

# Kilconquhar Loch, Fife: an historical and palynological investigation

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## SUMMARY

*Kilconquhar Loch in the East Neuk of Fife provides an unusual and distinctive feature of that area's landscape. Archival, geomorphological and palynological investigations reveal the loch's origins as lying in human exploitation of peat deposits combined with extreme natural events which culminated during the first millennium AD.*

## INTRODUCTION

Included among the growing number of specialists who are involved in modern archaeological excavations is the palynologist. The incidence of micro- and macro-fossils in the accumulated horizons on an archaeological site can provide vital information on the environment occupied by and the economic activity of its inhabitants: for example, the degree to which arboreal pollen is present in deposits will say much about the wooded status of the site and its environs. The level of occurrence of cereal and ruderal pollen will indicate the degree of involvement of the site's occupants in pastoral and arable farming; if the latter appears to be considerable then macro-fossils might well include cereal grains. All of this information is important in the final synthesis of evidence from an excavation but to realize its full potential it also needs a regional setting into which it can be fitted. The establishment of the status and changing nature of areal vegetation patterns is as important in the full interpretation of environment and economy as is the detailed evidence of those features which can be gained from the analysis of site-located material. To this end the palynologist seeks to provide more general environmental information.

In order to achieve this, however, it is necessary to have the right pollen-bearing deposits in an area. These are usually peat accumulations or water bodies containing continuous increments of mud. In western and upland Scotland the former is usually present and in many areas the latter also. In the eastern Lowlands of Scotland the activities of man, in an area which also has a more favourable climate, have rendered such conditions less likely to be found. The growth of peat was less than in the west and upland areas and the higher Lowland population densities, at least since the sub-Atlantic climate deterioration, have meant a high demand for it as fuel. Water bodies, due to the uneven topography of much of Scotland, abounded in the past. As part of the development of capitalist farming in the 18th century most of the shallow lochs were drained as landowners sought to increase their ploughland. The combined effect of fuel need and land hunger was the gradual extirpation of

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those features needed by the palynologist. Thus their continued existence in an area is a cause of much satisfaction but a satisfaction which often turns sour. This has been a frequent experience in an attempt to establish the nature of vegetation change in Fife. The extensive peat deposit of Moss Moran in the south (NGR NT 903 172) has clearly been much cut over and vital sections of the vegetation history are lost. The pollen in the centrally located Star Moss (NO 041 306) is frequently so badly damaged as to be unidentifiable. The cols in the Ochil Hills which have been over-deepened by ice action contain peat deposits but they have been truncated by human action (Cundill & Whittington 1983; Watkins 1984). The lochans of the Lomond Hills contain polleniferous sediments but they too have hiatuses. As a result any peat deposit or water body within Fife has to be approached by the palynologist with some trepidation.

In the East Neuk there occurs the only loch in the Fife Lowlands. To the north of Elie and at the foot of Kilconquhar village lies the Loch of the same name (NO 485 021). For the palynologist it provides an important potential site in an area for which the vegetational history is as yet not established.

## KILCONQUHAR LOCH AND ITS SETTING

### THE GENERAL SETTING

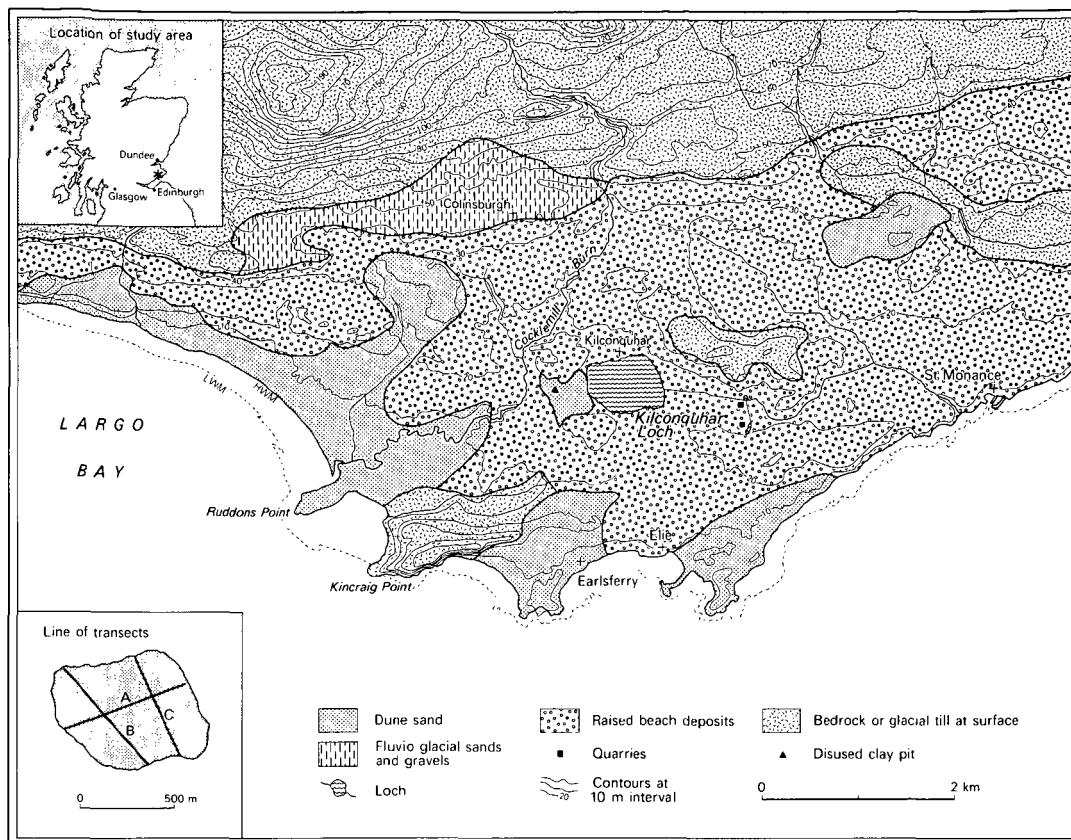
Kilconquhar Loch (illus 1) occupies a shallow depression on the coastal plain of south-east Fife. Despite its size (0.38 km<sup>2</sup>) its maximum depth is less than 1.5 m and its catchment only 2 km<sup>2</sup>. The loch surface is maintained at an elevation of 27 m OD by a weir at the outlet with drains southwards through a culvert.

The drift deposits of the coastal tract which provide the physical setting for the loch owe much of their origin and form to events associated with the decay of the last ice sheet. Below an elevation of about 30 m, glacial deposits have been modified at their surface by marine action during late-glacial and post-glacial phases of higher relative sea level. The resulting raised beach topography consists of gently rolling ground with surface spreads of sand and fine gravel. Close to Kilconquhar Loch these deposits appear to be thin, the underlying rock being exposed beneath about one metre of sand and gravel in shallow quarries at NO 502 013 and NO 501 016 and outcropping at the surface near Kilconquhar Church immediately to the north of the Loch. Elsewhere around the loch sands and gravels lie upon glacial till.

More recent deposits of windblown sand blanket large areas of the raised beach topography to the west of the loch and around the margins of Largo Bay (illus 1). According to Ritchie (1979) sand in the intertidal zone drifts eastwards in Largo Bay and accumulates near Ruddon Point (NO 455 005). From its initial accumulation on the beach the sand is remobilized by wind erosion and blown onshore by the prevailing south-westerly winds to become incorporated into hummocky dune ridges and links. The areas of windblown sand penetrate at least 2 km from the present shore and their distribution appears to reflect the funnelling effect of Kincaig Ridge on the south-westerly winds. Today much of the links area is afforested or stabilized by typical links vegetation.

### THE NATURE OF THE LOCH BASIN AND ITS DEPOSITS

The nature of the loch basin has been investigated by a series of borings across the loch along three traverse lines (illus 2). A Russian borer was used to obtain undisturbed cores of sediment at each location for which the stratigraphy has been recorded. At two locations (illus 2 a and b) material was retained for pollen analysis and a more detailed examination of the sediments. The sediments may be divided into three units:



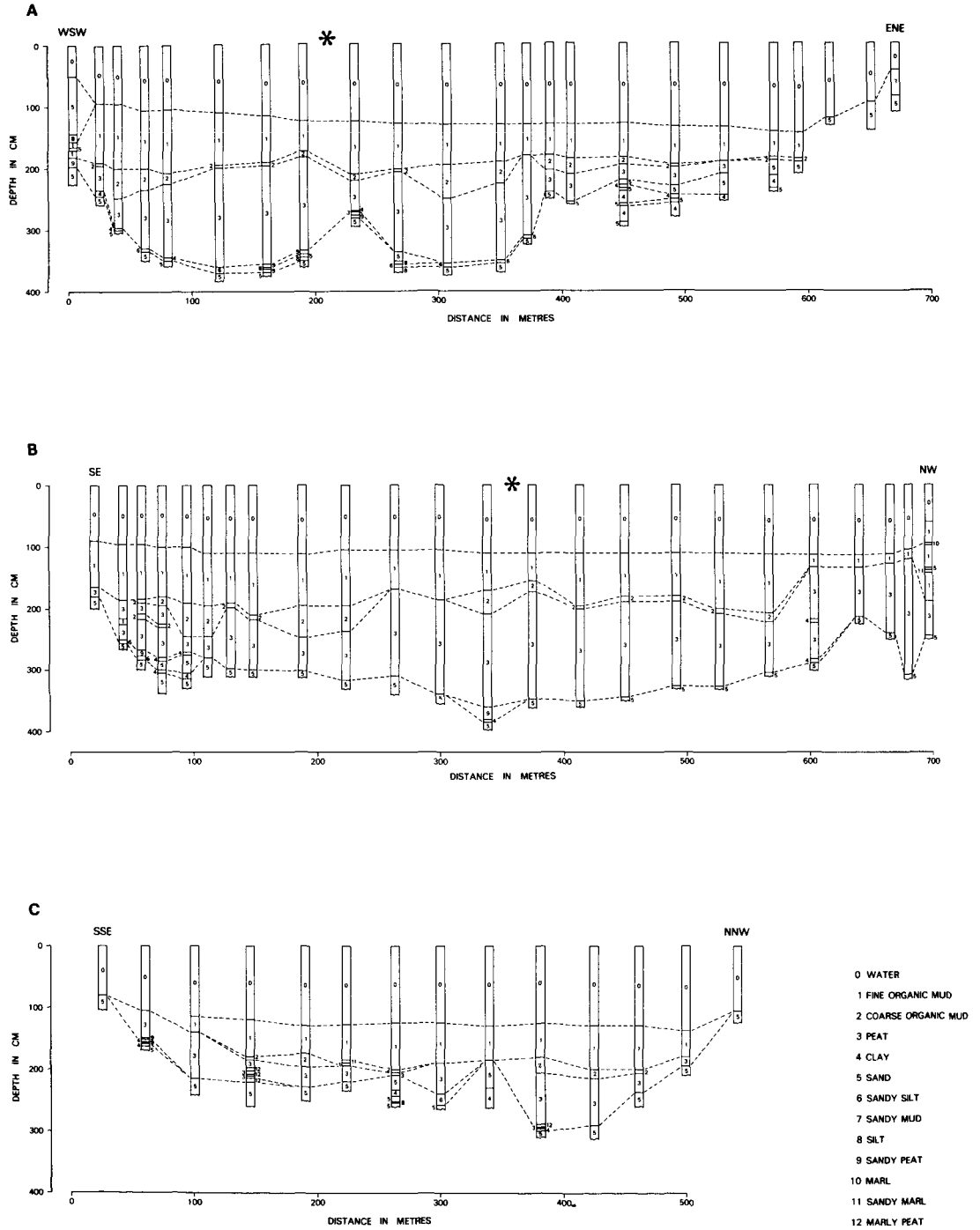
ILLUS 1 The location of Kilconquhar Loch and the nature of its physical surroundings

### (i) Unit 1: Basal sands and gravels

This unit defines the shape of the loch basin. It was difficult to penetrate by hand borer, consisting of sand and fine gravel with occasional angular fragments of sandstone. In one or two localities the basal sands are covered by a thin veneer (less than 10 cm) of pink/grey silty clay; lenses of similar material were also found within the sands where deep penetration was possible. Forsyth and Chisholm (1977) report the same features in deposits of raised beach origin in south-east Fife. This lowest unit of material in the loch is thought to represent unmodified deposits of a probable late glacial age and raised beach origin although there are no indicators of marine activity.

### (ii) Unit 2: Peat

Unit 2 comprises a compact peat layer up to 150 cm thick with a sharp contact at both upper and lower surfaces. The upper contact has a very irregular elevation which bears no relationship to the under-lying topography. Rare silty clay bands occur within the peat and appear to represent sedimentation associated with streams which flowed through or across the peat surface at some stage during its growth. This unit is thin or absent in the north-eastern sector of the loch basin where the basal sediments lie at a higher elevation than elsewhere. This unit appears to be the remains of an ombrogenous peat accumulation. The lack of differentiation within it suggests a continuous



ILLUS 2 The stratigraphy of the sediments in Kilconquhar Loch. The transects used to establish this are shown on illus 1. The asterisks on transects A and B indicate the position from which cores were obtained for the pollen analysis

accumulation from its initial formation. The irregular upper surface and its sharp contact imply a major hiatus in the conditions of sediment accumulation in the loch basin.

### (iii) Unit 3: Organic lake muds

The sediments of unit 3 are up to 150 cm thick and are the most recent deposits within the loch. In many locations this unit may be sub-divided into coarse and fine facies with a merging boundary. The lower coarser material appears to have accumulated preferentially in hollows on the peat surface which are best developed in the south and west of the basin. Both elements consist of poorly consolidated silty organic material with occasional molluscan shell fragments and represent allochthonous and biogenous sediments associated with deposition in a water body. The coarser material formed the initial sedimentation, possibly in a loch of restricted size and depth compared with that of today. This is overlain by the finer sediment, the change in texture reflecting either a diminution in the supply of coarse material from the catchment area or an increase in water depth compared with the earlier stages.

Infilling of the irregular peat surface has proceeded to the extent that today more than 90% of the loch bed lies between 100 and 150 cm below the water surface. The remaining 10% of the bed forms the littoral zone which is largely devoid of recent sediments because wave activity in the shore zone is sufficiently intense to inhibit sedimentation. Wave activity appears to be related to the prevailing south-westerly winds since the south-western shore, which is sheltered by trees, has mud deposits right up to the loch side.

## THE ORIGIN OF THE LOCH

### A POSSIBLE ORIGIN

The most surprising feature which emerged from the series of cross sections obtained from the loch basin was to find that beneath the expected muds there lay extensive deposits of peat; apart from the eastern margins it is practically ubiquitous although of varying depths. The immediate consequence of this discovery was the elimination of the loch as a water body of any great age. The nature of the peat surface (illus 2) also suggested that the whole deposit, like others already referred to elsewhere in Fife, had been subjected to the activities of fuel gatherers, presumably from the settlements of Kilconquhar and Balclevie (the latter was removed in 1760). If this were to be the case Kilconquhar Loch would fall into the same category, as far as origins are concerned, as the Broads of East Anglia (Lambert *et al* 1960). Support for this comes from the first *Statistical Account of Scotland* (Small 1790-1, 294-5):

‘There is a beautiful piece of water on the south of the village of Kilconquhar, commonly called Kilconquhar Loch, almost  $\frac{1}{4}$  of a mile in length, and about  $\frac{1}{4}$  of a mile in breadth. The Loch was originally called Redmire, from which much fuel was got, as peat and turf. It had a drain west-ward to the sea. There is a tradition here, that in the year 1624 or 1625, the drain was filled up with sand driven by a violent gust of wind from the sea, and that the water, thus stopped in its course, became a lake.’

This statement, although clearly a folk-memory, does serve as a hypothesis for the origin of the loch. Before that can be accepted, however, there are many facts which need to be established.

### THE PEAT DIGGING

The importance of peat to a local economy made it a valuable asset, and it was, as a result, listed in land grants. It might be expected, therefore, that the occurrence of peat digging in the vicinity of Kilconquhar would be listed among the assets of properties entered in the *Register of the Great Seal*

(*Registrum Magni Sigilli Regum Scotorum*, 1306–1659). Although the name of Kilconquhar occurs as early as 1548 there is no mention of any kind of fuel there until 1592:

‘confirmavit . . . terras de Balneill cum carbonibus in parochia de Kilconcher, vic. Fyiff’ (*RGS* 2100, 716).

Despite this reference to coal it is clear that peat digging also occurred in the area for in the same grant is stated:

‘de novo dedit dictis personis dict. terras de Balneill, cum communi pastura et libertate, lucrandi *lie feuall, fail, fail et dovett in Firthmure*’ (*RGS* 2100, 716).

In 1603 ‘Firthmure’ is again mentioned and also:

‘. . . cum communis pastura et libertate lucrandi *lie feuall, turvis, fail et dovettis* in mora nuncupata Schyremure, in parochia de Kilconquhar, senesc. et vic. de Fyiffe’ (*RGS* 1405, 497).

Nowhere under Kilconquhar is any reference made to peat cutting at a location called Redmire. In the adjacent lands of Carmurie in the Barony of Ardros, however, there is a revealing statement involving the name of Redmire. In 1599 the Register states regarding a boundary:

‘viz. begynnand at that part of the south syde of the gret loch callit of auld the Reedmyre’ (*RGS* 874, 284).

So part of the statement earlier alluded to from the first *Statistical Account* appears to be true. The loch was once called Redmire. Its origin is clearly earlier than 1624 or 1625 but as yet there is no certainty that it was once a turbary nor that it resulted from a catastrophic event. Reference to the loch in exactly the same terms as for 1599 occurs again in 1615, 1643 and 1652. Earlier, reference was made to the Norfolk Broads, and, just as there, there is found recorded for the loch at Kilconquhar in 1617:

‘de terras et dominis de Kilconquhair, cum lacu et piscationibus ejusdem’ (*RGS* 1550, 589).

Turbary, as yet unproved, gave way to piscatory.

#### THE OUTLET

The statement by Small in 1790 averred the origin of the loch to lie in the damming of Redmire’s drainage channel by windblown sand. This channel conducted the water westwards into the Cocklemill Burn and certainly between that Burn and the western end of the loch there is today a considerable deposit of sand (illus 1). By 1598, however, it is clear that there was a major outlet from the loch, just as today, but southwards towards Elie. The *Register* refers to it:

‘. . . cum libertate piscandii in dicto lacu, et latitudinem 20 pedum dict. terrarum de Balclavie adjacentum dicto magno aqueductui ex orientali latere et secundum dictum latus ad Pedgicroft, et latitudinem 12 pedum de Balclavie adjac. dicto lateri dicti aqueductus a dicto vado ad dictum *lie auld dyk*, cum potestate to *cast and clenge* dict. *lie loches et myris* promeliore ducta aquarum per dictas aqueductus *als deip and wyde* quantum satis esset ad optimum conductum aque, et eosdem purgandi, et reparandi cum *lie fail, dovattis et lie uther materiallis* dict. terrarum de Balclavie . . .’ (*RGS* 874, 286).

The description here sounds like an artificial waterway rather than a natural stream and one which is deliberately well maintained. The earliest representation of this area cartographically is by Blaeu (1654) but neither Kilconquhar nor the Loch is shown. Moll (1725) records the loch but no outlet is indicated. Roy’s Map (c 1749) not only shows the loch, ‘Kinconquer’ and ‘Booths’ (Balclavie) but also a sinuous outlet from the loch flowing into the sea at Elie. That this outlet was

artificial and managed is suggested by the presence of a water-driven mill at Elie in 1584 and there are later references to the 'mylne dam and mylne leid' as in the confirmation of a grant to Thomas Dishington in 1598 (SRO, GD147/Box 6/Carmurrie). The tenants were also thirled to Elie Mill and had to 'contribute to the Uphold and maintenance of my milne leads and milne' (SRO, 1715, GD147/Box 9/Buchlivie). However, such documentary references to maintain the mill and its lead disappear in the late 18th century.

#### THE PALYNOLOGY OF THE LOCH DEPOSITS

When referring earlier to the problem of finding suitable sites which would allow the determination of Fife's vegetation history, allusion was made to the hiatuses which exist in many of the deposits used in such work. If peat digging had occurred at Redmire before Kilconquhar Loch existed then such a hiatus must also occur there. An analysis of the pollen content of the loch deposits would allow the clarification of the nature of the peat, an important factor in its suitability for fuel, whether any of it had been removed and also whether any further light can be shed on the possible date of the flooding of this supposed turbary.

Two cores were obtained from the loch; one from a point where the peat was shallow and a second where it approached maximum thickness. The pollen spectra of the two cores are shown in illus 3 and 4. A description of the pollen assemblage zones into which these spectra may be divided is given first and then a discussion of their significance is undertaken.

The pollen diagrams have been zoned into local pollen assemblages which are biostratigraphical units, being subjectively derived in the first instance from the pollen and spore content of the spectra. These divisions were, however, confirmed by the results obtained from the use of SPLITINF and COSLINK pollen-zoning computer programs (Gordon & Birks 1972). Each length of the profile characterized by a pollen assemblage is numbered from the bottom of the core and prefixed by the site code KL.

#### Kilconquhar Loch Core I

The diagram from this site has been divided into five main local pollen assemblage zones (LPAZ), one of which is further subdivided. Individual aquatic pollen/spore percentages are derived from the sum of the total aquatic pollen/spores plus the total land pollen at any one level.

##### *KL1a(i) (Below 186cm) Cyperaceae LPAZ*

Herb pollen is over 90% with Cyperaceae pollen the dominant type with values up to 80%. Gramineae pollen is 20%.

##### *KL1a(ii) (186–180 cm) Cyperaceae LPAZ*

Herb pollen is over 90%. Cyperaceae pollen is dominant rising to 92%. Gramineae pollen is always less than 20%. *Equisetum* spores reach 80%. *Typha latifolia* pollen appears.

##### *KL1a(iii) (180–172 cm) Cyperaceae LPAZ*

Herb pollen values are 80%. Cyperaceae pollen declines to 48%. Gramineae pollen rises to 28%. *Betula* and *Pinus* pollen enter as does *Artemisia* pollen which peaks (10%) in this zone. *Equisetum* spores having declined throughout the previous zone rise to a peak (64%) as do pollen of *Typha latifolia* (64%) and *Typha angustifolia/Sparganium* (20%).

##### *KL1a(iv) (172–164 cm) Cyperaceae LPAZ*

Herb pollen values are 70%. Cyperaceae pollen dominates (72%). Gramineae pollen declines (8%). *Pinus* pollen achieves its highest value (8%) and *Betula* pollen continues to rise. *Juniperus* pollen appears and peaks (8%). *Equisetum* spores having declined from a peak at the base of the previous zone peak again (40%) along with pollen of *Typha latifolia* (16%) and *Menyanthes* (14%).





*KL1b (164–104 cm) Gramineae-Coryloid-Cyperaceae LPAZ*

Herb pollen values are mainly over 60%. Gramineae pollen rises quickly to a virtually constant 24%. Cyperaceae pollen declines from 72% in the previous zone to 16% and maintains that level. *Coryloid* pollen rises immediately and maintains 10% value. *Alnus*, *Quercus* and *Ulmus* pollen enter, as does that of a wide range of herbaceous species including *Cerealia* and *Cannabis sativa*; the latter two species maintain a continuous presence in the zone. *Potamogeton* pollen, *Sphagnum* and *Filicales* spores all develop continuous curves (10%). *Equisetum* spores, *Typha latifolia* and *Typha angustifolia/Sparganium* pollen totals all collapse.

*KL1c (104–44 cm) Gramineae LPAZ*

Herb pollen is up to 80%. Gramineae pollen (up to 36%) dominates the pollen spectra. Cyperaceae and *Coryloid* pollen decline continuously. *Cerealia*, *Cruciferae* and *Plantago lanceolata* pollen increase. *Cannabis sativa* pollen peaks (8.6%). *Myriophyllum spicatum* pollen rises above 2% and along with *Potamogeton* pollen and *Sphagnum* and *Filicales* spores provide continuous curves.

*KL1d (44–24 cm) Gramineae LPAZ*

Herb pollen is up to 80%. Gramineae (over 40%) increases its dominance. Apart from *Ranunculaceae* pollen that of all other herbaceous species shows a continuous decline. *Myriophyllum spicatum* pollen increases (12%) but *Potamogeton* pollen and *Sphagnum* and *Filicales* spores all decline.

*KL1e (24–4 cm) Gramineae-Ranunculaceae LPAZ*

Herb pollen is 70%. Gramineae pollen maintains its previous level. *Ranunculaceae* pollen rises to a peak (45%). *Ulmus* (8%) and *Fagus* (4%) pollen achieve maxima. *Pinus* pollen maintains levels (4%) developed in KL1d. Only *Myriophyllum spicatum* and *Potamogeton* pollen are important (up to 5%) among aquatic species.

The most striking feature of the pollen diagram obtained from Kilconquhar Loch Core I is the sharp hiatus which occurs at 164 cm. Below this level LPAZ KL1a displays features which appear to belong mostly to the vegetational history of the Late Devensian period (pre-10300 BP). The pollen spectra are dominated by Gramineae and Cyperaceae pollen while the low totals of arboreal pollen indicate predominantly treeless conditions. It is significant that thermophilous tree species are not represented and even *Coryloid* pollen is barely present; the occurrence of *Salix* pollen probably indicates the existence of local scrub willow. Dryland vegetation is represented by *Artemisia*, *Rumex* and *Filipendula* while the occurrence of *Juniperus communis* indicates that temperatures were beginning to ameliorate as the level of the pollen hiatus is approached. The existence of waterlogged ground is indicated by the high percentage of the pollen of *Menyanthes*, *Typha latifolia* and *Typha angustifolia/Sparganium* and of *Equisetum* spores. LPAZ KL1a indicates the existence of a boggy hollow with areas of open but shallow water which has accumulated on the impervious material of the depression on the raised beach.

All the LPAZs above the hiatus, ie above 164 cm, are spectacularly different from that below. They are dominated by Gramineae and *Coryloid* pollen and have a wide range of herbaceous pollen types. Several features are worthy of careful note : thermophilous tree species such as *Ulmus*, *Quercus*, *Fagus* and *Fraxinus* occur from the base of zone KL1b, the first after the hiatus; *Cerealia* pollen is continuously present from the hiatus upwards; another cultivated plant, *Cannabis sativa* (for the separation of this species from *Humulus lupulus* see French and Moore 1986), is immediately present and accompanied by the weeds of cultivation such as *Centaurea cyanus*, *Polygonum convolvulus* and *Rumex acetosella*. Clearly a major change has occurred in the landscape and it is coincident with the alteration in the pollen-containing matrix; below the hiatus it is peat while above it is organic mud. This change is also reflected in the pollen of aquatic species. At 164 cm the bog-inhabiting plants such as *Typha* and *Equisetum* are severely curtailed, being replaced by species such as *Potamogeton* and *Myriophyllum spicatum*. At this level Redmire must have become Kilconquhar Loch.

## Kilconquhar Loch Core II

It is noticeable in illus 2 that the depths of peat recorded under the muds of the loch are very variable. In Core I the complete vegetational history of this area is clearly not fully represented. The nature of the LPAZ immediately above the hiatus means that it cannot be any older than 5300 bp, a date before which

arable farming on the scale and intensity indicated here could not have occurred. Thus it appears that at least 5000 years of peat deposition is missing. An investigation of one of the deeper peat accumulations might reveal a different situation and so a second core was taken and in the deeper peat. The pollen spectra for Core II are shown in illu. 4. They have been divided so as to provide LPAZs; six of these are identified, three also being subdivided.

*KLIIa(i) (Below 244 cm) Cyperaceae LPAZ*

Herb pollen is over 80%. Cyperaceae dominates with up to 50%. Gramineae pollen rises to 20%. *Pinus* (10%), *Rumex* (8%), *Compositae tubuliflorae* (6%) and *Betula* (5%) pollen make significant contributions. *Equisetum* spores rise to 16% and *Potamogeton* pollen has values of 5%.

*KLIIa(ii) (244–224 cm) Cyperaceae LPAZ*

Herb pollen is 90% at the start of the zone but falls to 50%. Cyperaceae pollen dominates rising to a peak of 87% but falling to 40%. Only Gramineae and *Rumex* pollen make other significant contributions. *Potamogeton* (rising to 48%), *Typha latifolia* (42%) and *Typha angustifolia/Sparganium* (9%) pollen are important along with *Equisetum* spores (12%).

*KLIIa(iii) (224–205 cm) Cyperaceae LPAZ*

Herb pollen rises back to 80%. Cyperaceae pollen increases to 60% and dominates. *Betula* pollen reaches 10%, *Pinus* pollen 20% but both then decline. *Empetrum* pollen enters, reaching 15% before falling to less than 2%. Gramineae pollen falls continuously from 35% to 12%. *Typha latifolia* pollen is 92% at the start of the zone but falls to less than 2% while *Equisetum* spores fall from 80% to 50%.

*KLIIa(iv) (205–195 cm) Gramineae LPAZ*

Herb pollen falls continuously to 50%. Gramineae pollen peaks at 35%. *Filipendula* pollen rises to 17%. *Empetrum* pollen peaks again (17%) and *Betula* pollen (up to 13%) becomes important. *Menyanthes* pollen achieves 44% and *Equisetum* spores peak at 40%.

*KLIIb(i) (195–167 cm) Betula LPAZ*

Arboreal pollen rises to 67%. *Betula* pollen dominates peaking at 60%. *Salix* (13%) and *Juniperus communis* (11%) pollen are important while *Filipendula* pollen maintains a level of 7%. *Menyanthes* pollen (20–40%) and *Equisetum* spores, peaking at 35%, remain significant. *Dryopteris* spores achieve a continuous curve reaching 20%.

*KLIIb(ii) (167–135 cm) Betula-Cyperaceae LPAZ*

Herb pollen recovers to a peak of 60%. *Betula* pollen, always over 20%, reaches 50% while Cyperaceae pollen peaks at 60% but falls again to 30%. *Pinus* pollen is up to 10% and *Coryloid* pollen enters achieving 15% before falling. *Dryopteris* spores start at 20% but fall to less than 2%. *Filicales* spores increase, reaching 14%. *Menyanthes* pollen and *Equisetum* spores virtually disappear.

*KLIIc (135–115 cm) Coryloid LPAZ*

Shrub pollen reaches 80%. *Coryloid* pollen rises continuously to peak at 80%. *Betula* pollen fluctuates between 15–30%. Cyperaceae pollen falls from 30% to 5%. *Filicales* spores decline from 20–10%.

*KLII d (115–70 cm) Coryloid-Cyperaceae LPAZ*

Herb pollen fluctuates between 40–70%. *Coryloid* (15–60%) and Cyperaceae (7–4%) pollen fluctuate reciprocally. *Filicales* spores reappear and rise to 23%. Thermophilous arboreal species enter.

*KLIIe (70–55 cm) Coryloid LPAZ*

*Coryloid* pollen is totally dominant and peaks at 95%.

*KLII f(i) (55–34 cm) Coryloid-Gramineae LPAZ*

Herb pollen achieves 40%. *Coryloid* pollen is steady at 40%. Gramineae pollen rises to 20%.



*Filicales* spores peak at 60% and decline. *Cerealia* and *Cannabis sativa* pollen enter along with that of *Centaurea cyanus*, *Polygonum convolvulus* and *Rumex acetosella*.

#### KLII(ii) (34–20 cm) Gramineae LPAZ

Herb pollen reaches 80%. Gramineae pollen rises to 35%. Pollen of *Cerealia* (5%) and *Cannabis sativa* (7.1%) achieve continuous curves. Cruciferae (6%) and *Rumex acetosella* (3%) pollen represent important ruderals. *Potamogeton* (5–10%) and *Myriophyllum spicatum* (5–18%) pollen reassert the aquatic species.

The marked hiatus isolated in Kilconquhar Loch Core I is also revealed by the second set of pollen spectra (illus 4). In this case it differs in being nearer the surface at 55 cm instead of 164 cm; it should be noted, however, that the top 20 cm of the fine organic mud were too saturated to allow its collection. Where Core II really differs from Core I is in the depth of peat present and this gave rise to the hope that a longer record of the area's vegetation history might be recovered. Zone KLIIa, like KLIa in Core I, belongs to the Late Devensian period, the local conditions again being treeless on dry land while a bog with pools of open water existed on the site of the future loch. Before the hiatus in Core I there was a hint of climatic amelioration and this is confirmed and extended in Core II. In Zone KLIIb *Juniperus communis* peaks twice as is common in most Scottish pollen diagrams and marks the temperature increase which followed the period after the Loch Lomond Stadial. Thus the peat accumulation at this site is more complete and indeed this is further confirmed by the occurrence of the normal vegetational succession sequence of *Betula* rise (LPAZ KLIIb(i)), *Coryloid* rise (LPAZ KLIIc) and thermophilous tree (*Ulmus*, *Quercus* in LPAZ KLIIId) entry. During this time peat growth at the site had reached 1.20 m and the virtual absence of aquatic or bog-inhabiting plants indicates the closing over and extinction of the water-filled hollows. The sequential migration of arboreal species into the area around 'Redmire' should have been continued by the arrival of *Alnus* but this tree is not recorded; thus the peat has been truncated at a date prior to 7100 bp (SRR-2623), a date by which *Alnus* is known to have achieved a significant presence in Fife. Indeed the truncation could have been even earlier because the pollen spectra for Core II do not show either *Ulmus* or *Quercus* as having achieved a continuous level of over 2% before the hiatus occurs and yet both species elsewhere in Fife had recorded this level by 7660 bp (SRR-2624). The top of LPAZ KLIIe must therefore be at least as old as that date.

The pollen record above the hiatus in Core II is similar to that in Core I. An increasing wetness in LPAZ KLIIf is shown by the growing presence of the pollen of *Myriophyllum spicatum* and *Potamogeton* and of *Sphagnum* spores. The dry-land species are dominated by Gramineae and *Coryloid* pollen and have the same wide range of herbaceous pollen types including the same cultivated plants, ruderals and thermophilous trees. Once again the hiatus coincides with the change in the Loch's sediment from peat to mud.

Thus apart from the survival of a greater depth of peat, the site of Core II reveals the same characteristics as the site of Core I. At both sites long periods of vegetation history are not recorded: for Core I from c 9000 bp to at least 5000 bp; for Core II from pre-7660 bp to at least 500 bp. The matrix which would have contained this history is absent. A further core examined by students in the Geography Department in the University of St Andrews showed exactly the same results, with, in this case, the hiatus at a level between those of Cores I and II. Doubtless other cores would reveal the same pattern.

## CONCLUSION

That Redmire existed and served as a source of '*feull, turvis et dovet*' can no longer be in doubt; the attractive upper *Sphagnum* peat has been cut and the faster burning lower Cyperaceae peat largely left untouched. What still remains to be established is how and when the transformation into Kilconquhar Loch occurred. From evidence in the *Register of the Great Seal* it is clear that the loch was in existence in 1599. A tombstone in Kilconquhar churchyard records the death in 1593 of James Bellenden, drowned while skating on the loch, and certainly by 1598 the southern 'aqueduct' was already a well-maintained feature.

The folk-memory of Redmire as a turbary has already been shown to be supportable by the exceedingly uneven nature of the peat surface under the loch muds and the gaps in the vegetation

history. Perhaps, therefore, the other part of the folk-memory should be investigated further – the damming of the stream which drained the bog westwards into the Cocklemill Burn. Reference has already been made to the sand deposits in this area (illus 1). With a Russian borer, several attempts were made to penetrate those located between the western end of the loch and the Cocklemill Burn and eventually success was achieved. At a depth of 310 cm the sand gave way to a mud deposit which extended to 358 cm before sand was again encountered. This mud was subjected to pollen analysis and produced the pollen diagram of Kilconquhar Loch III, shown in illus 5. It divides into just one LPAZ with two sub-zones:

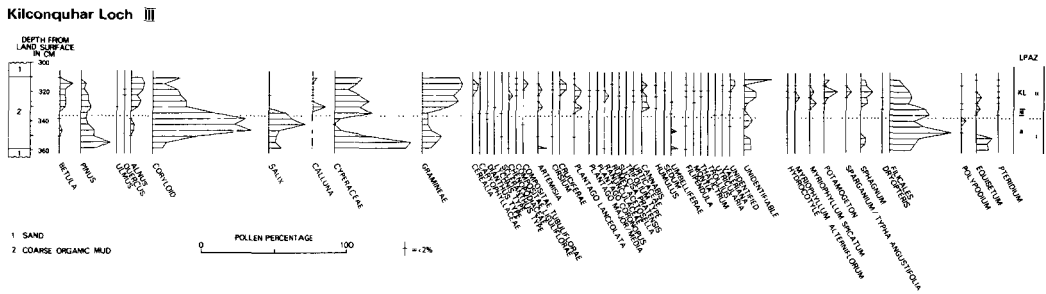
*KLIIIa(i) (358–336 cm) Cyperaceae-Gramineae LPAZ*

Herb pollen falls from 70–10%. *Coryloid* pollen rises from 7 to over 70% while Gramineae pollen falls from 50 to 4%. *Filicales* spores are always over 15%.

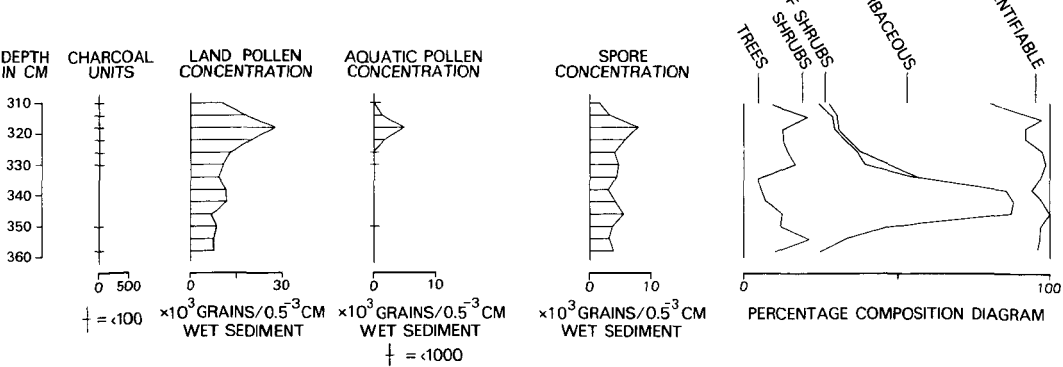
*KLIIIa(ii) (336–310 cm) Gramineae-Cyperaceae-Coryloid LPAZ*

Herb pollen rises continuously to 70%. Gramineae pollen increases to 25%. Cyperaceae pollen is mostly over 10% while *Coryloid* pollen declines from 40–15%. *Cerealia* and *Cannabis sativa* pollen enter accompanied by ruderals such as *Artemisia*, *Cruciferae* and *Rumex acetosella*.

The discovery of this mud was extremely fortuitous and important. It first of all demonstrated that a sand blow had overwhelmed the western end of the Redmire. Furthermore, that it had occurred at a time just after the entry was made into the pollen spectra by *Cannabis sativa* which has a continuous presence immediately after the hiatus in Core I. Thus there is a close relationship between the boundary which divides KLIIIa into two sub-zones and the beginning of mud deposition in the



**Kilconquhar Loch III**



ILLUS 5 The pollen diagram for Kilconquhar Loch Core III

loch. The sudden appearance of the pollen of *Cannabis sativa* is a common feature in many pollen diagrams and shows a consistent date of entry. It has been dated as being prior to 920 bp (UB-2291) for a site, Black Loch (NO 262 149), in the Ochil Hills of Fife. The conversion of Redmire into Kinconquhar Loch must therefore have occurred near that date. It is perhaps surprising that such an early event should have persisted as a folk-memory up to 1791. On the other hand, however, peat digging does have a long recorded history in this area. Wood (1862, 21) quotes a rescript of 1295 to a dispute dating from 1250:

'At Kilconath, Sunday next before the feast of St. Margaret, 1295, William Bishop of St. Andrews orders the rector of the church of Abercrombie and chaplain of the parish of Kilconath to admonish Walter de Bigerton, Laird of Kincaig, from casting peats in the muir of the hospital of Earlsferry, and from carrying away the peats of Osanna, prioress of North Berwick, and of the nuns . . .'

There is every reason to believe that peat cutting has had a very long history, especially in the coastal zone where exposure to wind, salt spray and a high population density would have meant that tree cover would never have been high once the original Neolithic forest clearance had occurred. Furthermore, the very early date proposed here for the conversion of Redmire into Kilconquhar Loch would explain why areas of turbarry such as 'Firthmuire' and 'Schyremuire' were repeatedly referred to in land grants whereas Redmire, as an active rather than a former turbarry, is never even mentioned.

In the introduction to this study it was stated that the palynologist approaches his potential source of information with trepidation. The case of Kilconquhar Loch has done nothing to dispel such a feeling. There is, however, the consolation here of having shed light on one of the most striking features of the landscape of the East Neuk of Fife.

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#### APPENDIX 1

##### THE COMMON NAME EQUIVALENTS OF THOSE PLANTS MENTIONED IN THE TEXT AND THE POLLEN DIAGRAMS

*Acer*: Sycamore.

*Alisma*: Water Plantain.

*Alnus*: Alder.

*Anthemis* type: includes eg Chamomile, Yarrow, Ox-eye Daisy, Corn Marigold.

*Artemisia*: Mugwort.

*Bellis* type: includes eg Daisy, Ragwort, Fleabane, Bur-Marigold.

*Betula*: Birch.

*Calluna*: Ling.

*Caltha*: Marsh Marigold.

*Campanulaceae*: includes eg Bell-flower, Harebell.

*Cannabis*: Hemp.

*Carduus*: includes eg Welled Thistle, Nodding Thistle.

*Centaurea cyanus*: Cornflower.

- Centaurea nigra*: Knapweed.  
*Cerealia*: includes the cultivated grains eg wheat, barley, oats.  
*Cerastium* type: includes eg Chickweed, Mouse-ear, Sandwort.  
*Chamaepericlymenum suecica*: Dwarf Cornel.  
*Chenopodiaceae*: includes eg Fat Hen, Goosefoot, Glasswort.  
*Cirsium*: includes eg Spear Thistle, Meadow Thistle, Creeping Thistle.  
*Coryloid*: includes eg Hazel and Bog Myrtle.  
*Cruciferae*: includes eg Cress, Rocket, Scurvy Grass, Mustard, Charlock.  
*Cyperaceae*: includes eg Sedge, Club-rush, Cotton-grass.  
*Cystopteris*: Brittle Bladder-fern.  
*Dianthus* type: includes eg Champion, Pink.  
*Drosera*: Sundew  
*Empetrum*: Crowberry.  
*Epilobium*: Willow Herb.  
*Equisetum*: Horsetail.  
*Ericales*: includes Cross-leafed Heath, Purple Heather.  
*Fagus*: Beech.  
*Filicales*: Fern.  
*Filipendula*: Meadowsweet.  
*Fraxinus*: Ash.  
*Glaux*: Sea Milkwort.  
*Gramineae*: Grass.  
*Hedera*: Ivy.  
*Helianthemum*: Rockrose.  
*Humulus*: Hop.  
*Hydrocotyle*: Marsh Pennywort.  
*Juniperus*: Juniper.  
*Linum bienne*: Pale Flax.  
*Lychnis* type: includes eg Ragged Robin, Champion, Corn Cockle.  
*Lycopodium annotinum*: Interrupted Clubmoss.  
*Menyanthes*: Bogbean.  
*Montia*: Water Blinks.  
*Myriophyllum alterniflorum*: Alternate-flowered Milfoil.  
*Myriophyllum spicatum*: Spiked Water Milfoil.  
*Nymphaeae*: White Water Lily.  
*Oxyria* type: Dock.  
*Picea*: Norwegian Spruce.  
*Pinus*: Pine.  
*Plantago coronopus*: Buck's-horn Plantain.  
*Plantago lanceolata*: Ribwort Plantain.  
*Plantago major/media*: Great Plantain and Hoary Plantain.  
*Plantago maritima*: Sea Plantain.  
*Polygonum amphibium*: Amphibious Persicaria.  
*Polygonum convolvulus*: Black Bindweed.  
*Polypodium*: Polypody.  
*Potamogeton*: Pondweed.  
*Potentilla* type: includes eg Cinquefoil, Silverweed, Tormentil.  
*Primulaceae*: includes eg Primrose, Cowslip, Loosestrife, Pimpernel.  
*Pteridium*: Bracken.  
*Quercus*: Oak.  
*Ranunculaceae*: includes eg Buttercup, Crowfoot, Spearwort.  
*Roseaceae*: includes eg Rose, Bramble, Cherry, Avens.  
*Rubiaceae*: includes eg Bedstraw, Sticky Willie.  
*Rumex acetosa*: Common Sorrel.  
*Rumex acetosella*: Sheep's Sorrel.  
*Salix*: Willow.

*Scleranthus* type: Knawel.  
*Scrophulariaceae*: includes eg Toadflax, Speedwell, Eyebright, Figwort.  
*Sedum acre*: Wall Pepper.  
*Sparganium/Typha angustifolia*: Bur-reed or Narrow-leaved Reedmace.  
*Sphagnum*: Sphagnum Moss.  
*Stellaria* type: Stitchwort.  
*Succisa pratensis*: Devil's-bit Scabious.  
*Taraxacum*: Dandelion.  
*Thalictrum*: Meadow Rue.  
*Tilia*: Lime  
*Trientalis*: Chickweed Wintergreen.  
*Trifolium* type: includes eg Clover, Medick.  
*Trollius*: Globe Flower.  
*Typha latifolia*: Bulrush.  
*Ulmus*: Elm.  
*Umbelliferae*: includes eg Caraway, Chervil, Cow Parsley, Dropwort.  
*Urticaceae*: eg Stinging Nettle.  
*Utricularia*: Bladderwort.  
*Valeriana*: Valerian.  
*Vicia sylvatica* type: includes eg Wood Vetch, Wild Pea, Bush Vetch.  
*Violaceae*: includes Violet and Pansy.

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