

**PAST LAND-USE AT CARMEL WOODS,
NEAR LLANDYBIE, DYFED**

AN
HISTORICAL
AND
ARCHAEOLOGICAL SURVEY

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SUMMARY

This study examines the cultural circumstances that have influenced and shaped the landscape of craggy, wooded, rubble-strewn scarps and slopes, tongues of pasture and industrial remains that comprise Carmel Woods.

It is clear that in the 17th, 18th and 19th centuries the woodlands owed their survival to the management policies carried out by the Cawdor, Dynevor and Derwydd estates. One object of these policies was to provide ample supplies of cordwood to feed local iron furnaces. This was done by a regime of coppicing.

The same period witnessed a remarkable rise in lime production. Forty sites of limestone quarrying and burning were discovered in the study area. The main fuel of this industry was coal, which, coupled with the estates' woodland management policies, ensured that lime burning had limited effect on the extent of the woodland.

It is suggested here that Carmel Woods was originally part of Mynydd Mawr Common out of which the farms that we see today were carved from about the 16th century onwards. There is some slight but nevertheless significant evidence in the form of a place-name and early field boundaries which suggests that prior to the formation of the Common some arable cultivation took place in Carmel Woods.

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1: INTRODUCTION

1.1 The Brief

This survey was commissioned by the Countryside Council for Wales from Dyfed Archaeological Trust in April 1992. The brief was to research aspects of past land-use at Carmel Woods which may have influenced the current biological richness of this important SSSI. It was suggested that the following sources and subjects be investigated, in addition to material from the Dyfed Archaeological Trust's Sites and Monuments Record and the general historical background:

- examination of records at Carmarthen Record Office particularly leases of the Cawdor/Vaughan and Dinevor estates to provide information on land tenure and use.
- mapping of lime burning areas, kiln remains, worked faces and their relationship with sections of old dry stone walls and trackways.
- examination of lime deposits to ascertain whether coal or wood was the fuel used.
- field names where they exist.

At the end of his *Report* on Carmel Woods Dr. Oliver Rackham sees the site as "created . . . and preserved through an exceptional combination of geomorphological and cultural circumstances". It is those cultural circumstances which are the concern of this Report.

1.2 The Survey Area (Maps 1 and 2)

The survey area comprises the central part of the Carmel Woods/Pant-y-llyn SSSI and excludes the Glan Gwenlais quarry area at the eastern end and Garn Farm to the west. It is owned by a number of private individuals, and the quarries to the east and west within the SSSI but outside the study area are owned by Messrs McAlpine. The area is 1.9 km from east to west, 0.6 km from north to south. It is located on a ridge of high ground which extends south-westward from the Black Mountain to north of Kidwelly, broken only by the valleys of the rivers Loughor and Gwendraeth Fawr. A narrow band of Carboniferous Limestone outcrops along the whole length of the ridge, which has been and continues to be extensively quarried. To the south it is separated by millstone grits and sandstones from the anthracite coal measures of south-east Carmarthenshire (Ordnance Survey 1977; Strachan, Cantrill and Thomas 1907, 59, 63-4). The study area is between 180 and 220 m. O.D. in height. The landforms are the product both of weathering of the limestone and displacement along faults; The harder rock forms parallel ridges with dry valleys between. The two major north south faults have been utilised for the roads which cross and bound the area and slighter faults further break up the ridges producing discrete rectangular blocks of limestone outcrops. These factors, together with the southward dip of the limestone strata, produce low craggy north-facing scarp-slopes and rubble strewn, wooded dip-slopes. The soils have been described by Rackham; they are thinnest on the rubble strewn slopes, which is perhaps why they were never cleared for agricultural use and are still wooded. Much deeper soils have built up in the dry valleys enabling them to be used for pasture and possibly arable cultivation. These dry valleys now comprise tongues of improved pasture. The mixture of pastures and blocks of woodland which characterise the area is further diversified by widespread traces of small- to medium- scale quarrying and lime burning.

The Trust is grateful for the help of Muriel Bowen Evans, the staff of Carmrthen Record Office and to Richard Davies, Llanelli Library, for his comments and advice. Special thanks go to John Moore, Carreg Gwenlais, for his help and information and to other landowners in Carmel Woods for their assistance.

The detailed mapping of kilns and other features has accordingly been confined to within the study area. However, in order to interpret the archaeological evidence for possible prehistoric land use, a wider area around has been examined from the Dyfed Archaeological Trust's *Sites and Monuments Record*. Similarly documentary and cartographic sources and published secondary sources have been searched for all the farms in the Carmel Woods area and general information on land-use and exploitation of mineral and stone resources included from the appropriate estate records where relevant. A list of all sources, cartographic, documentary and published, consulted for this report is given in Appendix 6.3.

2: THE PREHISTORIC EVIDENCE (Map 3)

A register of all the known archaeological sites in the Carmel Woods area is given in Appendix 2. A cave system was broken into in the early 19th century when the Pant-y-llyn quarry was being extended. Records are poor and confusing but it is clear that the bones of Palaeolithic man and animals were found. Other human remains were also discovered - perhaps of Bronze Age date, since 'copper' implements were reportedly found (Stepney-Gulston 1893). Bronze Age ritual and funerary structures survive along the whole of the upland ridge of south-east Carmarthenshire. (Ward 1988). South and south-west of the Carmel Woods study area along Allt-y-garn are three round-barrows (657, 658 & 659) (The numbers quoted here and shown on Map 3 are those appearing on the Dyfed Archaeological Trust's *Sites and Monuments Record*.) A ring barrow (258) lies south of Bwlchau Gwynion and a probable Standing Stone (13127) 200m to the south-east. A Late Bronze Age flat axe was found in 1962 close to the Pant-y-llyn quarry; this may be a stray find, or part of a hoard. The Bronze Age spanned a period of climatic change in Britain, with warmer drier weather which allowed exploitation of uplands, both for grazing and farming giving way c. 800 BC to colder weather conditions. Field systems and hut groups of possible Bronze Age date are known from the Black Mountain and from Mynydd Llangendeirne east and west of the study area. There is archaeo-environmental evidence for woodland clearance during this period; felling, coppicing and clearances for stock grazing (Caseldine 1990, 55-66). Although no study has yet been undertaken it is possible that the changing composition of fossil molluscan fauna from deeply stratified areas of soil within the Carmel Woods study area might indicate whether partial or extensive clearance of woodland had taken place during the Bronze Age.

Although almost wholly quarried away, place-name and antiquarian evidence suggests that there was an Iron Age promontory fort at Dinas (4869), on the northern edge of Cilrychen quarry. Taken with the Bronze Age evidence, this suggests a partly - conceivably extensively - cleared landscape which might therefore imply regeneration of woodland in the post-Roman centuries. Equally, surviving woodland at Carmel Woods may have been managed by coppicing since there is an increasing body of evidence for such techniques from the Bronze Age (Coles 1975-80).

3: HISTORICAL EVIDENCE

3.1 Administrative Units, Medieval Land-Use, Tenure and Patterns of Communication

3.1a Administrative Units

In the Middle Ages, the area lay at the southern end of Llanfihangel Aberbythych parish and was part of the Commote of Iscennen. It is interesting to note that the southern parish boundary runs along the ridge of Allt-y-garn, the gritstone ridge south of Carmel Woods, for long part of the common of Mynydd Mawr (Map 4). The rare survival of marginal notes recording the 9th century bounds of an estate (Meddynfych) in the so-called Book of St Chad, actually a Gospel Book from the pre-Norman monastic centre at Llandeilo, has been noted by both Rackham and Stringer and Davies. In a recent reappraisal of this evidence Professor Glanville Jones (1972, Fig. 43) notes the woodland element in the names of the boundaries on the north-west side of the estate which are close to Carmel Woods. He discerns a well organised landscape with arable cultivation in open fields, upland meadows and small hamlets as well as woodland. The boundaries of the 9000 acre estate of Meddynfych, with two extensions, became those of the later parish of Llandybie. In other adjacent areas the commote was divided into *maenorau* also thought to be Dark Age 'multiple estates' on the Meddynfych model. When parish boundaries were being formalised in the 13th century these *maenorau* boundaries were utilised for the parishes of Llanarthney, Llanddarog, Llanfihangel Aberbythych, Llanon and Llangendeirne. These parishes share boundaries adjoining and along the limestone and gritstone ridges, rimming the coalfield, and it is reasonable to suggest that they shared common pasture, heath and woodland resources there.

3.1b Mynydd Mawr Common

This hypothesis is substantiated by the existence of common land in the Middle Ages at Mynydd Mawr, an area which later contracted to cover a reduced area, but originally applied to an extensive tract of land and probably included Carmel Woods. The Enclosure Award of 1820 (CROAE17) shows the minimum extent of this Common (Map 4). It is likely, though not certain, that Carmel Woods was once part of the Common, but from the 16th century if not earlier the boundary of the Common lay to the south of Carmel Woods along Allt-y-garn. Commons included open moorland, heath, marsh, and woodland, which tenants of lordships and later of their successive manors were entitled or claimed to be entitled to use. Clearly the most valuable or productive parts of Commons would be those enclosed or encroached upon first.

3.1c Medieval Tenure

A single placename - *rhandir* - on the estate map of 'Bwlche or Garn' (CRO Dynevor Map Book 5, p100, field 10 of 14) gives a clue to Medieval land tenure. The name possible indicates a Welsh tribal district subdivided into *rhandiroedd* - sharelands - marked by their own metes and bounds. Such a system has been described by T. Jones Pierce (1972, 339-351): "sharelands included territory which was used as common pasture, the most prominent feature in every shareland was a group of homesteads, set in small enclosures, forming a loose girdle pattern as it were, round an area of open and quilled arable land". He

considers that this system of agriculture was beginning to dissolve after AD 1300. At its dissolution the land of the rhandiroedd system was probable subsumed into Mynydd Mawr Common. Carmel Woods lies on the boundary of poor quality land (former common) to the south and west and better, lower lying land to the north and east. The margins of cultivated lands may have included part of Carmel Woods at the period (13th century) of maximum extent of medieval cultivated land. This process of abandonment of cultivated land was recognised in 1609 on a common elsewhere in the Lordship of Kidwelly when "in some parte of the same land ... there appeared diverse balkes and other markes whereby it seemed that parte thereof had byne before ploughed" (Rees 1953, 248). It is probable that this cultivation of the later commons and less favourable lands dates to the 13th century - the climatic optimum for agriculture in post-Roman Britain - and its abandonment due to climatic deterioration and population decline began in the early 14th century (Moorhouse 1986, 37).

3.1d Roads & Tracks

The nature of the terrain of today's Carmel Woods makes it difficult to cross from east to west; it is the north-south fault lines that provide easier route corridors (Map 5). Two east-west roads bound the area on the north and south sides. The Tithe Map does not show a continuous road from Garn to Pentregwenlais (see Map 20), though OS original survey drawings compiled between 1809 and 1836 do mark a continuous, albeit unenclosed, road. It may be, therefore, that this road originated in a route westwards from Pentregwenlais where there was a medieval mill and chapel, and eastwards from Garn, and may indicate the different directions from which the enclosures and clearance to create the Gwenlais place-name farms and Bwlchau Gwynion took place. Once these farms were in existence it is this approach road which marks the Boundary between Mynydd Mawr Common and the area we know as Carmel Woods. The east-west road on the northern side of the woods leads from the modern settlement of Carmel to Pant-y-llyn and seems to cut across earlier field boundaries and access points to the Woods from the north (Map 7). The most convincing of the north-south routes is that which runs up through Bwlchau Gwynion and through to Cae'r ffwrn (Map 5), but an alternative form of the name of Pwll-y-march - bwlch - and the layout of that farm partly within the northern part of the study area may hint at other access points.

The relevance of these routes to this Survey is that some at least are likely to predate the creation of the farms and possibly also the creation of the rhandiroedd system; the woodland would therefore have been fragmented to some extent and these access ways may also indicate the points of origin of any early assarting or enclosure, most easily done from existing routes. As section 3.1c above details there are some slight hints of communal cultivation within assarted areas in the wood.

3.2 The Growth of Gentry Estates and Tenant Farms

The period 1350-1450 in the upland 'Welsh' areas of the Lordship of Kidwelly has been termed one of 'transformation' of rural settlement and economy (Davies 1978). But it is only in the early 16th century that the process of building up gentry estates and the creation of tenant farms can be clearly seen from the surviving documentary evidence. The process was accompanied by the steady encroachment on and appropriation and enclosure of commons, waste and woodlands. The Vaughans of Golden Grove, with their numerous cadet houses in Carmarthenshire, including that of Derwydd, took a leading role. The other major

Carmarthenshire family, the Rices of Dynevor managed to reestablish themselves in the 17th century, following the execution of Rhys ap Gruffydd in 1531 and the forfeit of the vast estates built up by Sir Rhys ap Thomas. It is not surprising to find that much of the Carmel Woods, Pentregwenlais and Cilrychen areas belonging to the Golden Grove, Derwydd and Dynevor estates by the mid to late 17th century. But it must also be recognised that the small freeholders were also carving out individual farms for themselves or adding land by encroachment to their existing holdings; this process has been detailed elsewhere in eastern Carmarthenshire by Bowen Evans (1991). A survey of the Commote of Iskennen in 1609 provides a contemporary description of how the Vaughans of Golden Grove carved tenant farms out of common land (Rees 1953, 303):

Jean David Gytto aforesayed of the age of lxxx yeares or thereabouts sayth that he knewe Mynith Kyvor to have byne a common tyme owte of mynd, But some lii years paste or thereabouts David Vaughan then under steward of Kydwelly rayسد a rente uppon certayne of his tenaunts in Llantharoge and Llanarthney before which tyme theare was never any rente payed for the same. The Donnes havinge diverse tenements adioyninge David Vaughan boughte the Donnes Lands and then claymed that Mynith Kyvor belonginge to those tenements, And that one greate parcell of that Mountayne inclosed within the Commotte of Iskennen is nowe in the occupation of John Thomas Wyllyam ffyrste enclosed by Sir John Vaughan, knight, within the space of ix or x years paste or theareabouts.

From the same survey it is clear that the Vaughans were also encroaching upon and enclosing parts of Mynydd Mawr Common (Rees 1953, 300).

It is evident that not all the farms in the study area came into existence at the same time. The documentary evidence does seem to indicate that individual farms were beginning to be created from the 16th century. A close study of farm boundaries, which is possible from the mid-18th century onwards, first from estate maps, then from the Tithe and later the large scale Ordnance Survey maps, shows that the present relict pattern of farms was in place and has changed little from the late-18th century (Map 7).

Table 1: Summary of documentary evidence on the farms within Carmel Woods

CAWDOR/VAUGHAN ESTATE

Garn: Garn Loyd 1543 (CRO Cawdor 59/6449), Tir y Garne Lloyd 1578 (CRO Cawdor 75/6899), Ty y' Garn 1759 (CRO Cawdor 102/8082), Tir y Garn 1782 (CRO Cawdor 8660B p22, map), Tir y garn 1839 (NLW AC483).

Pwll-y-march: Tir Pwllamarche 1550 (CRO Cawdor 122/8596) no other mention -possibly a stray deed in the Cawdor collection and not part of the estate.

Carreg Gwenlais: Kerigwenlays 1556-7 (CRO Dynevor 781), Carreg Wenlais 1680, - 2 messuages (CRO Cawdor 96/7800), Carreg Gwenlesh 1720 (CRO Cawdor 96/7779), Carreg Gwenlesh 1734 (CRO Cawdor 99/7895), Glan Gwenlais isaf 1782 (CRO Cawdor 8660B p21), Carregwenlais 1839 (NLW AC483), farm now quarried away by Glan Gwenlais quarry. It would seem that the two messuages of 1680 were split with one being named Glan Gwenlais by 1759.

Glan Gwenlais: Glan Gwenlais 1759 (CRO Cawdor 102/8028), Glan Gwenlais 1761 (CRO Cawdor 100/7982), Glan Gwenlas 1782 (CRO Cawdor 8660B, p21, map), Glan Gwenlais 1839 (NLW AC483).

Carreg Gwenlais formerly **Llygad Gwenlais:** Tir Funon Gwenlaid 1719 (CRO Cawdor 87/7382), Llygad Gwenlais 1786 (CRO Cawdor 84/7260), Llygad Gwenlas 1782 (CRO Cawdor 8660A p19, map), Blaen Gwenlais 1820 (CRO Dynevor Map Book 5, p100), Llygadgwenlais 1839 (NLW AC483).

DYNEVOR ESTATE

Bwlchau Gwynion: Bwlche or Garn 1820 (CRO Dynevor Map Book 5, p100), Bwlchgwyntog (OS 1809-36), Bwlchaugwynion 1839 (NLW AC483).

Cae'r ffwrn: Cae'r ffwrn 1800 (CRO Dynevor Map Book 5, p74), Caerffwrn 1839 (NLW AC483). According to the 1800 map this property included lands that in 1839 were part of Gelli Fawr.

DERWYDD ESTATE

Pant-y-llyn: Kay Ieuan alais Pant Llyn 1611 (CRO Cawdor 48/5933), Pantyllyn and Tir Evan Lake 1761 (CRO Stepney p70), Pantyllyn 1839 (NLW AC483). 'Tir Evan Lake' referred to that part of the property now in Carmel Woods while the farm of Pant-y-llyn lay to the north-east. At the time of the Tithe Survey in 1839-40 the name 'Tir Evan Lake' seems to have been forgotten.

OTHER PROPERTIES

Pant-y-garn: Pantygarn 1820 (CRO Dynevor Map Book 5, p100), Pantygarn 1839 (NLW AC483). Apparently not attached to a major estate, though the 1761 map of Pant-y-llyn seems to show it as part of the Cawdor Estate.

4: HISTORICAL EVIDENCE FOR LAND-USE

4.1 Farming

There is very little evidence on the farming regimes of the Carmel Woods farms, although on general grounds it must be assumed that the emphasis was always pastoral. This is supported by a quitclaim of 1556-7 on a messuage called 'Kerigwenlays' (Cerrig Gwenlais) which mentions meadow and pasture (CRO Dynevor 781). However, mixed farming was also practiced in the area as a documented of 1560 relating to an unlocated tenement in the parish of Llanfihangel Aberbythych mentions arable, meadow, pastureland, wood and underwood (CRO Dynevor 783) and in 1800 a map (CRO Dynevor Map Book 5, p74) shows five out of the ten fields belonging to Cae'r ffwrn under an arable regime (see Map 18).

There is some slight but significant information of former agricultural practice in the form of field names from a 1820 estate map of 'Bwlche or Garn' (CRO Dynevor Map Book 5,

p100), see Map 19. On this map the field numbered '10 of 14' is called Rhandir Fawr = large shareland. This is a strong indication for collectively held land, and is an indication of agricultural, probably arable, use prior to the creation of individual farms (see section 3.1c above).

4.2 Woodland

4.2a Introduction

The studies by Stringer and Davies and Rackham of the present day woodland conclude that they are a survival from an earlier, more common regime of combining pasture fields with patches of woodland. The patches of woodland (Stringer and Davies 1989, Figure 20) differ in age and composition of species. Stringer and Davies' study produced evidence of extensive felling in the Second World War and earlier clearance around medium-sized stone quarries and limekilns. The citation for SSSI status describes these ash-dominated woodlands as transitional in character between ancient woodlands on calcareous soils in southern England and those further north and emphasises the unique status in Wales of Carmel Woods.

4.2b Estate Uses and Management of Woodland

Few appreciated the use and value of woodland more than the Vaughans of Golden Grove, a concern well reflected in the surviving estate records and one which has been extensively described by Francis Jones (1963-4). The main uses were threefold: clear felling of mature trees to produce timber for building and shipbuilding, mainly oaks, barking of these fellings and smaller trees for use in tanning and dyeing and use of underwood for fuel and charcoal. Woods were a valuable cash asset which could be realised to pay off debts, but equally there was a recognition that replanting and coppicing regimes needed to be maintained.

Conditions in the various leases of the farms within the study area provide detailed information on how Carmel Woods were used and managed in the 17th, 18th and 19th centuries. A Golden Grove Estate lease of 'Carreg Wenlais' in 1680 (CRO Cawdor 96/7800) reserves the lord's right to "enter into the premises there to fell and cutt down Timber trees and wood". The tenant was additionally required to "grow yearly upon some Convenient part of the premises ffour saplings of Oak trees and ffour of Ash trees". In 1761, the tenant of 'Glan Gwenlais' could not 'cut sell fall nor suffer to be sold, cut or fallen, any Saplings Wood timber or trees whatsoever without the leave or consent of the said John Vaughan'. (CRO Cawdor 100/7982). The tenant was also obliged to plant yearly "three saplings of oak three of ash of strait and handsome trees". A few years later in 1786 at 'Lygad Gwenlas' the estate retained "all timber trees and trees likely to become timber and all coppices of wood and underwood". The tenant was not allowed to "fell, cut down, lop, top or uproot any timber or other trees" and he was obliged to plant ten saplings of oak and ten of ash and "sufficiently fence them so that they may become timber" (CRO Cawdor 84/7260).

Although the Golden Grove estate documents are the most prolific for woodland management and resources, other estates like Dynevor and the Vaughan cadet house of Derwydd were equally aware of their value. This is borne out by the lack of any significant variation in the woodland blocks across Carmel Woods despite the different ownership of the farms.

All the records suggest a well established regime of coppicing with standards. Dr Rackham identified ash and oak stools of at least 400 years old and estimated that coppicing ceased by about 1920. He further inferred that ash has only recently become abundant. Oak whether pedunculate or sessile seems always to have been uncommon. The evidence from the Golden Grove Rentals suggests that ash was sparse enough to be individually counted: for example in 1759 'Tyy' Garn' had "30 ash of middling size and about 20 acres of underwood of 2 years growth" and 'Glan Gwenlais' "3 ash and about 10 acres of underwood of about 4 years growth" (CRO Cawdor 102/8028).

As will be explained in detail below wood was not the primary fuel for the lime kilns being built in increasing numbers, there were plentiful supplies of coal available. It was therefore possible for woodland to be maintained and at the same time increasing use to be made of the limestone. Since the evidence does not suggest that timber (mature oaks particularly) were present or exploited in appreciable quantities we are left with ash and brushwood. There can be little doubt that from the late 17th through most of the 18th century this was used to make charcoal to supply the iron forges of the area, most notably at Llandyfan 5 km east of the study area.

4.2c Iron Forges

Landlords in south-west Wales from the 16th century onwards were keenly aware of the mineral resources of their estates; as detailed below exploitation of limestone and coal resources went hand in hand gathering pace from the 16th century onwards. Students of early iron working have stressed the opportunity for timber sales for charcoaling as being an important motive in fostering the establishment of iron forges on estate lands. The Vaughans leased the Llandyfan or Iskennen forge out to iron masters from the 1670s onwards and supplied it with cordwood for charcoaling (Evans 1973). Close control was exercised over the leasee of the forge by the Vaughans in order ensure they received a good price for their cordwood. In 1756 concerns were expressed that an iron master named Robert Morgan would take over the lease and would 'dictate his own Terms & Reduce the price of Cordwood' (Evans 1973, 140). That forge as well as others in Carmarthenshire was also supplied by the Dynevor and Edwinstford estates and probably by smaller landlords as well as owner-occupiers. It is likely therefore that the main market for underwood from Carmel Woods was local iron forges. Their production levels were small compared to those at Carmarthen or Kidwelly let alone those in south-east Wales and these inland forges declined in the later 18th century as coal was increasingly used for smelting and the Carmarthenshire iron industry centred on the Llanelli coalfield. This might be a contributory factor to the evident shift in interest to more extensive lime extraction and processing, which, as the estate maps demonstrate, actually led to the quarrying away of some farms and woodland.

4.2d Coal

The celebrated description by Leland (Hearne 1744, Vol 5, 23) in the 1530s of the differences between the ring and stone or anthracite and bituminous coals of south east Carmarthenshire is evidence of their exploitation from the early 16th century if not earlier:

At Llanethle, a Village of Kidwelli Lordship, vi Miles from Kidwelli, the Inhabitans digge Coles. Ther be ii Maner of thes Coles. Ring Coles for Smith be blowid and waterid. Stone Coles be sometime waterid,

but never blowen. For blowing extinguisht them. So that Vendwith Vaur Coles be Stone Coles; Llanethle Coles Ring Colis.

Such resources were regarded as part of freeholders' rights of common in areas like Mynydd Mawr, of which, as we have seen, Carmel Woods may have been once a part (Rees 1953, 300):

wee saye that there are coales founde wrought and digged in the sayd common called Mynith Mawre the use whereof the sayed tenaunts of the sayd Commotte and theare auncestors and those whose estate they severally have in and to theare sayd severall tenements by themselves and theare under tenaunts have severallye and respectively hadd for all the tyme whereof the memory of man ys not to the contrary for necessary ffyre and burninge of lyme as parte of theire freehould and appurtenaunte to their sayd severall tenements.

The relevance of this to the present survey is that the exploitation of lime and coal went together, there was no need to rely wholly on timber for fuelling the limekilns, it was therefore possible to increase the lime burning and quarrying within the Carmel Woods area without wholly destroying the woodland. The large tracts surviving on the 1782 Golden Grove estate maps demonstrate this very clearly. As we shall see below this is borne out by the ubiquitous presence of coal in the spoil heaps of the lime kilns in the area. The Golden Grove leases also demonstrate that woodland management, farming, and lime quarrying and burning could co-exist.

4.3 Quarrying & Lime Burning

4.3a Background Information

Although lime was burnt in the Middle Ages for mortar (see for example the lime kilns at Carreg Cennen castle), there is general agreement that the use of lime as a fertilizer did not become common until the 16th century. In his late 16th century *Description of Pembrokeshire* George Owen noted that "lyminge hath been more used within these thirtie or fortie yeares than in times past". The extract printed above from the 1609 Survey of the Lordship of Kidwelly provides further evidence of freeholders rights to dig lime in Mynydd Mawr Common close to the study area. George Owen also gives us an excellent description of the whole process and of kiln structure:

this lymestone beinge digged in the quarey in great stones is heawen lesser to the biggnes of a mans fist & lesse, to the ende they might the sooner burne throwe, and beinge heawed smale the same is putt into a kill (kiln) made of wall sixe foote heighe fowre or five foote broade at the bryme but growing narrower to the bottom havinge two lope holes in the bottome which they call the kill eyes, in this kill first is made a fier of Coales or rather colme which is but the dust of the coales which is laid in the bottome of the kill filled with these smale hewed peeces of lymestones, and then fier beinge geaven, the same burneth for the space of and maketh the lymestones to become meere red fierye coales which being don and the fier quenched the lyme so burned is suffered to coole in the kill and then is drawn throwe these kill eyes, and in this sorte is caried to the land where it is laied in heapes and the next showre of rayne maketh it to Molter and fall into dust which they spreade on the lande

Walter Davies writing in 1815 noted that kilns similar to the one described above were still in use in several places in South Wales. They required rebuilding or repairing once a season. A new kiln was about two days work for a mason. He then describes a perpetual kiln that had first been introduced into South Wales in about 1775:

the first of this kind in Glamorganshire was built of fire brick at Cardiff, its diameter at the top seven feet ten inches and a half; for two feet six in depth it was a perfect cylinder; for seven feet two inches more, it was an inverted section of a cone, the lower diameter being two feet three inches; it then became a cylinder again for two feet three inches more, which was the breadth at the base of the pipe; the whole depth twelve feet.

Most of the kilns mapped in the survey are probably of the type described by George Owen. However, there is a possibility that some are of a more primitive type, the so-called 'sod-kiln', one of which was excavated by Ward (1983) at Cefn Bryn, Gower. Here the kiln comprised a penannular bank of earth and stone 3.8m in diameter, enclosing a 30 cm bowl with a flue to the west. The spent fuel in the kiln consisted of cinder and coke with very small quantities of charcoal. Near to and associated with the kiln was a small, stone, rectangular structure, probably a storage shed and shelter. Artefacts from the kiln suggest that it was in use in the early decades of the 19th century. The author noted that documentary evidence indicated that sod kilns as opposed to stone kilns were something of an anachronism in Glamorgan by 1835.

Primitive forms of burning lime are known of from documentary sources. The description quoted below is from a Welsh medieval manuscript (Williams 1986, 117-8) and although the fuel is wood it is conceivable that a method of burning using coal could have been used. The relevance to this description to our survey is that primitive forms of lime burning may have been employed in Carmel Woods of which no recognisable, surface archaeological remains survive:

Cut gorse, ferns, thorns, and underwood, in winter, where limestone is at hand; plough a ridge seven yards wide; place thereon a layer of fuel, then limestone, and so on alternately to the height of three yards; and make flues in the fuel in all directions, that the fire may pervade the whole heap. Then cover the kiln with sods, and upon those, /clay or marl; then set fire to it, and when it is well kindled, stop the mouths of the flues, and let it burn until the fire breaks out through the clay or marl: then cover again, and so on, until the fire breaks out the third time, when it will have burned sufficiently: when cooled a little, open it, and carry the lime to where it is wanted. Bestow lime once in nine years upon arable land; and once in 18 years upon grass land.

4.3b Documentary Evidence for the Survey Area (Maps 7-11)

Although there is good documentary and cartographic evidence for the construction of lime kilns within the study area, it is not usually of sufficient detail to allow precise identification between those kilns mentioned or mapped prior to 1887 and those recorded on the ground by the Archaeological Survey. Only the kilns shown on an estate map of 1800 are locatable on the ground (Section 5.4b, Site 18). In addition, of course, there are numerous kilns which either never had any documentary record or for which documentation has not survived.

Specific documentary evidence indicates that lime had been burnt in the area prior to the 17th century. In a series of rentals of the mid-17th century for the Golden Grove estate one of the customary duties of the tenants was the provision of lime. A typical entry from 1648 reads: "Thomas Walter - 2 capons, 2 hens, 2 loads of coale 2 of lime" (CRO Cawdor 112/8399). By 1734 a payment of one shilling was permitted in lieu of these duties (CRO Cawdor 99/7895). In the same document, a lease of 'Carreg Gwenlesh' (Carreg Gwenlais), we learn that the tenant was allowed to build two lime kilns on the land provided "no waste or spoil shall be made by means of building the said kilns, carrying of lime stones or burning of lime".

Ten years later in 1744 a yearly payment was made to the Golden Grove estate for “the liberty of erecting a lime kiln and quarrying of stones on that part of a Common called Great Mountain known by the name Castelly Garreg” (CRO Cawdor 64/6618). It is clear from the many leases and rentals of the Cawdor collection in the Carmarthen Record Office that the Golden Grove estate kept careful control over their mineral rights. For instance, in a lease of ‘Lygad Gwenlas’ of 1786 (CRO Cawdor 84/7260) the estate maintained their control over “all quarries of stone, veins of coal, culm, lead, copper, tin or iron ore and all other mines and mineral”. The words ‘all quarries of stone’ had been added by a different hand. This suggests that although the estate was mainly concerned with controlling its more valuable assets such as coal and metal mines, it also realised the potential of lime as a commodity.

But despite this stringent control there is also evidence for freeholders and tenants building their own kilns and quarrying the lime wherever it outcropped. In 1755 on the Black Mountain “the homagers were engaged in secretly burning lime and selling it without the lord’s licence” and again a year later we learn of tenants “who are so audacious as to burn lime and sell it out of the lordships” (Jones 1963, 197 and 191).

Throughout the 18th and early 19th century the limestone quarrying and burning industry continued to expand, but remained a local concern with individual landowners and tenants developing small quarries and kilns on their own land. From printed and manuscript maps and from documentary sources it is possible to construct an history of the industry in Carmel Woods from the 18th century. The earliest reference to lime burning is of 1734, quoted above. The first estate map of the area dates to 1761 and shows ‘Pant y llyn’ (CRO Stepney p70). The area around the now disused Pant-y-llyn quarry is shown on this map but with no evidence for limestone quarrying, though three small circles added by a later hand may be depictions of lime kilns (Map 14). By 1782 when a series of maps were surveyed for the Golden Grove estate (CRO Cawdor 8600 Map Book) lime kilns and quarries were in existence at the extreme west end of the woods (Map 15). Two kilns also stood on the northern edge of the woods on Cae’r ffwrn farm by 1800 (CRO Dynevor map book 5, p74; Map 18). Incidentally, the place name ‘Cae’r ffwrn’ probably indicates the site of a more ancient kiln. A later map dated 1820 of ‘Bwlche or Garn’ (CRO Dynevor map book 5, 100; Map 19) shows a kiln in the centre of the wooded area with two other kilns added by a later hand. Of these two kilns, one is on the site of the later kiln at Bwlchau Gwynion, the other cannot be traced on the ground. Quarrying at Pant-y-llyn was under way by August of 1813 when famous archaeological discoveries were made when some bone caves were uncovered (Stepney-Gulston 1893, 163).

On the 1839 Tithe Map of Llanfihangel Aberbythych (NLW AC483; Map 20) four kilns are shown in the Pant-y-llyn area, six at the western end of the ridge on Garn farm, two at Carreg Gwenlais and two near Bwlchau Gwynion, although the depiction of these last two kilns is not at all clear.

During the next half century from the Tithe Survey in 1839 to the publication of the OS 1st edition 1:2500 maps in about 1887, limestone quarrying and burning in the Llanfihangel Aberbythych and Llandybie area changed from a local industry carried out at slack times of the year by farmers and agricultural workers to an extensive and intensive extractive industry. This is testified in Carmel Woods by the small- to medium-sized quarries that mark the landscape; Pant-y-llyn, Pant-y-garn, Carreg Gwenlais, Pwll-y-march, Bwlchau Gwynion

and Garn. These quarries are marked and each shown with a lime kiln on the 1st edition maps. All these kilns apart from the one at Carreg Gwenlais survive. The one at Bwlchau Gwynion is reputed to have a date stone of 1857 (Thomas 1975, 54); this has not been seen by the present writer. Large architect-designed lime kilns were also opened in 1857 at Cilrychen, Llandybie (Morgan-Rees 1975, 175). It is claimed by Roberts (1939, 212) that the opening of the Cilrychen quarry and kilns soon led to the closing of Pant-y-llyn quarry and, one assumes, the other smaller quarries in the area. This assumption does not seem to be entirely correct as all the quarries except one in and around Carmel Woods are shown operational in 1887. By the time of the OS 2nd edition 1:2500 (1906) all the old quarries in the Woods had closed. The final demise of these was undoubtedly caused by the opening in 1903 of the Llandybie Lime Works with its three massive lime kilns and stone crushing plant. A new quarry at Glan Gwenlais was opened to serve these works. Glan Gwenlais quarry continued to work up until after the Second world War. Pwll-y-march quarry was reopened and worked until the early 1970s. The extent of these quarries is shown on OS 1973-4 1:2500 maps. There may have still been some small scale, localised production of lime however even after the large kilns were operational. As late as 1910 lime was being burnt on Llwyn-yr-ynn Farm between Pentregwenlais and Gorslas (Roberts 1939, 211).

4.3c Conclusion

The quarrying and lime burning industry thus became the dominant activity in the Carmel Woods, Pentregwenlais and Cilrychen areas in the later 19th century. The large scale quarries to the west and east of the study area thus removed much of the former farms of Tir y Garn, Pant-y-llyn and Carreg Gwenlais whose past landscapes have been reconstructed from historical evidence. But the change in both the scale and location of the industry has also preserved the unique historical landscape of the central part of the Carmel Woods area, thus allowing the origins, development and climax of the lime quarrying and burning industry to be represented within the SSSI.

5 ARCHAEOLOGICAL SURVEY

5.1 Boundaries in the Survey Area

The boundaries consisted of wide, uncoursed rubble-walls in various states of repair sometimes topped with plashed hedges. Often they ran along the top of low natural cliffs as in woodland blocks 3 and 18 (Maps 6, 12). The woodlands blocks follow the numbering system devised by Stringer and Davies 1989 (Fig 3). Only the walls surrounding the field immediately to the east of Pant-y-garn are of a later and different constructional technique from the norm. Here they are of tall, thin dry-stone build and still stockproof. Nowhere else in the survey area are the walls stockproof; they are supplemented with wire fences. On the survey drawing (Map 12) only definite boundary walls are shown, i.e. those that exhibit some structure.

It should be noted that linear bands of rubble exist on the edge of many woodland blocks (not shown on Map 12). No structure is evident in them. It is considered that they are the result of stone clearance from the neighbouring parcels of pasture, though the possibility that they are robbed and spread boundary walls cannot be discounted.

If the boundaries recognised during the archaeological survey (Map 12) are compared with those shown on manuscript and published maps (Maps 8-11) then it is clear that there has been a greater sub-division of woodland and pasture on the ground than has been recorded on maps. This is particularly the case at Bwlchau Gwynion (woodland blocks 7, 8, 25, 27 29) where many former divisors between pasture and woodland and between woodland and woodland can still be seen. Some of these boundaries were mapped by earlier surveyors, but it is clear that by the time of the earliest map of 1820 most had decayed and were not considered worthy of surveying. It would seem that at some time prior to 1820 many of the parcels of land which are now pasture were physically separated from the woodland. A similar pattern can be seen elsewhere in the survey. In particular, note the woodland blocks 3, 17 and 18. Here the low cliffs form a length of the divisor, rendering unnecessary the construction of a wall. The date of this subdivision of the land is not known. It is possible that this may perpetuate an earlier arable use of the area under the 'rhandiroedd' system (Section 3.1c), but it could be much earlier.

Equally some of the boundaries shown on earlier maps have now disappeared. Between woodland blocks 3 and 42 a small enclosed field is shown on 1887 OS maps and parts of the boundaries of this are still present in 1973; there is now no trace of them. Likewise with a boundary to the east of woodland block 29.

There was no stratigraphic relationship between walls, i.e. at no point in the survey was an old wall found to be overlain by a more recent one. On the southern side of Pwll-y-march quarry a wall-line has been partly destroyed by the workings. Elsewhere relationships between quarry faces and walls were difficult to obtain; the walls often ran along the crest of natural cliffs and these cliffs were often employed as quarry faces. At kiln sites 1, 39 and 40 (Map 13) spoil had spilt over and partly engulfed walls. This suggests that the boundaries formed no useful purpose when these kilns were being worked - probably prior to the Tithe Survey of 1839. This is of particular interest at site 1 where the wall forms the boundary between Bwlchau Gwynion and Pwll-y-march.

5.2 Routeways

Only tracks that lead up to farmhouses are metalled. In the survey area the remainder are now little more than rough footpaths, including those which were shown on earlier printed and estate maps as routeways of equal importance as those which are now public highways.

5.3 Buildings

The only farm building in the survey area is Pant-y-garn, which has been abandoned for about 40 years. Its possible origins are discussed in section 3.2, but the farm buildings suggest a date of construction earlier than 1839 when they were first recorded in the Tithe Schedule. The now roofless, two-storey farmhouse was originally of one or one-and-a-half storeys and seems to be the remains of a classic, sub-Medieval longhouse. It is rectangular in plan with its long axis aligned downslope, the upper part of the house built on a terrace cut into the hillside. Entrance was by means of a cross-passage. This may have been a common entrance for men and livestock. The byre on the downslope side, living quarters on the upslope side. To the south of the farmhouse is a range of buildings including a small barn, stable and pigsty.

5.4 Limestone Quarrying and Burning

There is abundant evidence of limestone quarrying and burning in Carmel Woods. Three classes of evidence were recognised in the survey: a) quarries and quarry pits, b) lime kilns and c) spoil heaps. In many cases all three classes occur together. It seems unlikely that surface stones and boulders were picked over by lime burners as was suggested by Rackham for in many areas of burnt lime spoil a natural spread of rubble is still in evidence. In all areas, apart from the recently worked Pwll-y-march Quarry, woodland has regenerated over these industrial remains.

5.4a Quarries

For the purpose of this study quarry pits range from small depressions 3m diameter and 1m deep up to hollows 15 to 20m diameter and 3 or 4m deep. A bare rock face only exists where the pits are dug into a steep slope. Small quarries such as Bwlchau and Pant-y-garn are considerably larger and have distinct quarry faces. Pwll-y-march is, for the purpose of this study considered to be a medium-sized quarry. It should be noted that the small- and medium-sized quarries employ natural cliffs as part of their working faces and it may be that many of the other natural cliff faces in the study area have been partly worked as a source of stone.

5.4b Lime Kilns

Two basic types of kiln were recognised (Map 13):

1) Large, well-built structures of mortared stone up to 5m in height. Built between 1839 and 1887. Four examples are listed below; nos. 5, 8, 11 and 19. This includes the double kiln at Pwll-y-march (no. 5) but not no. 26 which had been demolished at the time of the survey, but was probably of this type.

2) Small, dry-stone structures on average 2.5m diameter. Fourteen of this type were recognised; nos. 1, 10, 13 (two kilns), 16, 17, 18 (two kilns), 25, 33, 34, 35, 39, and 40. These kilns are all of similar form, comprising an armchair-shaped earthwork with the opening (mouth or tap hole of the kiln) facing downslope. They are all sited on slopes, with quarry pits upslope and spoil spilling downslope. The two kilns under no. 18 are shown on a map of 1800. No others of this type in the survey area are shown on early maps. This type of kiln is consistent in form and size with the one described by George Owen in the early 17th century while some of the smaller examples listed below are similar to a 'sod-kiln' excavated on Gower (section 4.3) and dated to the early decades of the 19th century. Due to the lack of any further dating evidence a broad date range from AD 1600 to 1840 is proposed for the use of this type of kiln in Carmel Woods. This end date is supported by field observation at the eastern end of the woods: several years ago the two kilns marked on the 1839 Tithe Map at Pant-y-llyn were examined; they were found to be considerably larger than the type 2 kiln and possibly examples of the perpetual kiln described by Walter Davies in 1815.

5.5c Spoil Heaps

All the spoil heaps listed below in the register are of burnt lime, unless otherwise stated. All

the spoil heaps were examined to determine the type of fuel used in the kilns. In all cases anthracite was found. In some cases small quantities of charcoal was found with anthracite; this was in sufficiently small quantities to indicate that it is the residue of kindling. The only evidence for spoil heaps of unburnt quarry waste was around Pwll-y-march Quarry, No. 5 below.

In several instances quarry pits and spoil heaps of burnt lime occurred together but with no indication of how the lime was burnt. In some cases where there are extensive pits and spoil heaps, as in nos. 6 and 32, the former existence of kilns is suspected. Where the surface evidence indicates smaller workings, nos. 3, 4, 28 and 38, the method of combustion is unknown.

5.4d Register of limestone quarrying and burning sites (Fig. 10).

1. Small stone-built kiln, 2.5m internal diameter, 0.5m high. Two medium-sized quarry pits on the upslope (north) side of kiln. Small spoil heap to south. The kiln and quarry pits are outside the survey area, the spoil, however, has spilt over and covered the boundary wall to Bwlchau Gwynion's land.
2. A series of small to medium-sized quarry pits downslope of 1. No evidence for lime burning.
3. Two small quarry pits and a spoil heap. There are a many natural boulders in the area of the quarries and spoil.
4. Quite an extensive spoil heap on a steep slope with small quarry pits above. Many natural limestone boulders in the area.
5. Pwll-y-march quarry and kiln. Kiln on the site by 1820. By 1887 kilns with small quarry to west. The kilns were disused in 1906. They survive, in good condition, as two single-pot, conjoined, but probably not contemporaneous, stone-built structures. Each pot served by two tap holes. The medium-sized quarry finally closed in the 1970s. Very large spoil heap to east of kiln with track across it. Spoil heap of quarry waste also to west of quarry. The quarry has destroyed the boundary that lay to the south.
6. A quite extensive area of small to large-sized quarry pits. There are spoil heaps among the pits and downslope (east) of them. No kiln was recognised, but the pits are in dense, impenetrable undergrowth.
7. Kiln marked on the 1839 tithe map, though may be a mis-location of kiln 8.
8. Bwlchau Gwynion quarry and kiln. Kiln on site by 1820. By 1887 a kiln and small quarry to west. Kiln disused in 1906. The kiln is reputed to be dated 1857. The kiln survives in good condition. It has a single pot and two tap holes. Extensive spoil heap to the east of the kiln.
9. Kiln marked (by later hand) on 1820 map. No evidence for lime quarrying or burning in this area. Possibly mistaken location for Kiln 10.

10. Small, stone-built kiln immediately upslope (north) of track. Large quarry pit with access track upslope of kiln. No obvious spoil, though evidence of burning in kiln.
11. Pant-y-garn I, kiln and quarry. In existence by 1887, disused by 1906. The kiln survives in good condition. Single pot with two tap holes. The very large spoil heap downslope (south) of the kiln has spilt over the field boundary to the west.
12. Medium-sized quarry pit with small spoil heap.
13. Two stone-built kilns with large quarry pits upslope and large spoil heaps downslope. The western kiln is the larger with a 4m internal diameter. It is 2 - 3m high. The eastern kiln is 2.5m internal diameter and 1m high. A 20m long and up to 4m high tongue of spoil runs out from the mouth of this kiln. There are numerous smaller quarry pits and spoil heaps in the area of these kilns.
14. Medium-sized quarry pit.
15. Spoil heap on a steep slope. No evidence for quarries or kilns. It is upslope of nos. 16 and 17 so probably no associated with them.
16. Possibly the remains of a small, stone-built kiln with a 2.5m internal diameter. Small quarry pit on upslope side (north-west) small spoil heap on downslope side.
17. Small, stone-built kiln, 2m internal diameter, 1.5m high. Medium-sized quarry pits on upslope side, very small spoil heap on downslope side.
18. Two kilns are marked here on a map of 1800. They are not indicated on the 1839 tithe map. The eastern kiln survives. It is stone-built, 2.5m internal diameter, 1m high. It faces a track. The site of the second (western) kiln was located. The kiln is of a similar size to the above, but ruinous. A cliff face to the south appears to have been quarried for stone. There are also some small quarry pits. Spoil heaps to the west of the kilns.
19. Pant-y-Garn II, kiln and quarry. Kiln with small quarry marked on 1887 map, disused by 1906. The kiln survives in good condition. It is single pot with two tap holes. There are extensive spoil heaps to the south of the kiln alongside a track.
20. Small quarry pit.
21. Small quarry pit.
22. Area of small and medium-sized quarry pits.
23. Area of small and medium-sized quarry pits.
24. Small dump of spoil. This has spilt over a boundary wall.
25. Base of a small, stone-built kiln. All that remains is a ring of upright stones 4m diameter. This kiln appears to be of a different type to all the other small kilns in the survey area. There

is a spoil heap on the downslope (west) side of the kiln. A low cliff immediately to the south-east may have been a quarry face. Built against the bottom of the cliff, 7m from the kiln, are the foundations of a two-celled rectangular building 10m by 4m.

26. Kiln marked on 1887 map, disused in 1906. It does not survive. Served by the quarry pit 29.

27. Small amount of spoil built up against a boundary wall.

28. Medium-sized quarry pits. Spoil was seen by Stringer and Davies, but not by the present writer.

29. Quarried cliff-face and an area of medium and large-sized quarry pits. Spoil heaps in area. The quarries probably served the kiln 26.

30. Medium-sized quarry pit.

31. Area of small and medium-sized quarry pits.

32. Extensive area of medium and large-sized quarry pits with spoil heaps on downslope (south) side.

33. Small, stone-built kiln, sub-rectangular 4m by 2m internally. Small amount of spoil at mouth of kiln on downslope side. Cliff face to south, possibly quarried plus some small quarry pits.

34. Small, stone-built kiln, sub-rectangular 4m by 2m internally. Small amount of spoil at mouth of kiln. Kiln built over possible boundary wall. Cliff face to south, possibly quarried, plus some small quarry pits.

35. Small, sub-rectangular stone built kiln 4m by 2m internally, over 2.5m high. Pile of rubble on downslope, mouth (west) side of kiln, possibly an unused charge for the kiln. No trace of spoil. Medium-sized quarry pits on upslope side plus a cliff-face, possibly quarried.

36. Extensive area of spoil on a steep slope. Medium-sized quarry pit on upslope (west) side. Many natural boulders in the area of spoil.

37. Small quarry pit.

38. Small quarry pits with spoil on their downslope side.

39. Small, stone-built kiln 2.5m diameter, 3m high. Medium-sized quarry pits on the upslope (north) side. Spoil heap on the downslope side overlies a boundary wall. A track runs immediately to the south at the height of the top of the kiln.

40. Small, stone-built kiln 2m diameter, 1.5m high. Medium-sized quarry pits on upslope side. Spoil heap on the downslope side overlies a boundary wall. A track runs immediately to the south at the height of the top of the kiln.

6. APPENDICES

6.1 Cartographic conventions

A study of Carmarthenshire estate maps by Evans (1977) demonstrated that their chief function was to provide accurate plans of individual farms for legal purposes. Thus the boundaries of farms and of individual fields were carefully surveyed and different land-uses were plotted. Clearly, estate mappers were not concerned with relict landscape features that served no agricultural or legal function such as a dilapidated field boundary contained within a farm holding. Though a boundary in a similar condition would have been surveyed if it formed the divisor between two farms. The high degree of accuracy obtained by 18th and 19th century land surveyors can be verified by comparing their plans with modern, large-scale Ordnance Survey maps.

It is clear from Figs. 3 to 7 that the basic farm and field boundaries have changed little in the past two centuries. And, it is suspected, that the minor changes recorded on the various manuscript and published maps are the result of surveying and cartographic vagaries rather than a true representation of the landscape. Major differences between the maps, however, reflect a true change in the pattern of the landscape. For instance, on an estate map a boundary is shown to the south of a small field between woodland blocks 3 and 42 (Maps 6 and 8). This boundary is not shown on the tithe map of 1839 (Map 9), but it and more divisors were clearly visible to the surveyors of the OS map of 1887. All these boundaries have now disappeared (Map 12). The comprehensive mapping of 1887 testifies to the diligence of the OS surveyors. But the inability or unwillingness of earlier cartographers to recognise all boundaries perhaps indicates that by the time of the first comprehensive estate survey of the area in 1782 many of these field walls were in a dilapidated state and simply not worthy of mapping.

Estate map surveyors and the tithe map surveyors always showed the limits of individual farms as a definite boundary. There is good evidence from later maps and from the archaeological survey to demonstrate that these boundaries did not always physically exist on the ground. The boundary between the farm now known as Carreg Gwenlais and Glan Gwenlais runs for part of its course in woodland blocks 17 and 18 (Maps 6 and 7). This is shown as a clear boundary in 1782 and 1839 (Maps 8 and 9), but is not shown on the 1887 OS map (Map 10). The reason for this is clear: for much of its course in the woodland blocks 17 and 18 the boundary is defined by the top of a low cliff not by a field wall (Map 12). It is probable that in the late 18th and early 19th centuries the line of the boundary between the farms was described by tenants and agents of the estates. The surveyors then dutifully recorded these on their maps as hard lines.

6.2 APPENDIX 2

Register of Pre- 1500 AD Archaeological Sites Around Carmel Woods

258	Ring-barrow	Bronze Age
654	Finds	Roman
657	Round-barrow	Bronze Age
658	Round-barrow	Bronze Age
659	Round-barrow	Bronze Age
790/7523	Holy Well/chapel	Dark Age/Medieval
808	Hearth	Prehistoric
815	Finds	Palaeolithic/Bronze Age
818	Finds	Bronze Age
4869	Place-name	Prehistoric
5967	Place-name	Prehistoric
7521-2	Finds	Palaeolithic/Prehistoric
7673	Unknown	Unknown
7657	Holy well	Dark Age
11250	Place-name	Dark Age/Medieval
13127	Standing stone	Bronze Age/Medieval

6.3 References and Bibliography

Abbreviations used in text

CRO = Carmarthen Record Office NLW = National Library of Wales OS = Ordnance Survey
Sources searched

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In the Carmarthen Record Office the schedules of the Cawdor, Dynevor, Derwydd, Picton and Cwmgwili collections were searched. The Map Books of Cawdor, Dynevor and Derwydd were examined. In the National Library of Wales the index of Estate Maps was searched.

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Extensive use was made of Dyfed Archaeological Trust's Sites and Monuments Records. Documents, including leases, rentals and quitclaims in the Carmarthen Record Office (Ref. No. followed by date):

Cawdor Collection;	59/6449	(1543)	87/7382	(1719)
	122/8596	(1550)	96/7779	(1720)
	75/6899	(1578)	99/7895	(1734)
	48/5933	(1611)	68/6616	(1744)
	112/8399	(1648)	102/8082	(1759)
	96/7800	(1680)	100/7982	(1761)
Dynevor Collection;	781	(1556-7)		
	783	(1560)		

Estate Maps in the Carmarthen Record Office:

Cawdor Collection;	8660A p19	(1782). Llygad Gwenlas
	8660B p21	(1782). Glan Gwenlas
	8660B p22	(1782). Tir y Garn
Dynevor Collection; Map Book 5, p74		(1800). Cae'r ffwrn
	Map Book 5, p100	(1820). Bwlche or Garn
Derwydd Collection; Stepney p70		(1761). Pant y llin

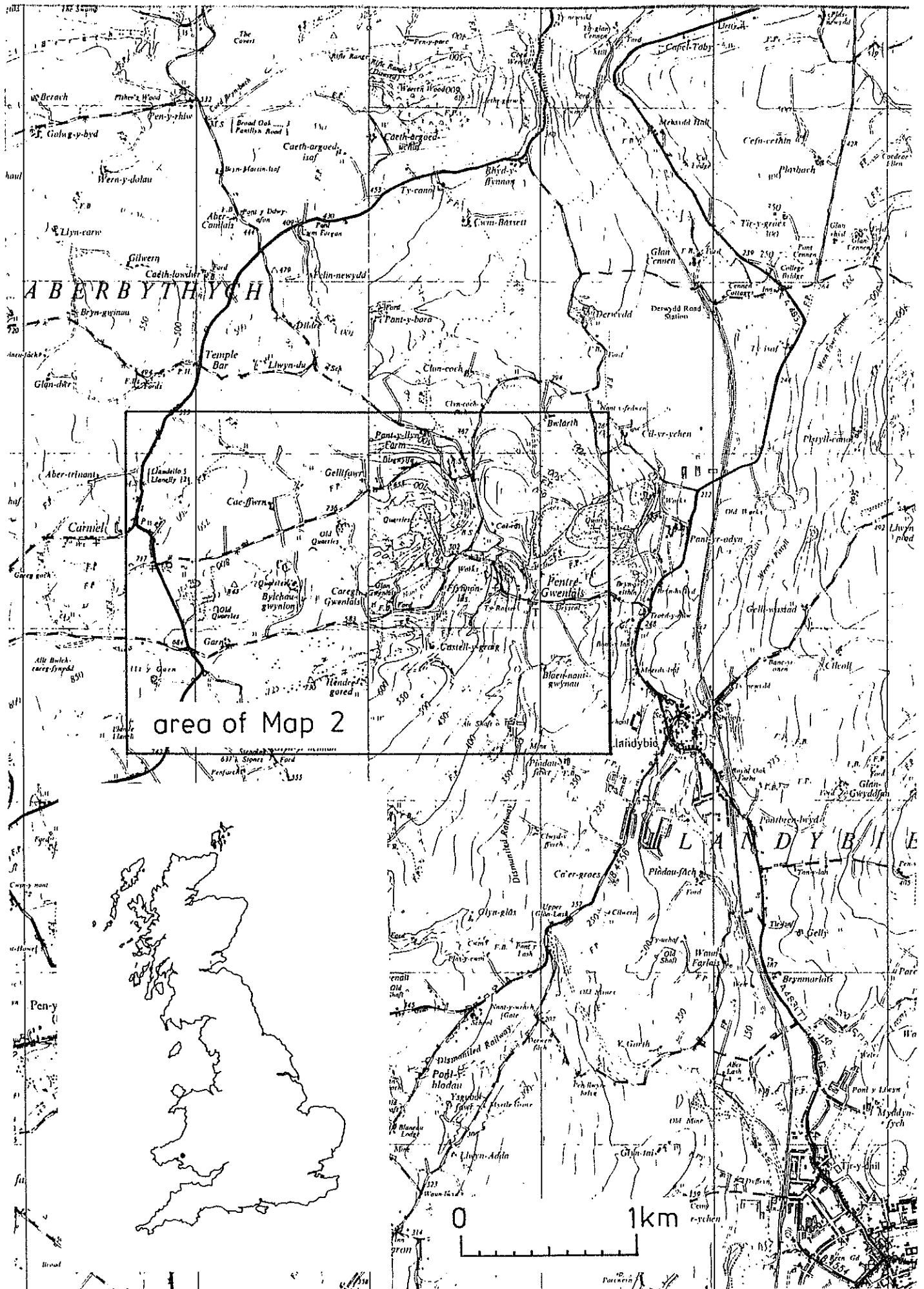
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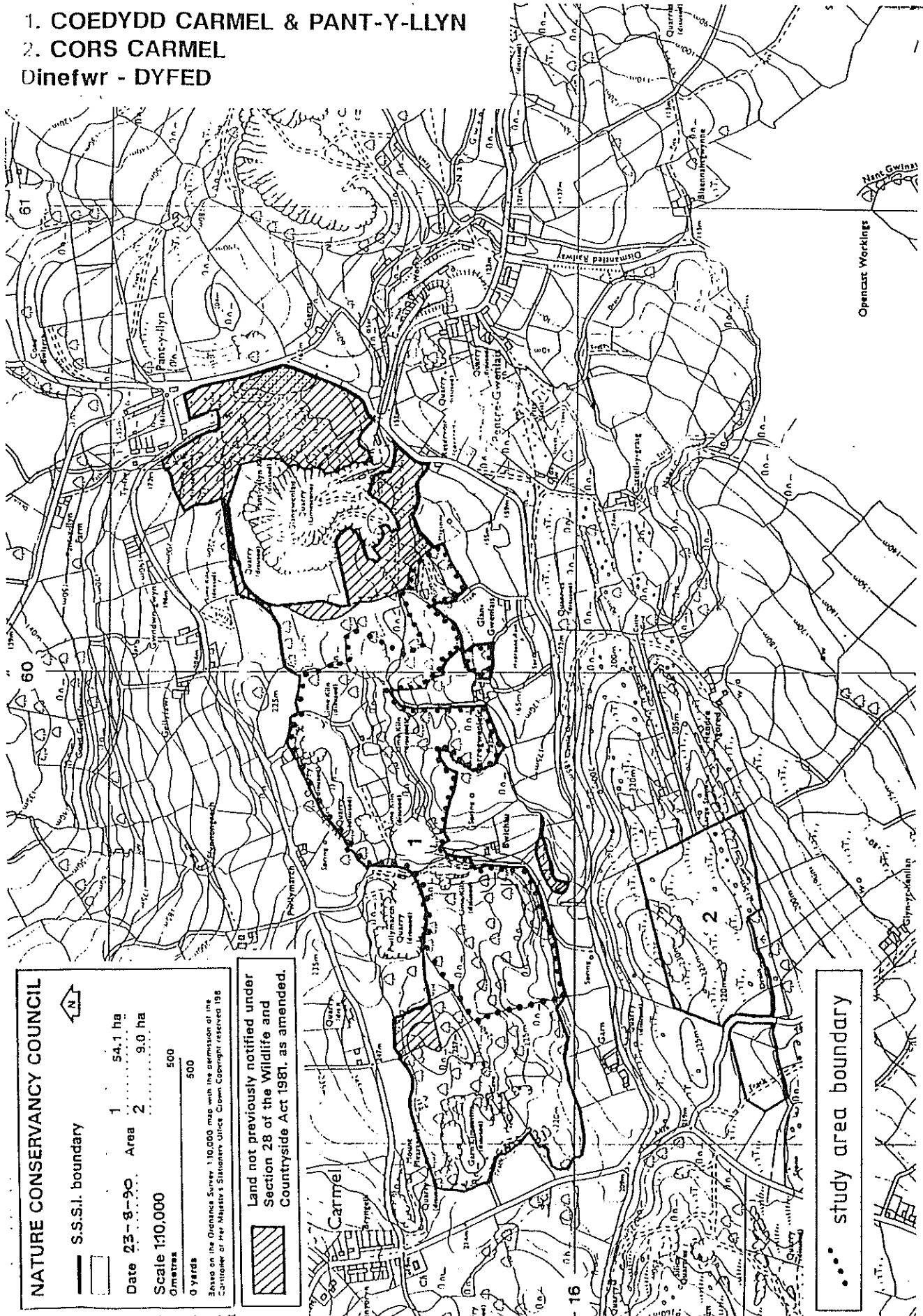
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Map 1



1. COEDYDD CARMEL & PANT-Y-LLYN
2. CORS CARMEL
Dinefwr - DYFED

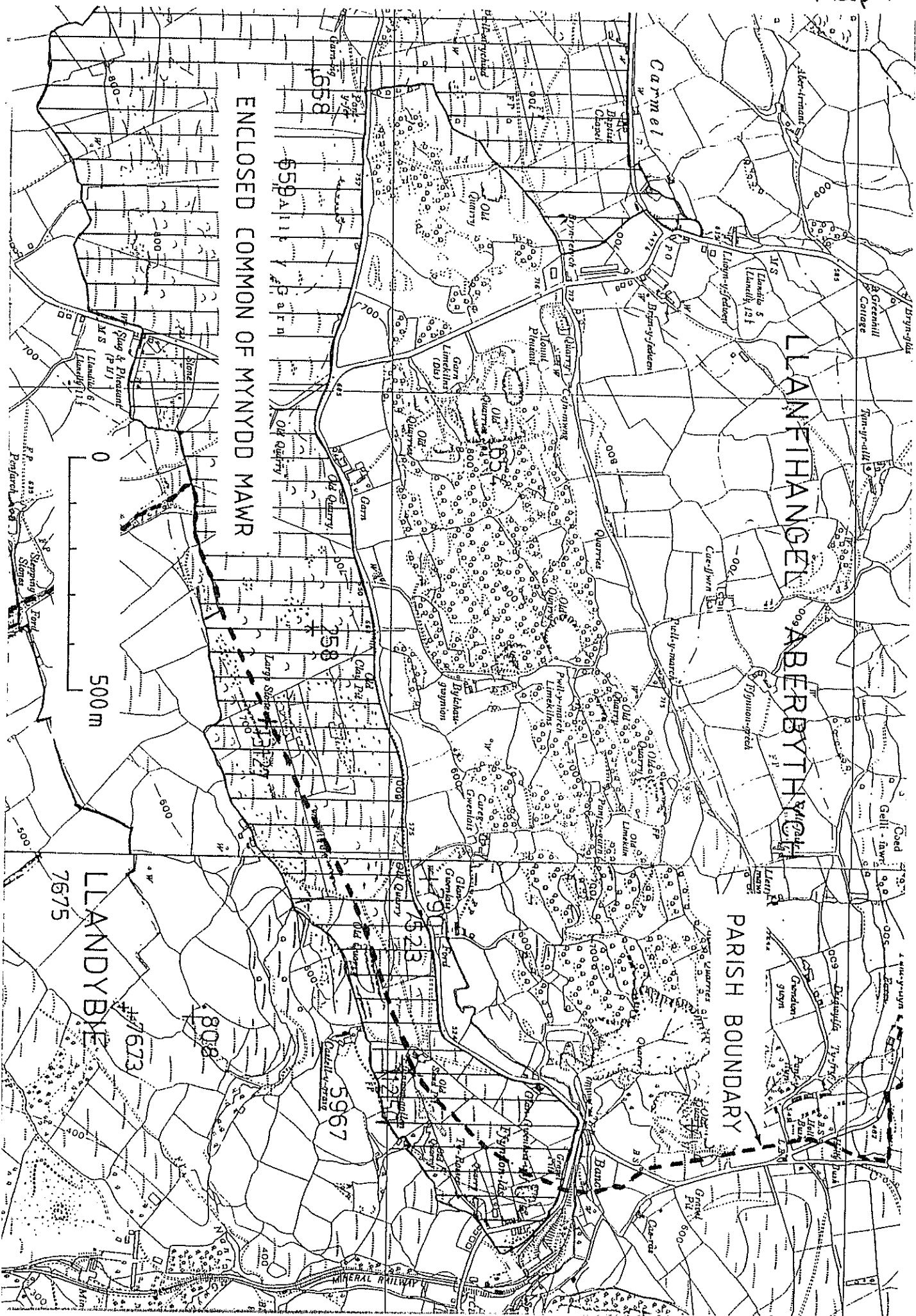


Map 3

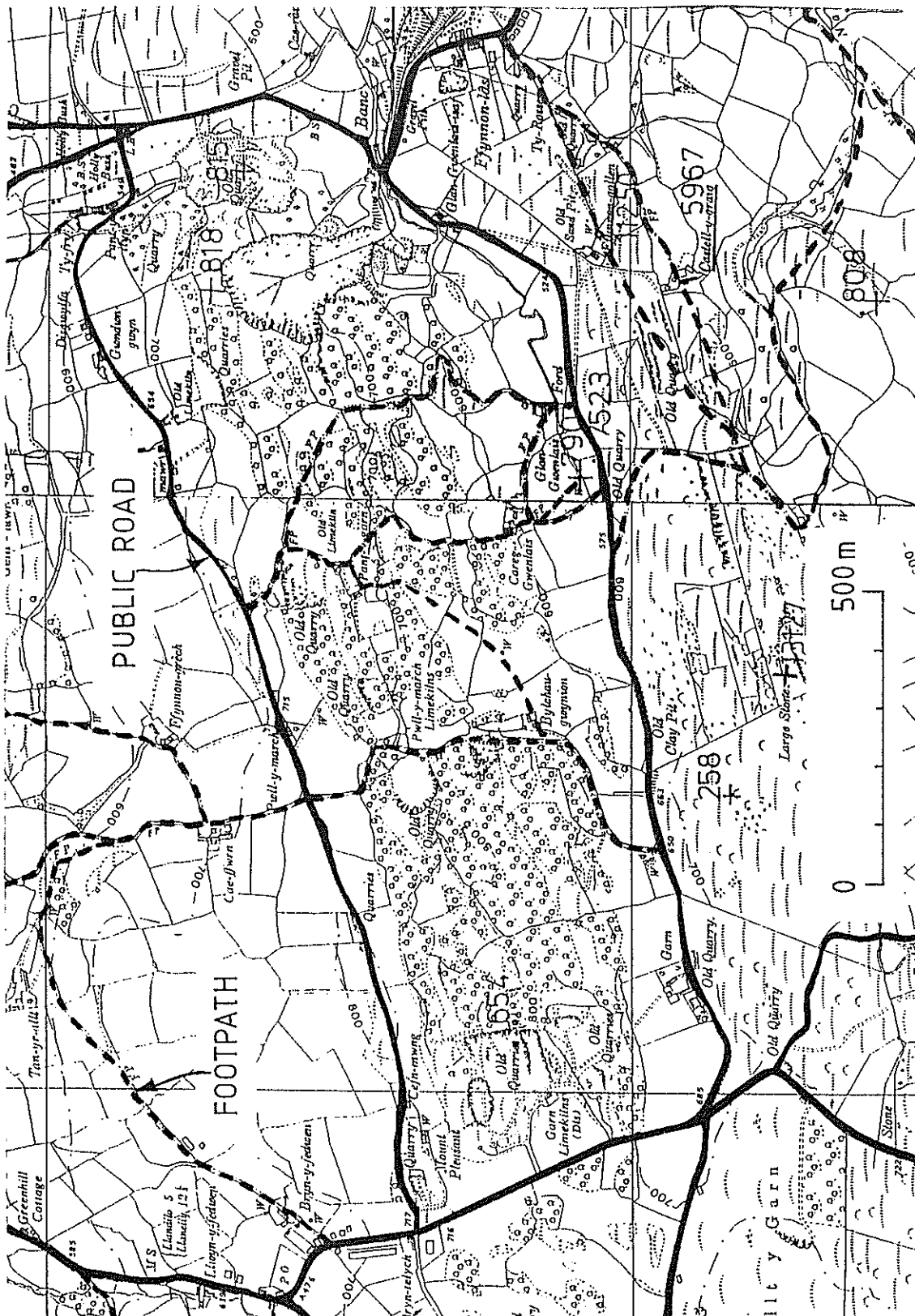


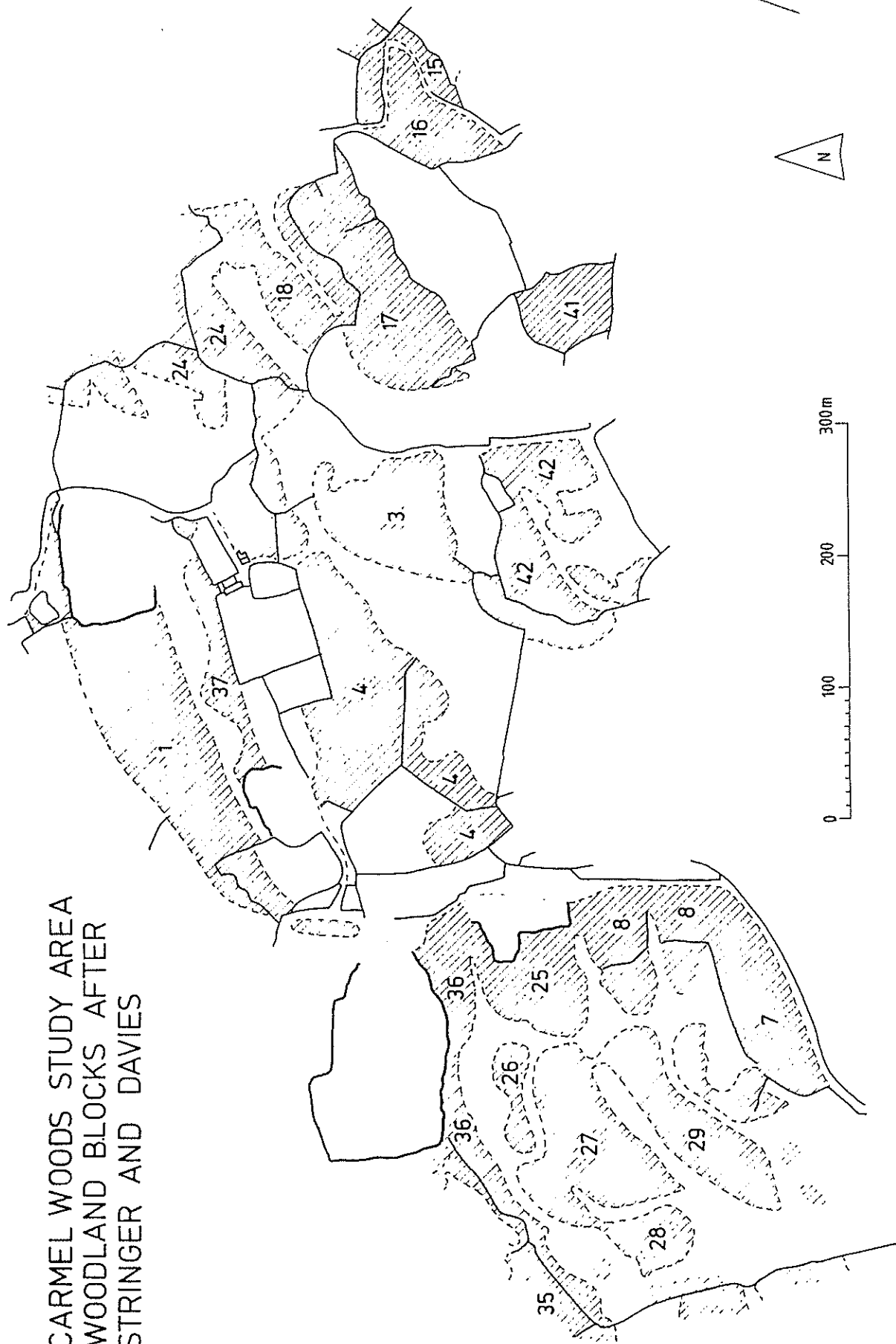
17 p 3

17 p 3



Map 5



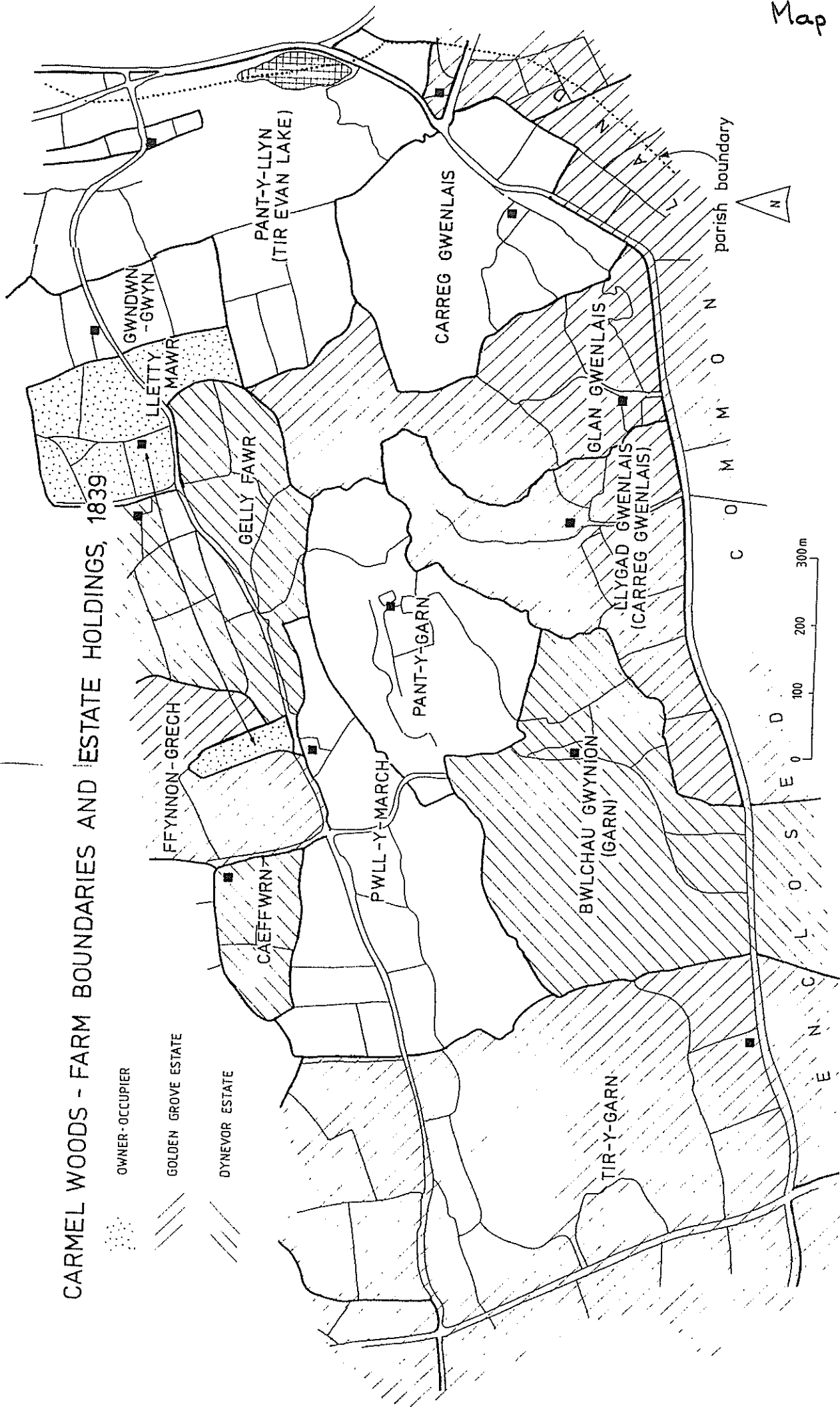


CARMEL WOODS - FARM BOUNDARIES AND ESTATE HOLDINGS, 1839

OWNER-OCCUPIER

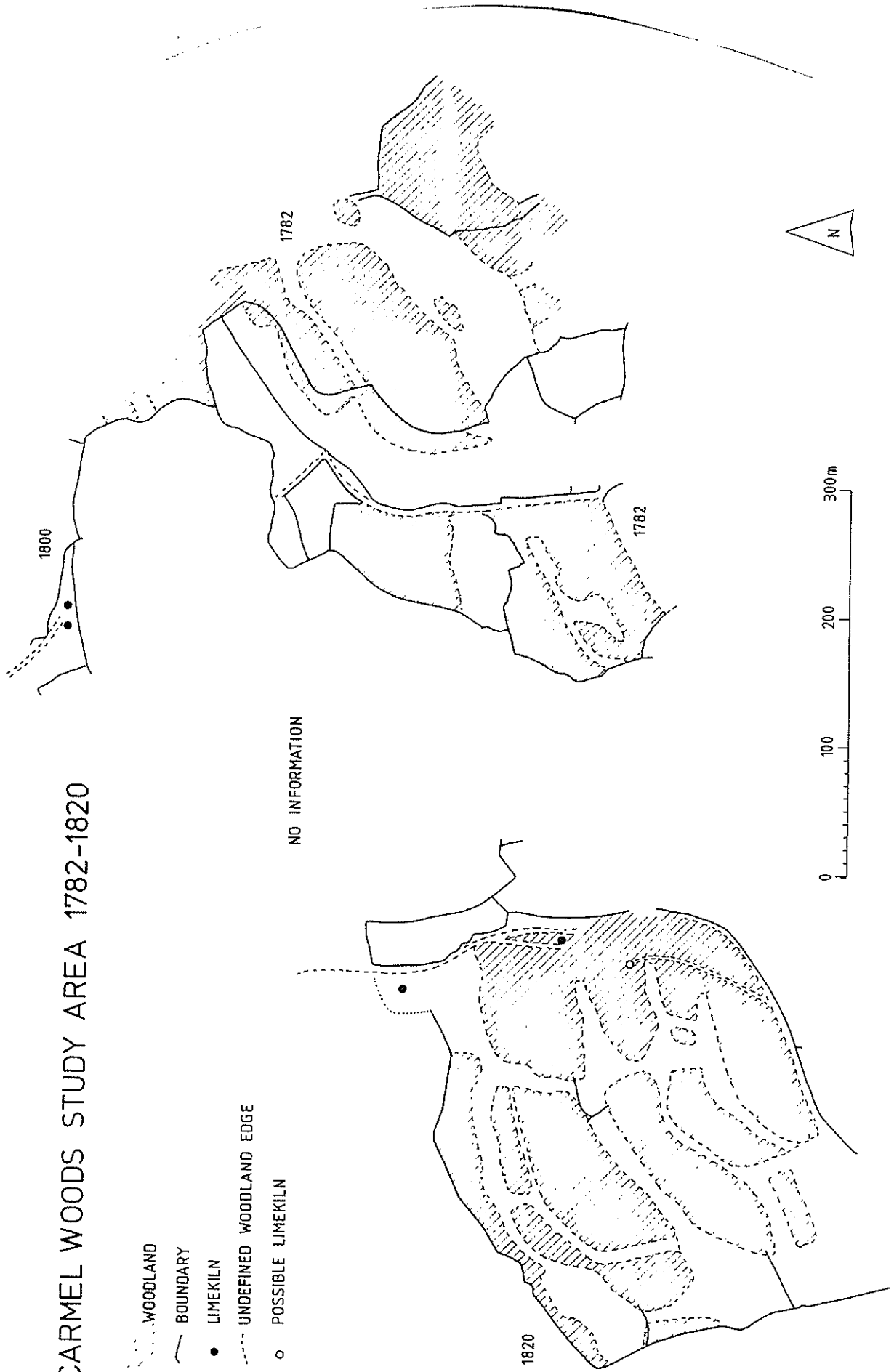
GOLDEN GROVE ESTATE

DYNEVOR ESTATE



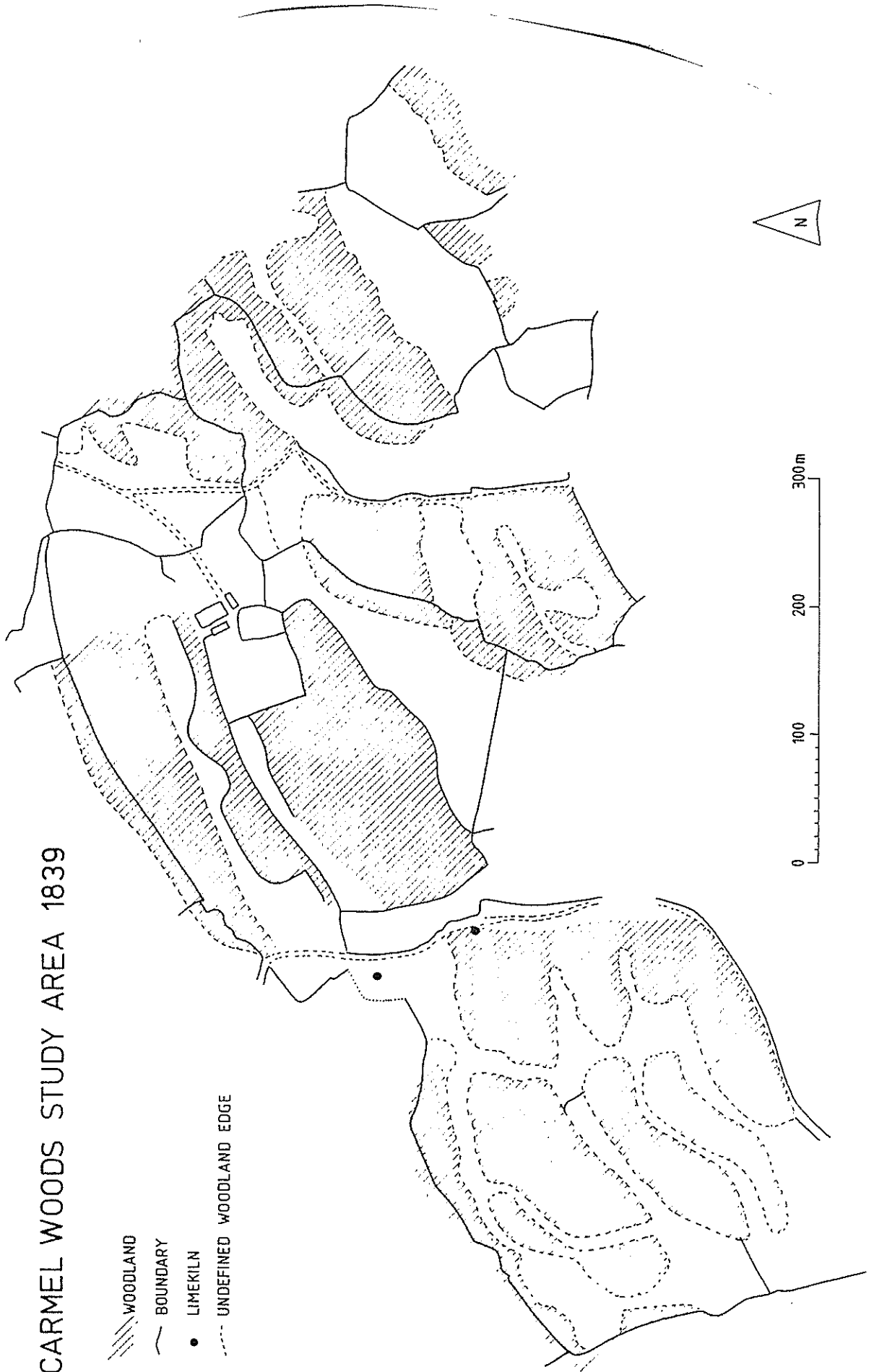
1347

CARMEL WOODS STUDY AREA 1782-1820

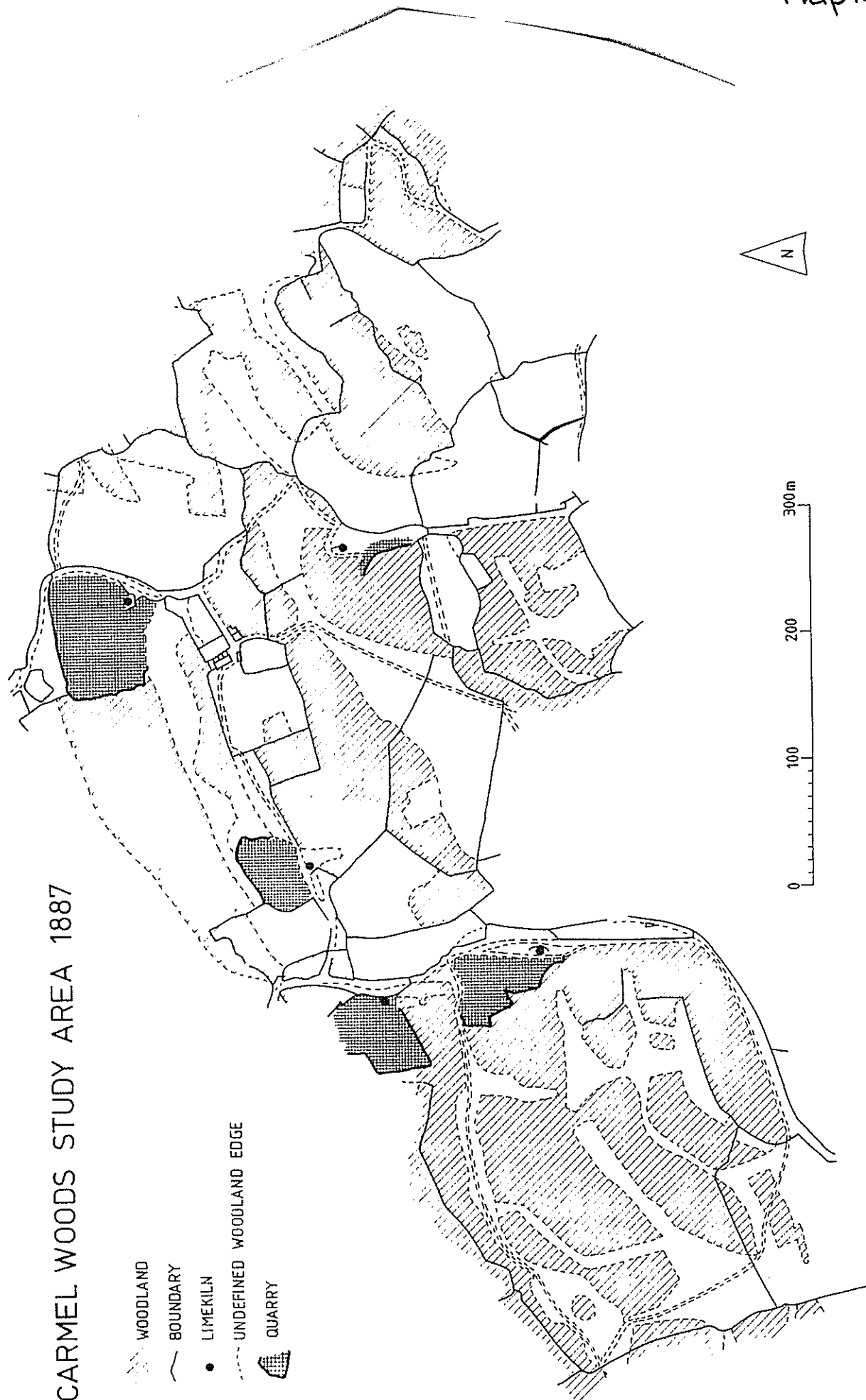


CARMEL WOODS STUDY AREA 1839

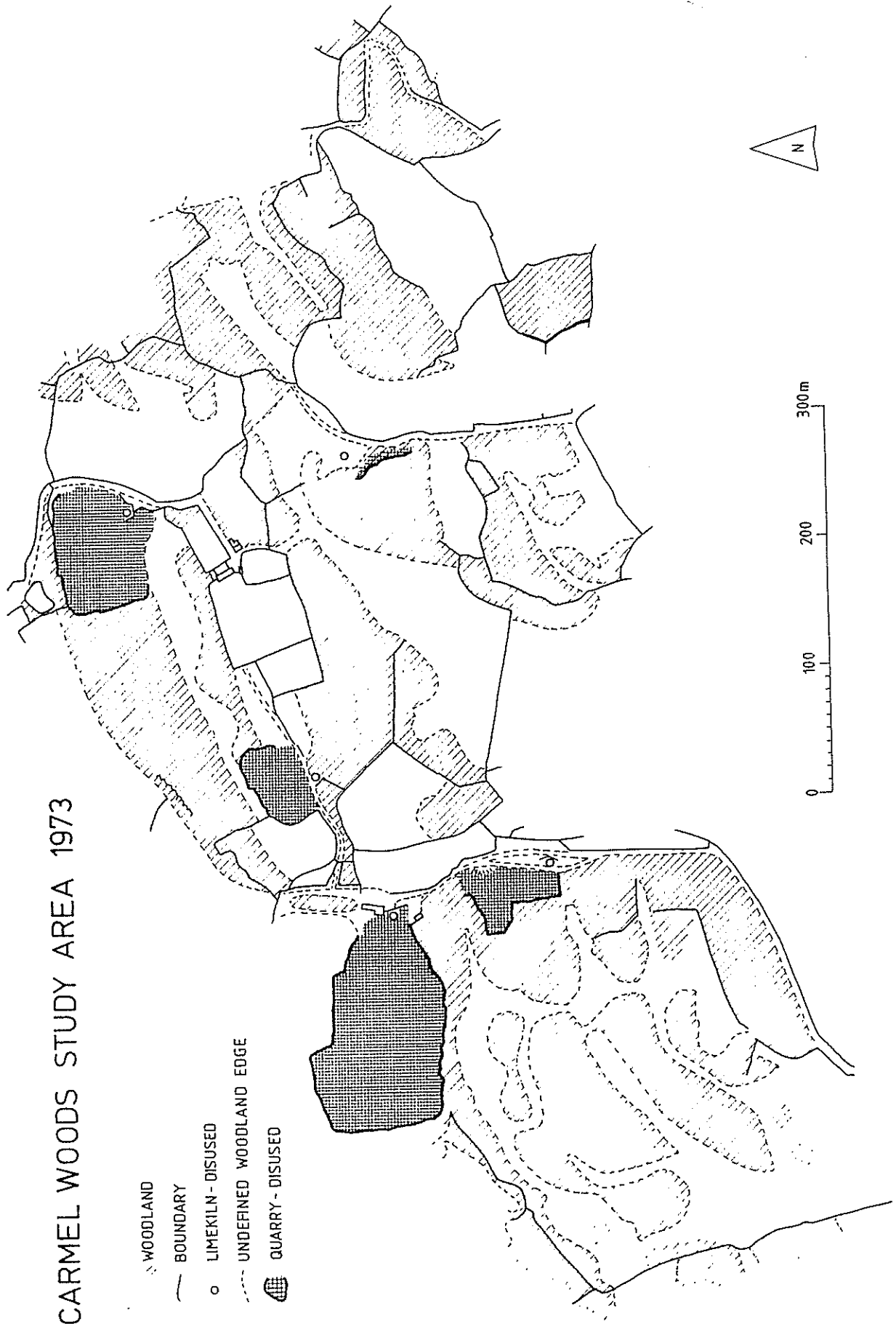
- WOODLAND
- BOUNDARY
- LIMEKILN
- UNDEFINED WOODLAND EDGE



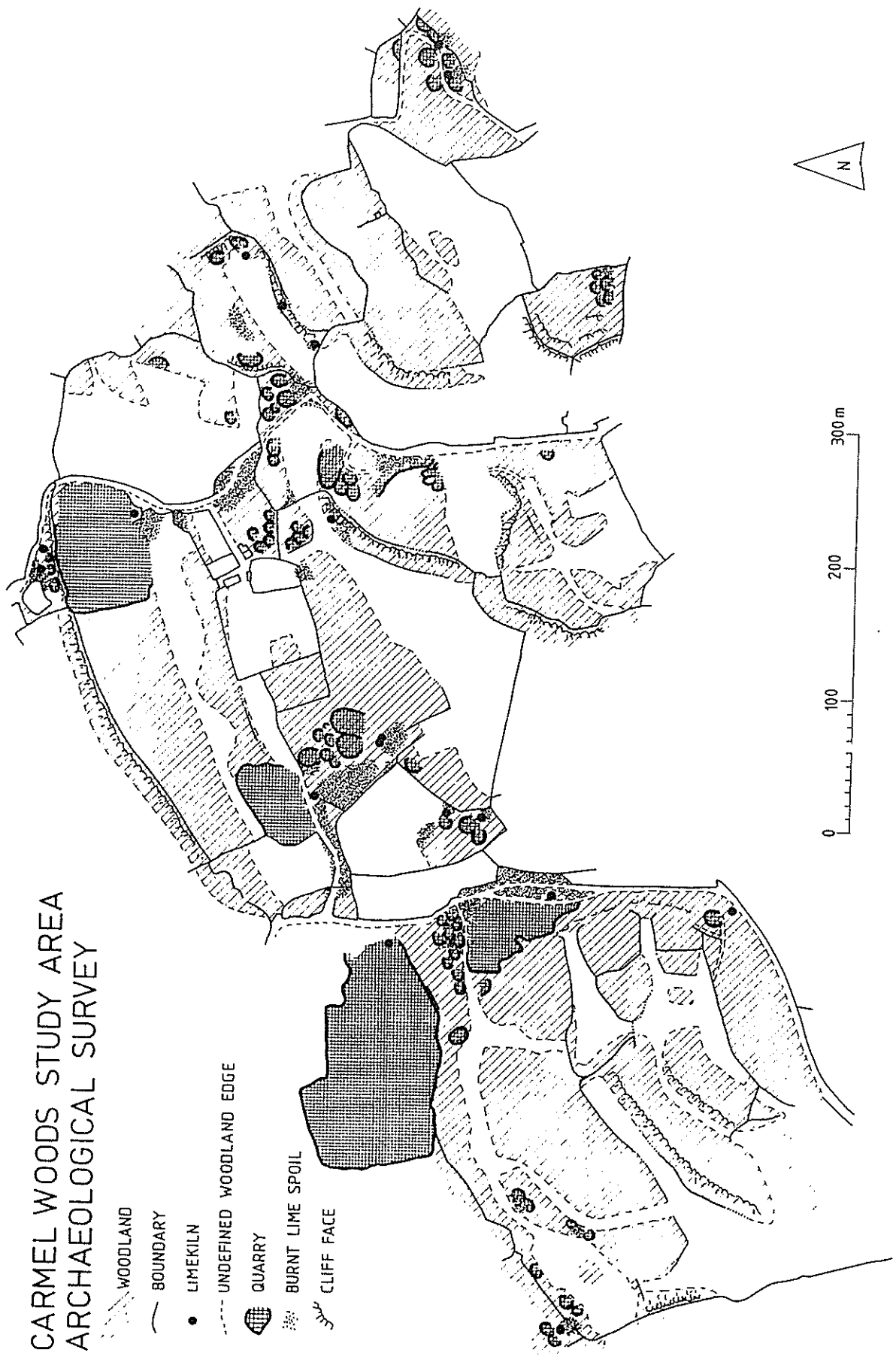
CARMEL WOODS STUDY AREA 1887



CARMEL WOODS STUDY AREA 1973

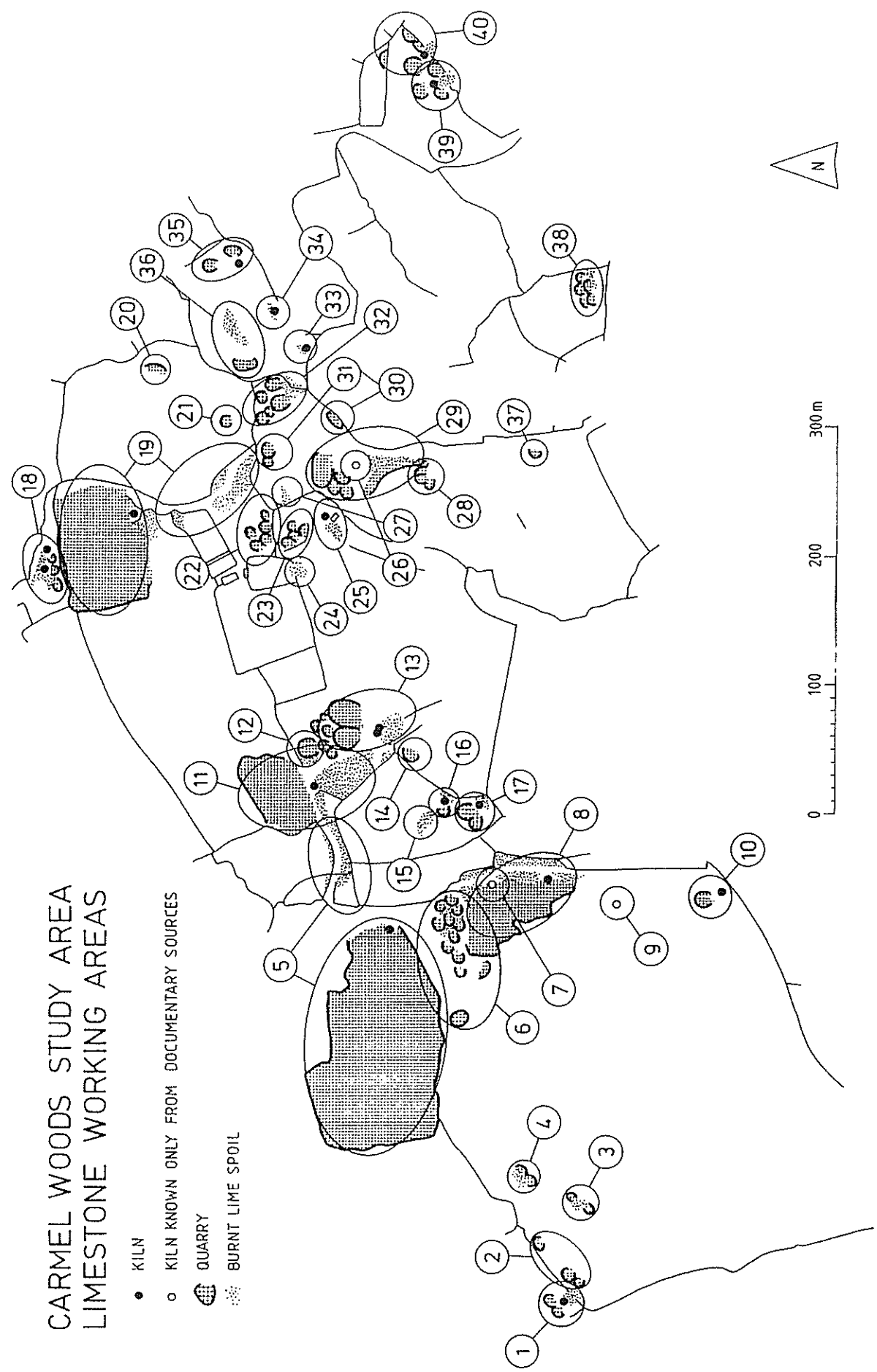


CARMEL WOODS STUDY AREA ARCHAEOLOGICAL SURVEY



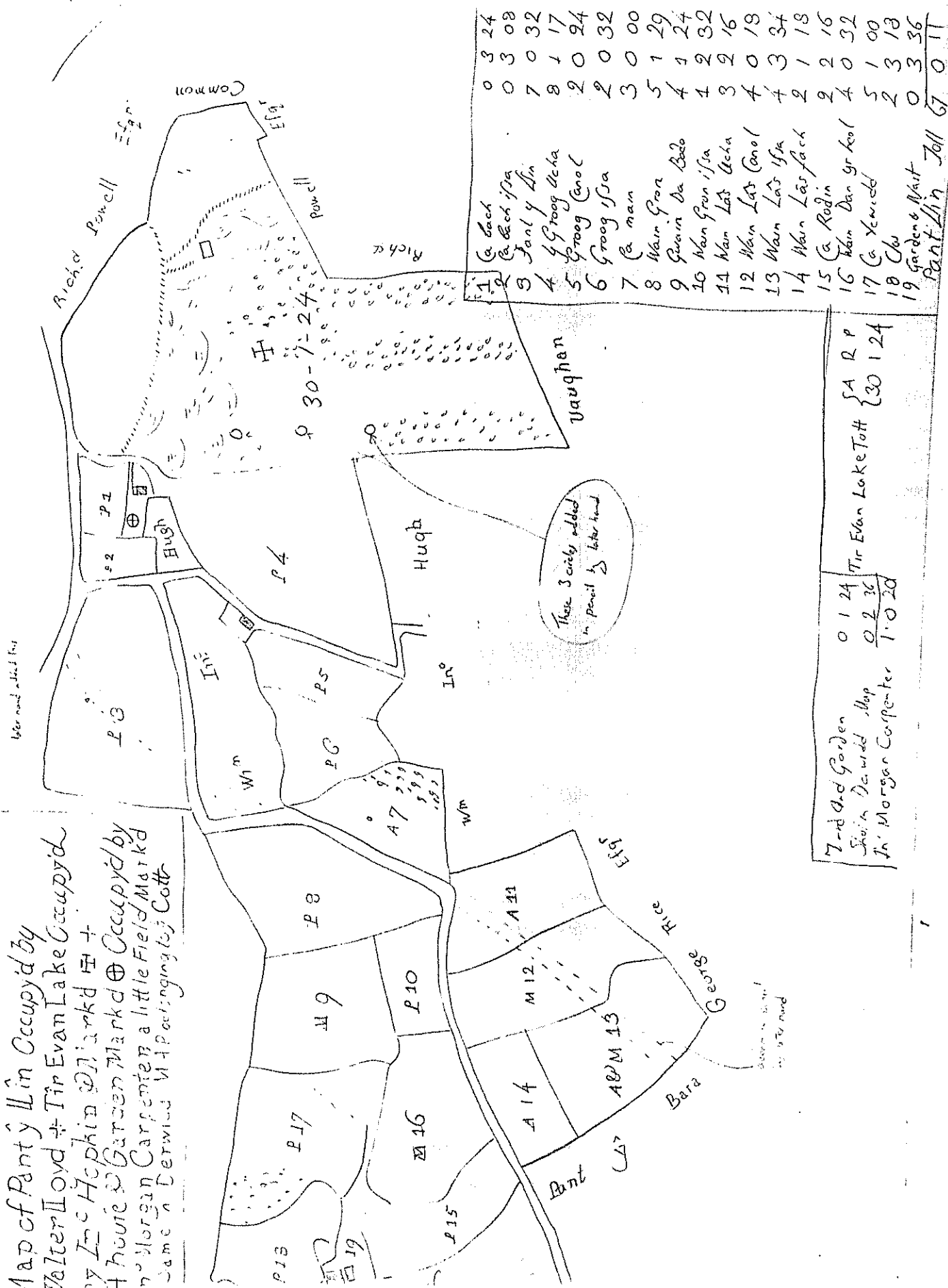
CARMEL WOODS STUDY AREA LIMESTONE WORKING AREAS

- KILN
- KILN KNOWN ONLY FROM DOCUMENTARY SOURCES
- ▨ QUARRY
- ▨ BURNT LIME SPOIL

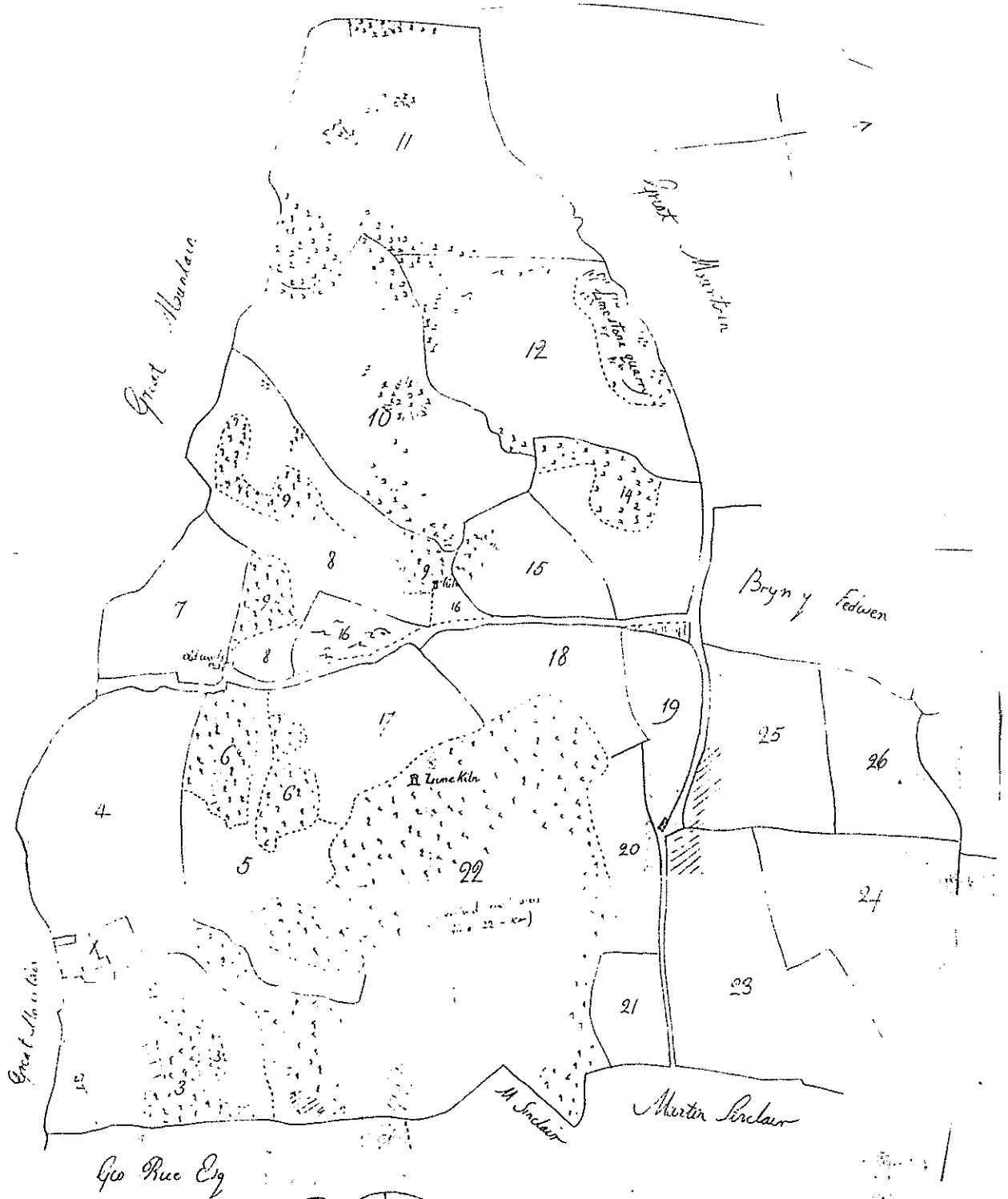


CRO STEPHEN P70
Plans of Estate in Carnation, Pando
Glasgow, the property of William
Chambers Esq
1761

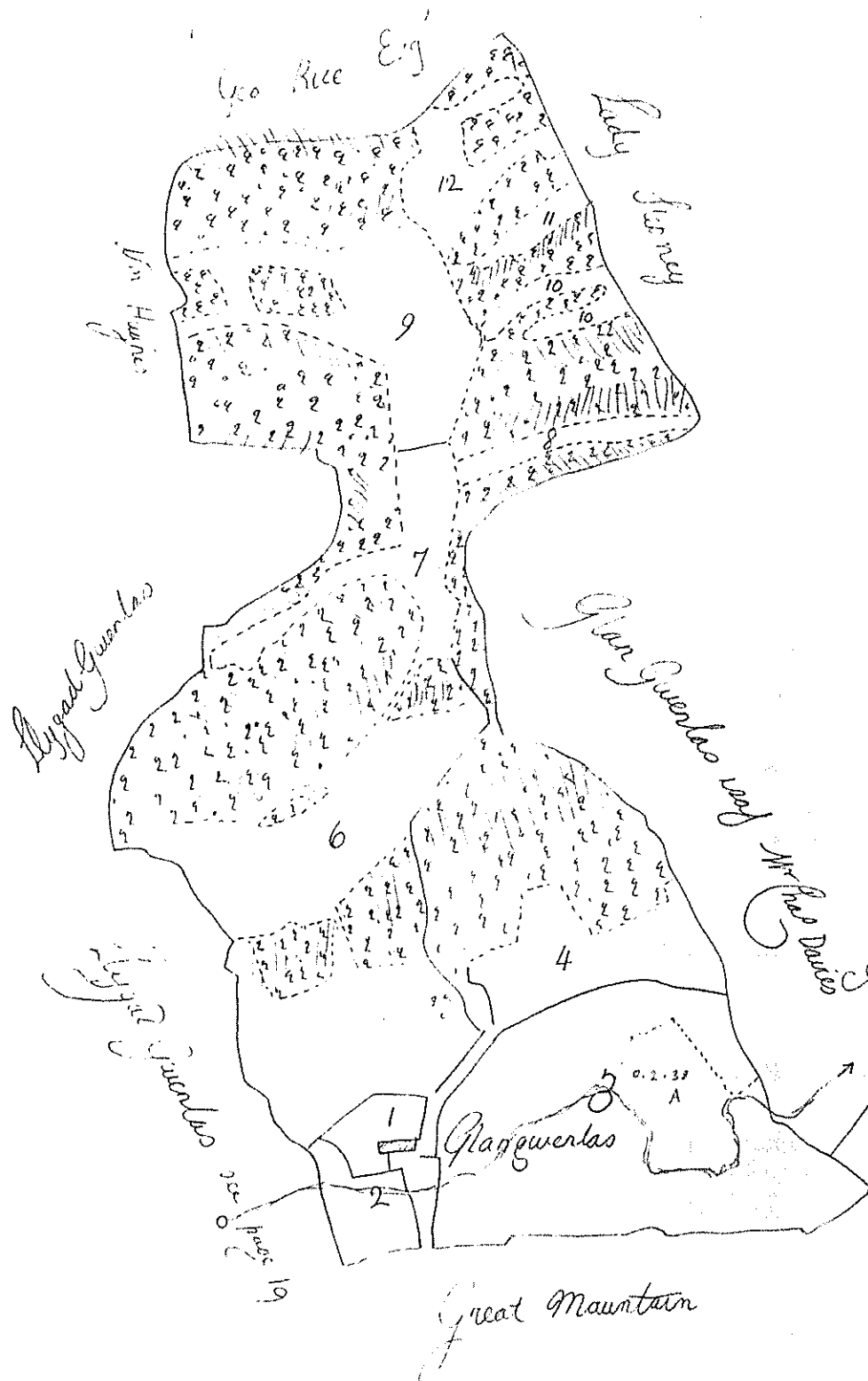
Map of Pant y Llin Occupied by
Walter Lloyd & Tir Evan Lake Occupied
by In c Hopkin & Llanckd H +
Thouie & Garden Markd Occupied by
Morgan Carpenter a little Field Markd
Same n Derwies W Hopkingingls Cott



7-nd d.d Garden	0 1 24	Tir Evan Lake Tot	SA R P
Shoin David Map	0 2 36		
In Morgan Carpenter	1 0 20		
			30 1 24



Tit v Garn m. Plan/Mangel Aberystwyth
1782



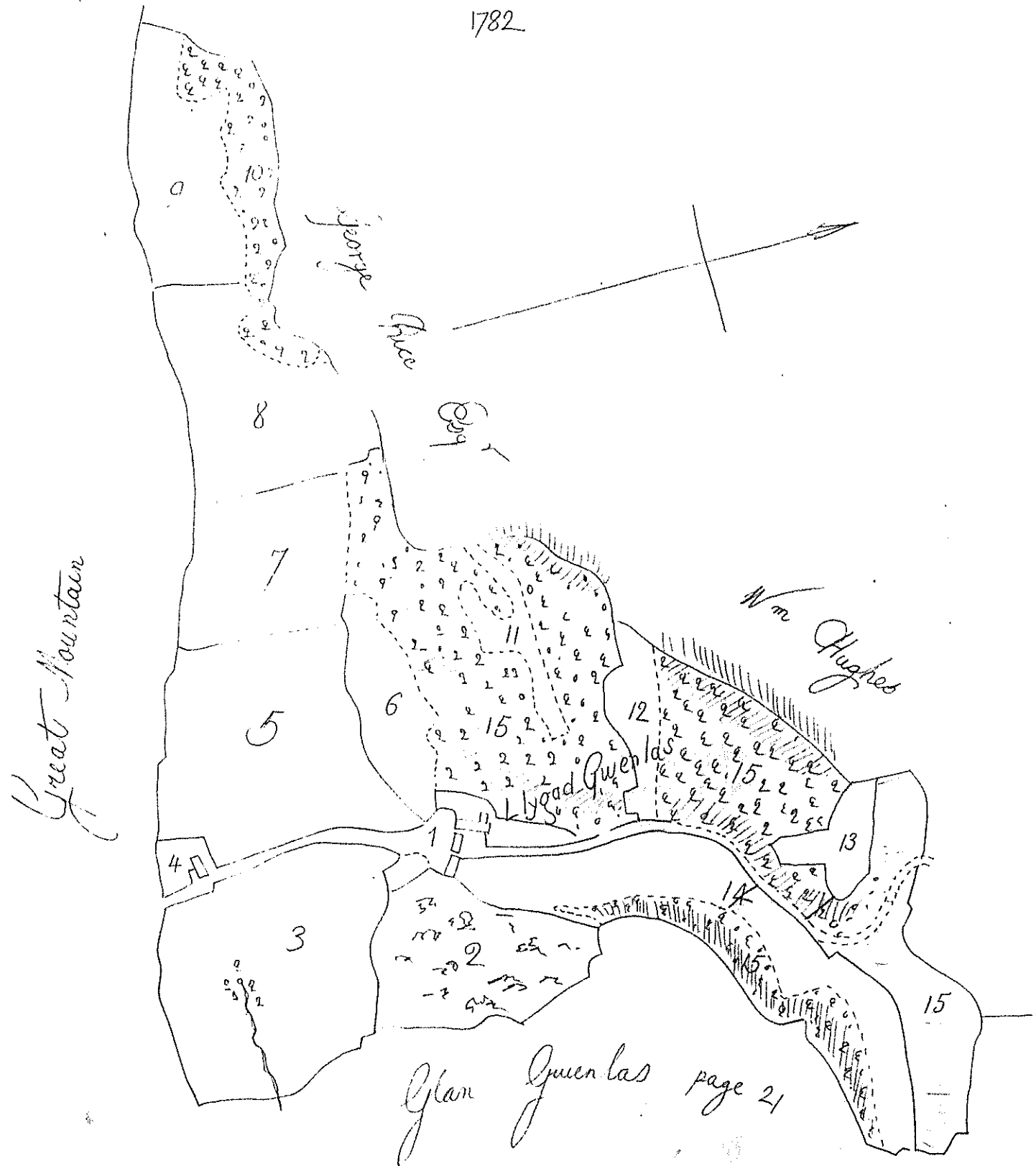
A novelty of the piece A belongs to
Wm Hughes of Llandilo fair

Candor 8660 B
p21.

Glan Gwentas 1782

Llygad Gwenlas

1782



CRO DYNFOR MAP BOOK 5 p. 74

- | | | |
|----|---------------------|--------|
| 1 | Cae'r Maen hir | arable |
| 2 | Cae'r Maen hir ylla | " |
| 3 | — | " |
| 4 | — | past |
| 5 | — | " |
| 6 | — | " |
| 7 | Cae'r Maen hir | arable |
| 8 | Banc | past |
| 9 | Cae'r Maen hir | arable |
| 10 | wood in ditto | — |

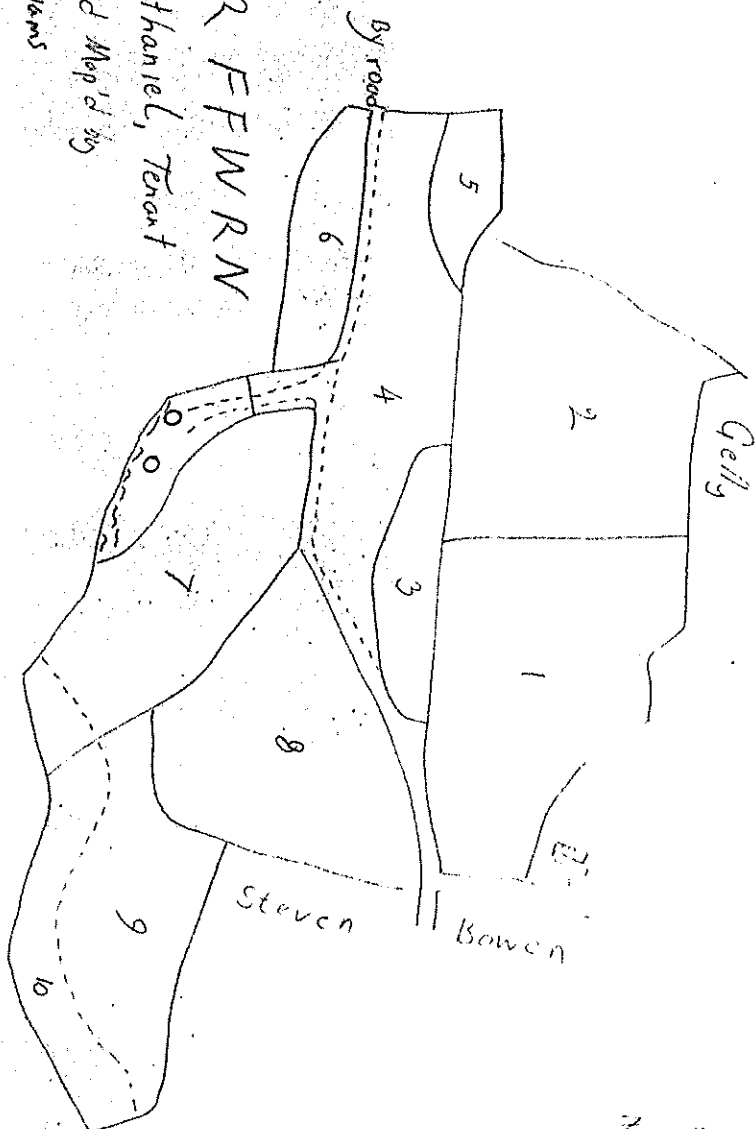
CAE'R FFWRN

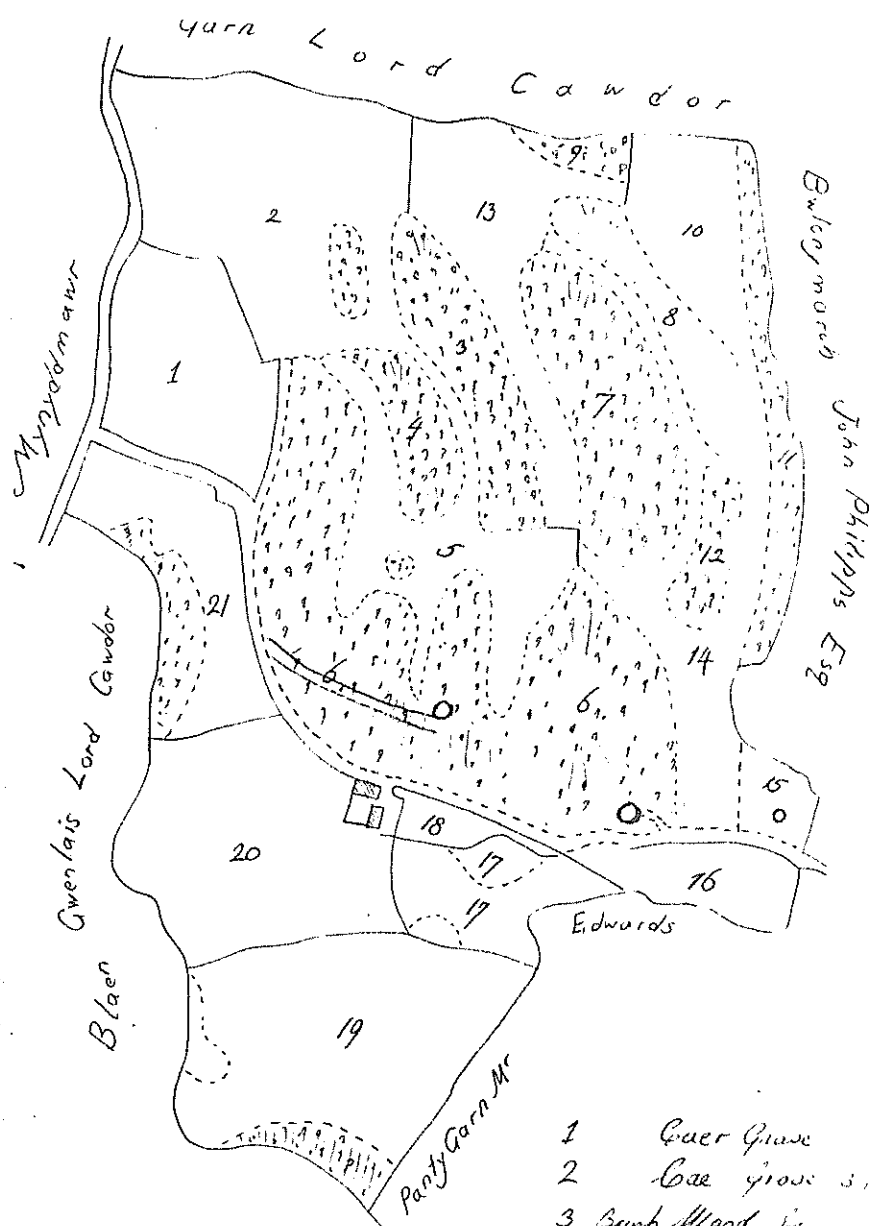
Daniel Nathaniel, Tenant

Surveyed and Map'd by

M. Williams

1860





8 = added by later hands

Bulche
or
Garn

1820

		u	h	p
1	Guar Grass	1	2	37
2	Coar Grass 3 1 2 3 4 0 0 25	3	2	8
3	Brush Wood f	1	0	36
4	do do	0	2	16
5	Slange	1	3	16
6	Brush Wood f	5	1	11
7	do do	1	3	8
8	do do	0	3	8
9		0	0	23
10 of 4	Rhandir fawr	2	3	28
11	Brush Wood	0	3	8
12	do do		1	20
13	Panty Teyn of Crofte	1	2	30
15	In the occupation of John Phillips Esq		1	16
16	Caebach	0	3	0
17	Caebach in 0 3 6 3 11 0 1 4	1	"	12
18	Houses of gardeners &	0	1	22
19	Caefannan 3 0 22 4 0 1 33	3	2	17
20	Grass & yew	3	0	0
21	Croft Pant 11 4 4 0 1 36	1	3	0
		33	2	36

Scale of furlongs

