were being planted, and during the mid 19th century there was considerable planting of woodland blocks (Tables 1 and 2) of both high forest and coppice, as well as ornamental and game clumps on the West Dean Estate (Tittensor 1979). These all provided ideal rabbit harbourage in their early stages and encouraged their increase in numbers. This increase in new tree cover continued from 1880 through to 1920, not from plantings but as a result of natural succession on abandoned downland as on Bow Hill and on the nearby escarpment of the South Downs (Tittensor 1979).

A new game warren, where rabbits were encouraged for sporting purposes, was set up in the 19th century just north of the former warren on Colworth Down (Fig. 1); the area is known now as 'Rabbit Warren'. A subterranean game larder was excavated at Stapleash farm buildings by Fred Aldsworth a short distance north-west of this game warren and may have been connected with it (see Appendix 2; Fig. 9). Details of the management of game warrens

were given in contemporary books such as Simpson (1893), and a similar warren at Fyfield Down, Wiltshire was described by King & Sheail (1970). Such warrens were enclosed with wire netting and rabbits encouraged by allowing scrub growth for cover, providing supplementary food when required, and controlling the predators.

For the West Dean Estate as a whole, game bag records for the period 1892 to 1912 are extant (W.S.R.O., WD 2689–90). Numbers of rabbits shot annually by sporting guns were in the region of 100, mainly from the game warren mentioned above, but the addition of those killed by tenants, keepers and rabbit-catchers across the estate gives figures varying from 1,131 to 6,315 per year, with only five years out of the twenty producing less than 2,500. From being largely confined to one part of the West Dean Estate a century earlier, rabbits were now found throughout the area, as the location details of the game bags demonstrate.

##### *Rabbits as Pests and Food (1914–53)*

In the inter-war years rabbits reached 'plague' proportions. Mr. W. G. D. Cox, a former tenant and farm manager at West Dean, has memories going back to 1923. The game warren continued in use until it became defunct in the 1930s; he remembers it fenced round with wire netting, and runways through the fence with one-way gates (allowing rabbits into the warren but not out). Within the warren the ground was rough grass with much scrub, particularly bramble, for rabbit cover; it was set out for shooting with frequent rides cut through the scrub. At certain times of the year the rabbits' diet was supplemented by feeding of hay. Rabbits from the game warren and from other woodlands on the estate provided sport for the landowners and their friends, but they were also taken by keepers as food for domestic staff at West Dean House, so a thriving rabbit population was encouraged. The keeper living at Double Barn cottages regularly killed over 40 rabbits per week.

The slopes of Bow Hill above Crows Hall Farm were also laid out for rabbit shooting, with rides cut east-west up the face through the juniper and yew scrub, using two lines of guns. The scrub was so thick that only terriers would penetrate it. Mr. A. H. Chitty and Mr. A. J. T. Jupp, for instance, rented the pheasant and rabbit shooting *c.* 1934 on all the unenclosed area of Bow Hill above the farmland from the West Dean Estate for £7 10s. per annum. Because of the thick scrub and the extensive burrow systems, shooting pheasants and catching rabbits with ferrets proved too difficult even to cover the cost of their rent!

There were very extensive open-ground rabbit workings elsewhere on the estate, with burrows going as far as 2 metres into the chalk. Areas with consistently high rabbit numbers within the former warren included Heathbarn and Warren Downs, Brickkiln and Bow Hill (especially Anger); elsewhere they included Preston, Upton, Old Monkton and Oak Tree Down (especially New Field, just north-east of the former warren), where rabbits could be seen going in at field edges 'in hundreds'.

These high rabbit numbers made farming difficult, and crop damage was worst in arable fields near to woodlands. Although whole fields were cleared of crops by rabbits, the full extent of the damage was not really appreciated. During the depression years some traditional farmers went out of business and were superseded by 'ranch'-style farming for low or nil rent; on the downs in this area rents were very low (*c.* 2s. 6d. per acre) compared with the coastal plain because of the considerable problems with rabbits and flints, but both items were regarded as a source of income by the tenants. Despite their deleterious effects, tenancy agreements were restrictive in relation to rabbits; although they could be taken from the fields, the farmers were not permitted to take them from the woodlands nor to use wire netting against them, which caused friction with the keepers.

On Crows Hall farm the shepherd caught

rabbits during the winter while a boy looked after the sheep on the Bow Hill downland. Mr. C. C. Mills came to the area about 1930 as rabbit-catcher, and rented the rabbiting annually from Brickkiln, Lodge Hill and Colworth farms in the middle of the estate, also covering adjoining areas like Brooms and Stapleash farms as an emergency measure on request. During the 1930s Mr. Mills caught rabbits from September to March, taking some 5,000 to 9,000 rabbits annually using a constant stock of about 1,000 snares, and visiting them with a horse and trap. The setting and checking of long lines of snares was a continual task; as one site was cleared of rabbits, the next site would be started, gradually covering the whole area in rotation. Mr. Cox remembers, up to 1935, double rows of crates containing rabbits standing with the milk churns at Lavant and Singleton stations on the Chichester-Midhurst railway, destined for London and the south-coast towns.

Snares were the main method used by the rabbit-catchers here, as gin traps were not liked by the keepers. Ferreting was also used, but resulted in considerable digging problems whenever the ferrets became laid up. Shooting rabbits as cereal fields were harvested was popular too. The keepers mostly used shooting and long netting, but night shooting with spotlights was not widely used; for formal shoots rabbits were smoked out of burrows prior to drives, and shot over dogs.

During the war years the West Sussex Agricultural Executive Committee, amongst its other duties, organized and enforced rabbit control. Mr. Mills carried out such control on behalf of the Committee, following up complaints of rabbit damage. This sustained effort reduced numbers temporarily, but after the war rabbits became re-established as the pressure was eased; about 1950 there was a change to night shooting as the main method of control. A continual battle was still waged against rabbits, although numbers were not so high as the pre-war period because much harbourage and

numerous burrow systems had been destroyed during wartime agricultural improvement.

#### *Myxomatosis and Recovery (1953–70)*

Myxomatosis first reached this area in late 1954, some 15 months after its initial introduction to Kent in September 1953 (Thompson & Worden 1956; Thomas 1960). Mr. John Mills (Mr. C. C. Mills' son) was rabbit-catcher when myxomatosis arrived and almost completely wiped out the rabbits; he did not see a rabbit in his part of West Dean for about six years. Mr. Cox recalls the foul smell of concentrations of dead rabbits, especially at Brooms farm and Old Monkton. Only the odd rabbit survived in the vicinity and every effort was made to clear out any survivors, including the (by then illegal) artificial spreading of the disease. At nearby Kingley Vale rabbits were absent for much of 1955 and 1956, but a few were seen in 1957 and from then onwards they were present in small numbers for the next few years (Thomas 1963). Detailed vegetation studies at Kingley Vale National Nature Reserve had started just before the impact of myxomatosis, and surveys continued annually so as to assess the ecological changes following the loss of rabbits. The rapid early changes have been described by Thomas (1960; 1963), but the subsequent changes to the present as rabbits became re-established are still being analysed (R. L. C. Williamson pers. comm.).

It was ten to fifteen years before rabbit numbers were noticeable and crop damage started again at West Dean. Mr. John Mills was amazed to see his first rabbit in Slippers Rew, West Dean around 1960, but rabbits spread out from this initial sighting during the 1960s despite repeated outbreaks of myxomatosis.

#### *Rabbits Re-established (1970–83)*

Rabbits are now present throughout the estate, and from the mid 1970s have become a serious farm and forest pest once again with numbers increasing into the 1980s. For instance, the production from 2 a. of cereals at Stapleash

farm was almost wholly lost from the 1983 harvest, and several attempts at establishing a plantation at Batten Hanger have failed. Myxomatosis, though still present and causing annual outbreaks, is killing a smaller proportion of the rabbits. In some places numbers are particularly high again, usually in those areas with a history of rabbit abundance, as on Bow Hill or at Old Monkton. Night shooting is now the main method of control, but the Estate is much less intensively kept than 50 years ago and the control effort cannot match the size of the problem. Use of wire netting to exclude rabbits from fields or new plantations is becoming more widespread despite the costs.

Between 1971 and 1982 detailed studies of rabbit population trends were carried out on Crows Hall farm and the slopes of Bow Hill, including part of the former West Dean and Ellingsdean warrens. The summer peak numbers fluctuated very considerably between years, but the level of the over-winter breeding stock was relatively stable; the dispersion of rabbits within the farm also varied greatly with time, but certain spots were favoured by rabbits throughout. Myxomatosis was present almost continuously, killing about half of the rabbits infected, but went through its own annual cycle of peaks and troughs; it was considered largely responsible for reducing numbers to the stable over-winter levels. Spring weather conditions and predators influenced breeding success and thus affected summer peak levels. Rabbit control, mainly by spring and autumn night shooting, did not reduce numbers significantly as these losses were easily absorbed by the considerable overproduction of young rabbits (Tittensor, A. M. 1981).

Black rabbits were noted during these detailed studies, and may be the descendants of coloured stock from the former rabbit warren. They were present in six of the twelve years monitored, averaging 0.5 per cent of the total population, but forming up to 3 per cent of the population in any one year. Locations of black rabbits in relation to the former warren boun-

daries are shown in Figs. 6 and 7, using information from this research and from local knowledge; occasional sightings also occur at Binderton and Old Monkton. In the 1930s black rabbits were often seen along the lower slopes of Bow Hill and occasionally on Warren Down and at Old Monkton. In addition smaller numbers of fawn or sandy-coloured rabbits, possibly with the same warren origins, are seen in the Blackbush area (Fig. 6); in the 1930s they were present in Pine Rew (near Heathbarn Down) and on Bow Hill (near Dean Cottages).

In the future it is likely that myxomatosis will eventually reach an equilibrium with its rabbit host, causing relatively harmless symptoms. This, however, will take a long time and meanwhile rabbit numbers will continue to climb slowly, with wide fluctuations in summer levels. After 20 years of respite, land managers at West Dean are taking them into account again. Future effective control should aim at habitat manipulation to discourage rabbits coupled with intensive culling of pre-breeding rabbit populations in winter and early spring where crops are susceptible. It will thus be necessary to ensure that the craft skills of rabbit-catchers such as Mr. J. Mills and his late father are passed on to future generations.

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#### APPENDICES (by F. G. Aldsworth)

##### 1. *Excavations at Cattle Corner*

In 1975 four trenches were dug by the Chichester Excavations Committee under the supervision of the author through the earthworks surrounding the tree clump known as Cattle Corner (SU 84451365; Fig. 8, Trenches 1-4). Two further trenches were excavated by the author in 1983 to the north-west of the clump (Fig. 8, Trenches 5 & 6).

All six sections show that the bank and ditch were originally constructed in a uniform way (Fig. 8). The ditch, which is always on the warren side of the earthwork, was dug to a depth of about 70 cm. in the bedrock (Layer 1) and the spoil from this was placed (Layer 3) as a bank on the old turf surface (Layer 2). A step was cut in the bedrock to accommodate the foot of a drystone flint wall (Layer 4), behind which soil (Layer 5) was piled to form a bank at least 90 cm. high and 290 cm. wide. A single stakehole, about 5 or 6 cm.

##### *Acknowledgements*

The Trustees of the Arundel Castle Estate gave permission for information in documents at Arundel Castle to be published here. The archivists at the West Sussex Record Office gave assistance and advice over several years. Students on local history and ecology evening classes perambulated the warren boundary and carried out detailed hedgerow studies. Mr. F. G. Aldsworth carried out archaeological surveys in the warren area; the use of his data is gratefully acknowledged. The Trustees of the West Dean Estate, Mr. W. M. Renwick of Crows Hall farm and Mrs. D. Renwick of Chilgrove farm gave permission for ecological and rabbit population studies on their land. Mr. and Mrs. J. Court gave permission for archaeological and ecological research to be carried out on Lodge Hill farm and took an active interest in this work. Mr. A. H. Chitty, Mr. W. G. D. Cox, Mr. A. J. T. Jupp, Mr. C. J. Mills and Mr. I. J. Odin willingly gave information from their memories. The Ministry of Agriculture, Fisheries and Food's Worplesdon Laboratory is gratefully acknowledged for permission to use information on rabbit population studies. Rosemary, Derek and Ralph Tittensor often helped with fieldwork.

in diameter, was found in Trench 1 and this may represent the remains of a fence. The original form of the work thus appears to have been a ditch about 200 cm. wide and 70 cm. deep with a bank on one side which was faced with flint and surmounted by a fence.

The ditch has subsequently been filled by primary silt (Layer 6), containing a number of waste flint flakes which probably represent the residue from the knapped flints used in the wall; a number of flint nodules (Layer 7), representing collapsed walling; and other soils (Layers 8-11), representing the result of ploughing.

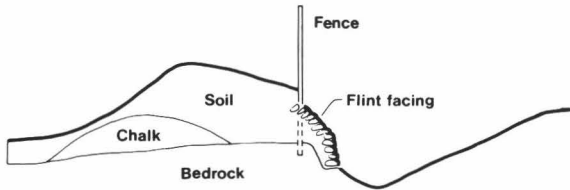
No dating evidence was found in any of the trenches and nothing was found within Cattle Corner to suggest why it should have been surrounded on at least three sides by the flint-faced bank with ditch.

##### 2. *The Game Larder at Stapleash*

In May 1979 the ground at the rear of the farmhouse at

## Excavations at CATTLE CORNER

### INTERPRETATION:



### SECTION:

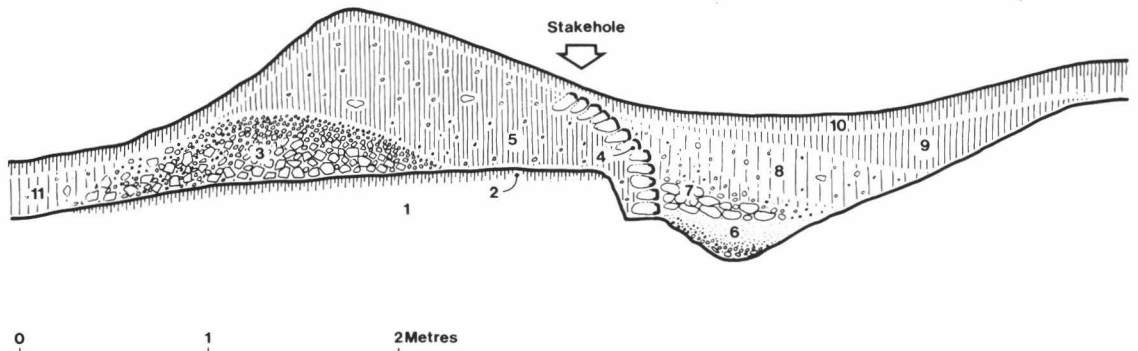


Fig. 8. Cattle Corner excavations, 1975-83. Location of earthworks (top right) with six exploratory trenches; generalized section (bottom) based on Trenches 1 and 5; outline interpretation (centre left) of this section.

Stapleash (SU 84011526) subsided to reveal a vaulted rectangular chamber, 3.2 metres long, 2.8 metres wide and 1.9 metres high (Fig. 9). It was constructed of carefully cut chalk blocks, with a few flints and bricks, bedded in a sandy mortar, the whole structure being set into a hole cut in the natural clayey chalk. In the south-west corner the mortar floor was interrupted by a soakaway. At the west end there was a round-headed recess with slots to carry four shelves. In the east wall were two niches with pointed heads and a central aperture, lined with bricks, which appeared to have been a light through which daylight passed from an adjoining flint-lined opening at ground level. The chamber was entered on the south side through a vaulted passage 90 cm. wide and 106 cm. long, but this was not fully explored and it is not clear whether this was reached by steps, a tunnel, or from an adjoining chamber.

Apart from the 18th- or 19th-century bricks used in its

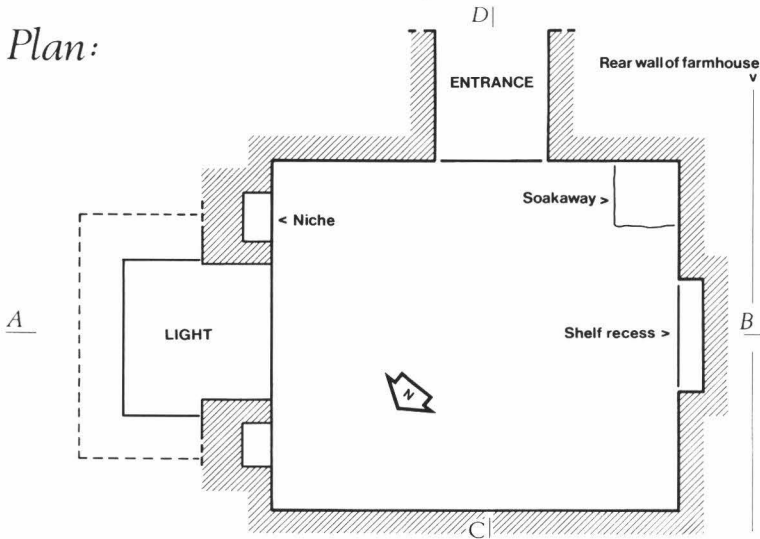
construction there was no dating evidence, but the position of the chamber at the rear of the farmhouse suggests that it was a form of cellar to the house. The present Stapleash Farmhouse appears to be a late medieval house, with some timber framing (phase 1), which has a later brick extension to the south (phase 2), possibly of the 17th or 18th century, and several more recent additions. There is no evidence, however, to suggest that the house formerly extended over this particular cellar, although there is a tradition locally that the house had cellars. The probate inventory of a former occupier, John Tregos, dated 1618 (W.S.R.O., Ep. 1/29/65/10) indicates that the house was quite substantial at the time because it included the following rooms: hall, hall chamber, maid's chamber, inner chamber, another little room, a low chamber, one little room, buttry, kitchen, quorn (?corn) house, malt loft and apple loft.

The most likely explanation for this structure seems to

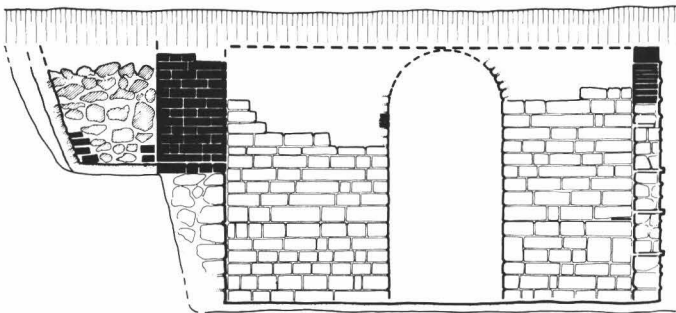


# STAPLEASH FARM 1979

*Plan:*



*Section AB*



*Section CD*

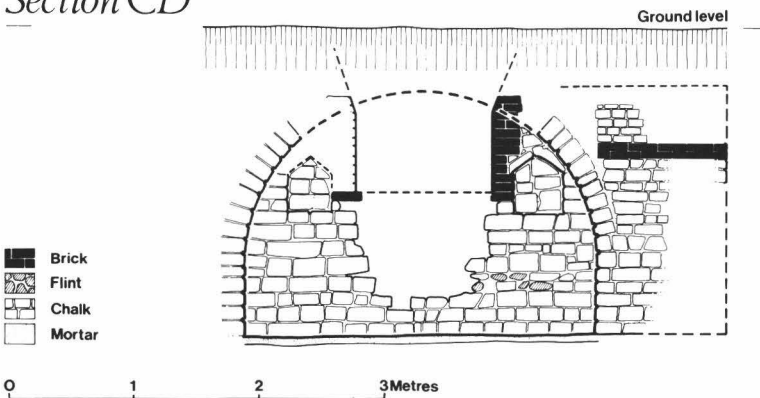


Fig. 9. Stapleash farm game larder excavation, 1979. Ground plan of underground chamber (top), with vertical sections AB (centre) and CD (bottom).

be that the cellar, which has been backfilled, was some form of ice-house or game larder which may have been used in association with the 19th-century game warren.

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