EXCAVATIONS AT BROAD SANCTUARY, WESTMINSTER

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SUMMARY

A series of 16th-century drainage ditches canalizing a branch of the river Tyburn at Thorney Island indicated that the area had been reclaimed from the surrounding marshes in the early post-mediaeval period.

INTRODUCTION

Prior to the redevelopment of the Broad Sanctuary site as a conference centre a trial excavation was carried out by the Inner London Archaeological Unit from February to March 1979 on behalf of the Department of the Environment. The site, bounded by Storey's Gate, Broad Sanctuary and Little Sanctuary (TQ29957962), lay near the presumed edge of Thorney Island about 140m north-west of Westminster Abbey and 260m west of Westminster (Fig. 1). The southern portion of the site had formerly been occupied by the Westminster Hospital and its deep basements had removed all archaeological deposits. However, test pits and boreholes at the northern end of the site, formerly Her Majesty's Stationery Office, indicated that some 2m of archaeological deposits survived beneath a 2m overburden of modern rubble.

It was the purpose of the excavation to determine the nature of the archaeological deposits and whether it would be feasible to excavate a larger area. Unfortunately, due to the depth of the deposits the cost of excavation was so high further work was restricted to a watching brief.

The site records are deposited at 42 Theobalds Road, London WC1.

DESCRIPTION OF THE EXCAVATION

An east–west trench 2m by 25.5m was cut in the north end of the site. Having removed *c.* 2m of modern brick rubble overburden by machine a further 2m of stratified deposits were excavated by hand. Note that heights are given according to the New Westminster Datum (NWD) which lies 100m below the Ordnance Datum at Newlyn.

Phase Ia (Fig. 2)

This comprised a shallow sloping sided stream bed (F107) approximately 2.5m wide running east–west for the whole length of the trench cutting the natural clay (top of clay at 100.5m NWD). Filling the stream was a compact grey-black clay (L55) containing numerous fragments of branches, twigs, leaves and other organic material over which lay a deposit of grey-brown clay (L64) containing a few small brick flecks. Both layers were deposited by slow moving water.

Phase Ib

Covering the west end of the stream a spread (F111) of light green sandy clay with gravel contained some limestone blocks. Over this was a small layer of grey-brown sandy clay. This spread may have been part of the stream F107 or material dumped to redirect the course of the stream.

Phase II (Fig. 2)

Cutting through the spread F111 and the stream F107 was a segment of a ditch (F99). A series of wooden posts and a plank (F54) on the north side of the ditch may have been the remains of revetting. The ditch was possibly part of the Phase IV ditch F100 which had silted up and required recutting for drainage.

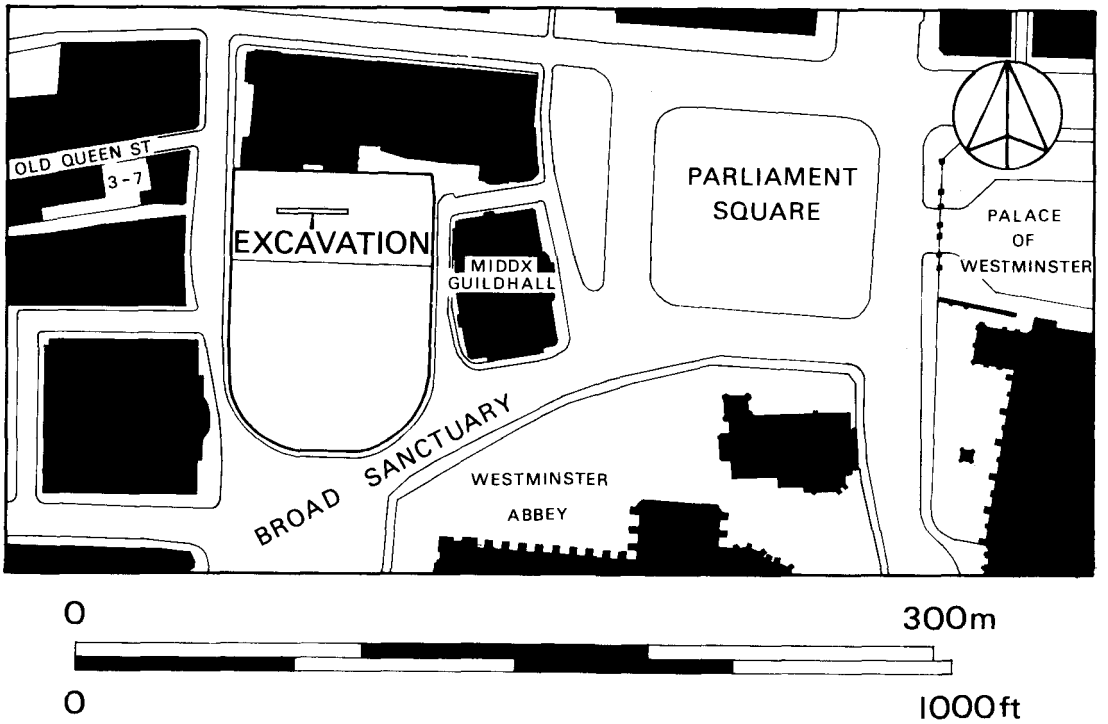


Fig. 1. Broad Sanctuary: Site Location.

Phase III

Over the fill of the ditch F99 was a deposit of green-brown sandy gravel (F112) which may have been dumped to consolidate the west edge of the ditch F100 (Phase IV).

Phase IV (Fig. 2)

Running east–west and turning south into the section at the west end of the trench was a large ditch (F100) (*c.* 2m wide, 1.5m deep) with sloping sides and flattish bottom. This cut through the stream F107, the earlier ditch F99, and the dump levels F111 and F112. Part of the south side was revetted by wooden posts (F114 to F134), wooden planks set behind posts (F57) and woven hurdling behind posts (F113). The planking, hurdling and some of the posts subsequently collapsed into the ditch F100. The ditch gradually accumulated deposits of clay, sandy clay and sand which were heavily contaminated with organic debris.

Phase Va (Fig. 2)

Cutting through the fill of the ditch F100 was another ditch (F108) (exc. width 0.6m, depth 0.8m) with steeply sloping sides and flattish bottom. The ditch ran east–west and was filled with grey-brown and grey-green clay.

Phase Vb

The Phase Va ditch F108 apparently silted up fairly rapidly and was recut on the same line at its east end (F109) (exc. width 0.6m, depth 0.8m).

Phase VI (Fig. 2)

Cutting through the ditches F108 and F109 was another ditch (F101) (1.2m wide, between 0.5m and 1.2m deep) with steeply sloping sides, rounded bottom; having run east–west for 20m the ditch turned south into the section. Though smaller this appears to be a recut of the ditch F100 (Phase IV).

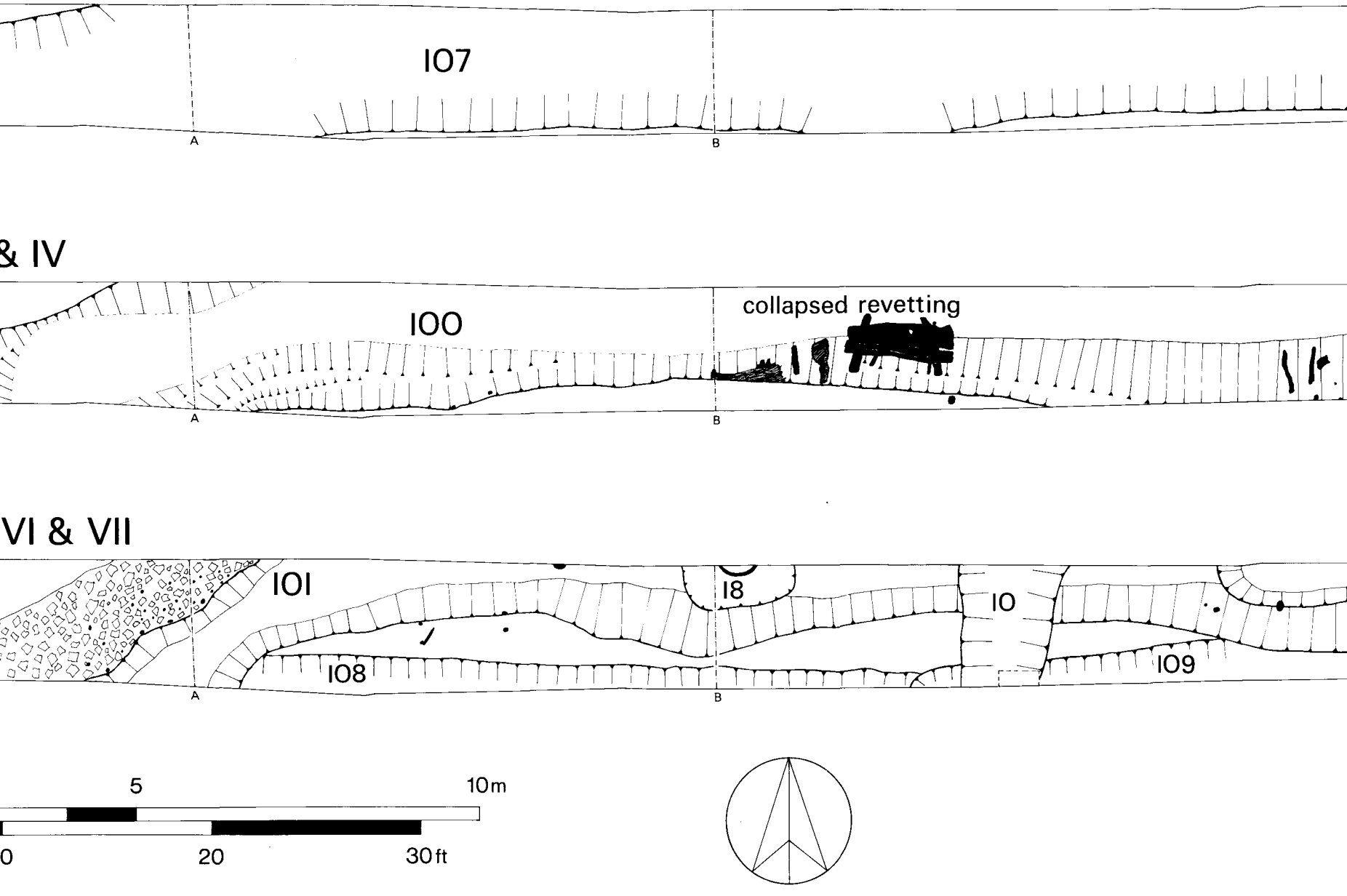


Fig. 2. Broad Sanctuary: Phase Plans.

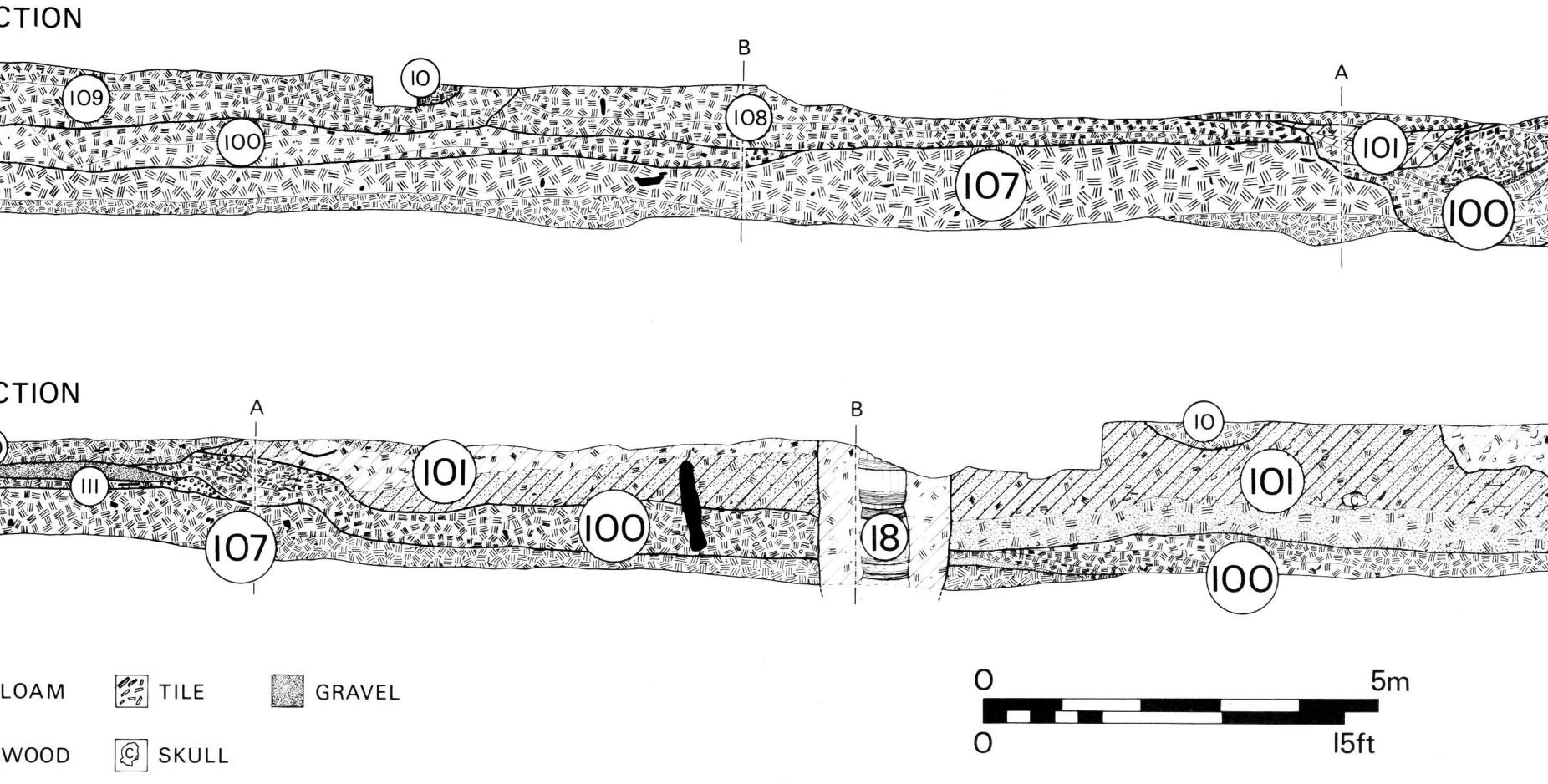


Fig. 3. Broad Sancturary: North and South Sections.

Where the ditch F101 curved south the corner of the earlier ditch F100 had been backfilled with a deposit of sawdust over which lay a dump of tiles in clay stabilized by numerous wooden stakes. A few wooden stakes and a plank (F42 and F43) may be a section of revetting associated with this ditch.

Like the other ditches investigated this ditch silted up with water-borne deposits and the slumping banks of the watercourse.

Phase VII (Fig. 2)

This phase consisted of features which were uncovered after the removal of the modern overburden and have no inter-relationships.

A ditch (F10), running north–south, had shallow sloping sides and a rounded bottom and was of unknown function.

A well (F18) cut through the ditches F100, F101 and the stream F107. The well was lined with reused overlapping barrels, from which the tops and bottoms had been removed. This feature was not fully excavated but was re-exposed during the watching brief.

At the west end of the site a deposit of dark grey sandy clay (F110) covered the ditch F101. It was not clear whether this was a deliberate dump or a flood laid layer.

Cutting through the east end of the ditch F101 was a steeply sloping sided ditch (F144) with a rounded terminal. This contained numerous fragments of leather.

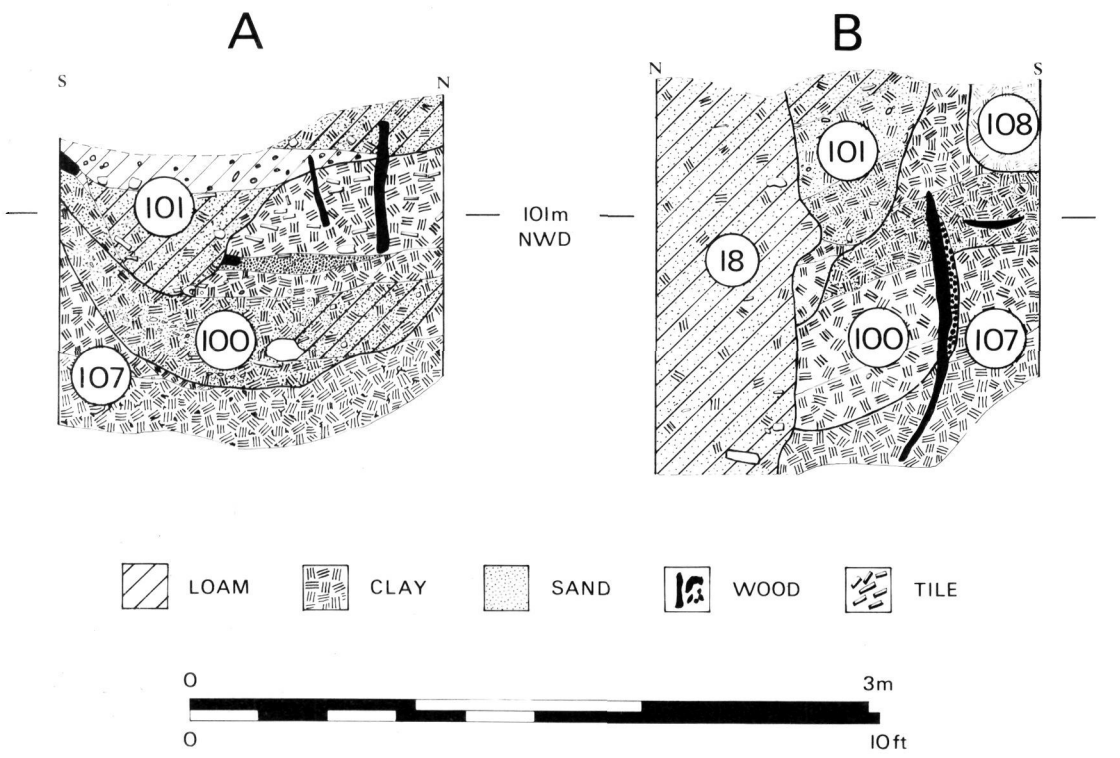


Fig. 4. Broad Sanctuary: Cross-sections A and B.

WATCHING BRIEF

The excavation at Broad Sanctuary was followed in February 1981 by a watching brief during which further archaeological and topographical details were recorded. Unfortunately, the speed with which the remaining deposits were removed (some 30,000 cu.m in 20 days) precluded the observing and recording of any but the most obvious features.

The general line of the stream/ditch was observed but no differentiation could be made between the phases of recutting and reuse. Six more barrel wells, probably 17th century, were recorded but no related structures observed. The vestiges of two pits were also recorded. Scattered over the site were a number of posts and stakes but no pattern was discernible, though they were probably more consolidation and revetting posts.

The natural subsoil over most of the site was a blue-grey viscid clay (height 100.5m NWD) but in the south-east corner the natural was a compact clean yellow-tan sand and clay. This seems to represent the geological edge of Thorney Island.

During site watching at 3–7 Old Queen Street (TQ29897964), some 30m west of the western edge of the Broad Sanctuary site, a series of stratified deposits were recorded. From the upper level (*c.* 101.85m NWD), a grey sandy clay, pottery dating from the 13th to the 16th centuries was recovered. Below lay a grey clay with numerous organic inclusions and a sharpened stake; the top of the natural clay was at 99.3m NWD. These deposits again seem to be part of the gradual expansion in the early post mediaeval period into the bog around Westminster.

DISCUSSION

Until the 16th century the area immediately around Thorney Island seems to have been a low-lying marshland crossed by numerous branches of the Tyburn and subject to regular flooding by the Thames. The stream F107 is likely to have been one of these water-courses which rendered the periphery of Thorney unsuitable for building. The process of canalizing the stream for more effective drainage commenced with the ditches F99 and F100, the deposit F111 possibly being dumped in the stream to strengthen the western limit of the ditch F100. Considerable care was taken to reinforce the banks of this ditch by the use of various forms of revetting. The ditch silted up and two (?one) other ditches were cut, F108 and F109, to provide alternative drainage: these too became choked with sediment. Eventually the large ditch F100 was recut on a smaller scale and following the same alignment, F101. Part of the earlier ditch was deliberately backfilled to create a reasonably solid bank for the recut. The deposit F110 may have been dumped in the ditch F101 to level up the surrounding ground surface, while another ditch F144 was cut at the east end of the ditch F101 to improve drainage.

The well F18 and the other wells recorded during the site watching may be associated with the houses which covered the site in the early post mediaeval period.

Elsewhere in Westminster, notably at Cromwell Green in the Palace of Westminster (Mills 1980, 25), and Richmond Terrace, Whitehall (Mills forthcoming) there was considerable pressure during the late Middle Ages for land all around Thorney Island, and areas which hitherto had been regarded as unusable were drained and built upon. It appears the ditches at Broad Sanctuary were part of this move to reclaim marginal land.

The gradual encroachment of Thorney Island's north–west corner began with the construction of the Belfry in the mid 13th century (Honeybourne 1932, 323). This Belfry was a free standing structure situated where the Middlesex Guildhall now stands, some 40m east of the 1979 excavation. Its massive ragstone foundations, 1.5m thick lying over a bed of elm and beech piles driven into gravel, were exposed (and dynamited) earlier this century (Norman 1916, 16; Radcliffe

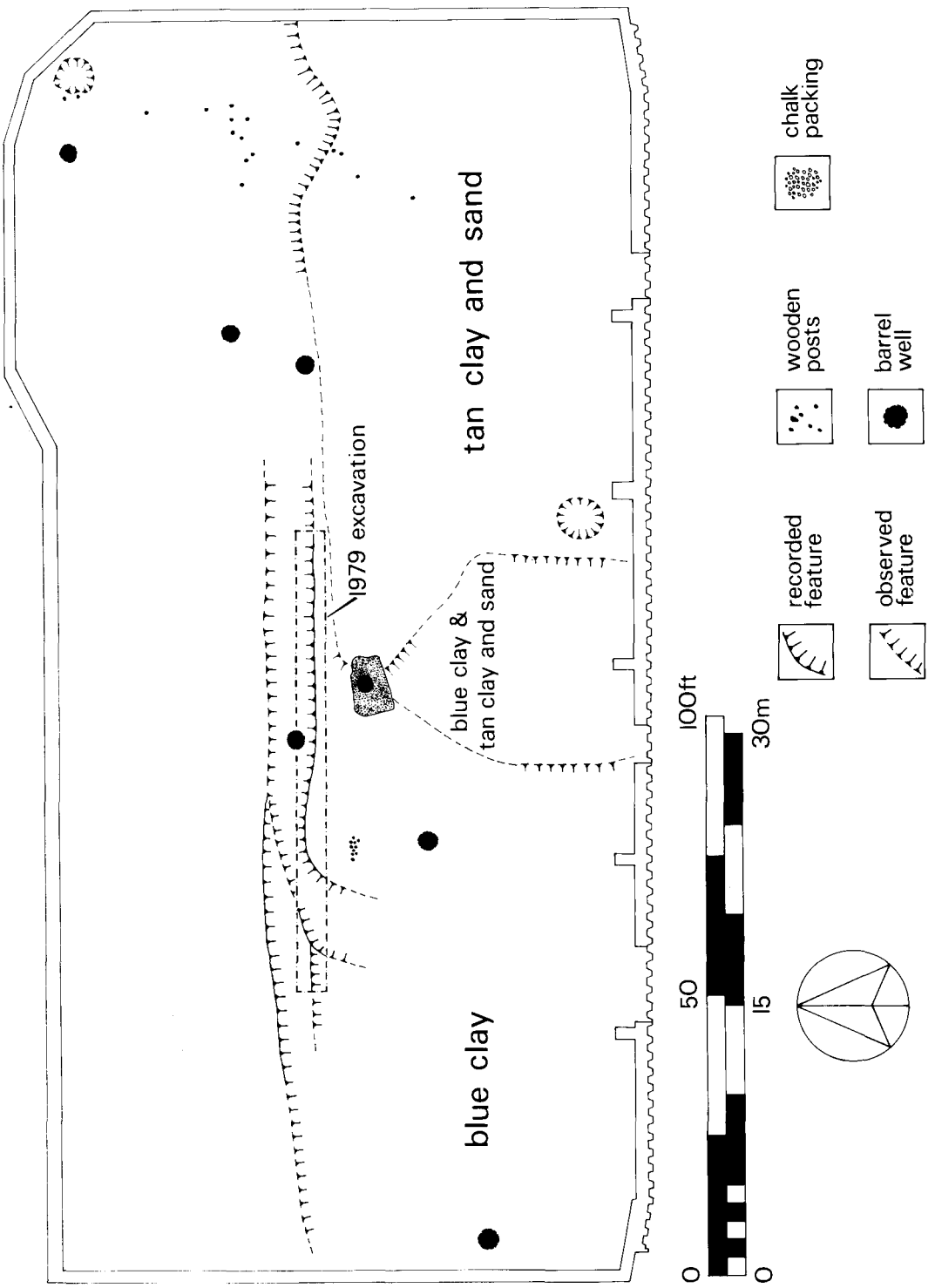


Fig. 5. Broad Sanctuary: Features observed during site watching.

1939, 40). During the late Middle Ages the Abbey built houses on land near the Belfry (also known as the Sanctuary church) to provide accommodation for those seeking sanctuary (Honeybourne 1932, 323) and it seems probable that the extensions into the marsh began at this time.

Although subsequent redevelopments removed all trace of structures on the site the area was exceptionally well recorded in pictures at the beginning of the 19th century (Capon 1808; Smith 1837, Pls. 43–47, drawn 1807). The prints depict 15th and 16th-century houses tightly packed in a maze of small alleys and courts.

The environmental evidence (see details below) recovered during the excavation sheds light on this squalid quarter of Westminster. The ditches, which in date only span the 16th century, needed to be recut regularly as they were blocked by discarded household rubbish, sewage and the by-products of animal slaughtering. The presence of leather debris and possible leather working tools (see below) may indicate a local industry. Likewise knives found on the site may be discards from an adjacent cutler's workshop. The promiscuous blend of domestic and industrial refuse implies the neighbourhood was a mix of houses and small scale businesses.

The area remained residential until widespread demolition for the Parliamentary Mews (later the Stationery Office) in 1826 and the Westminster Hospital in 1832.

THE FINDS

The site did not produce a large quantity of material, and what was recovered bore out the conclusion of the excavation, that the area uncovered had been backfilled to reclaim land on the edges of Thorney Island. The backfilling would appear to have been done over a comparatively short period, perhaps from the end of the 15th century to the middle of the 16th, and it is quite likely that the material was local, rather than transported any great distance. It is not possible to state whether the earlier material was wholly residual or whether it was dumped simultaneously with the later—perhaps an example of the long usage of the highly decorated wares—but at least some sherds appeared to show considerable abrasion. The waterlogged nature of the deposits preserved some organic artifacts fairly well, notably the leather, but it is interesting that no traces of handles to the knives were discerned, suggesting at least the possibility of their being discarded as rubbish when broken. The iron piercing tools could suggest leather working but no undeniable off-cuts of leather were found, and other light industrial use might be suggested for them.

THE POTTERY

by Elizabeth Platts

The evidence of the pottery, consisting in the main of a large proportion of unconnected quite small sherds, confirms the evidence of the excavation that such finds as were able to be recovered were dumped on the site. The small extent of the area uncovered did not allow the finding of the settlement which provided the material, but the documentary evidence shows that Thorney Island itself was well populated through the medieval and early post-medieval periods, and one aspect of the range of pottery—the straight-angled-handled pipkin sherds which were found in several deposits—suggests, at least in one case, a limited source for the material dumped. The range of the pottery, including locally (London) made wares and imported pots from Europe, particularly Northern Europe, is the expected one of an area such as that round the Abbey, a mixture of resi-

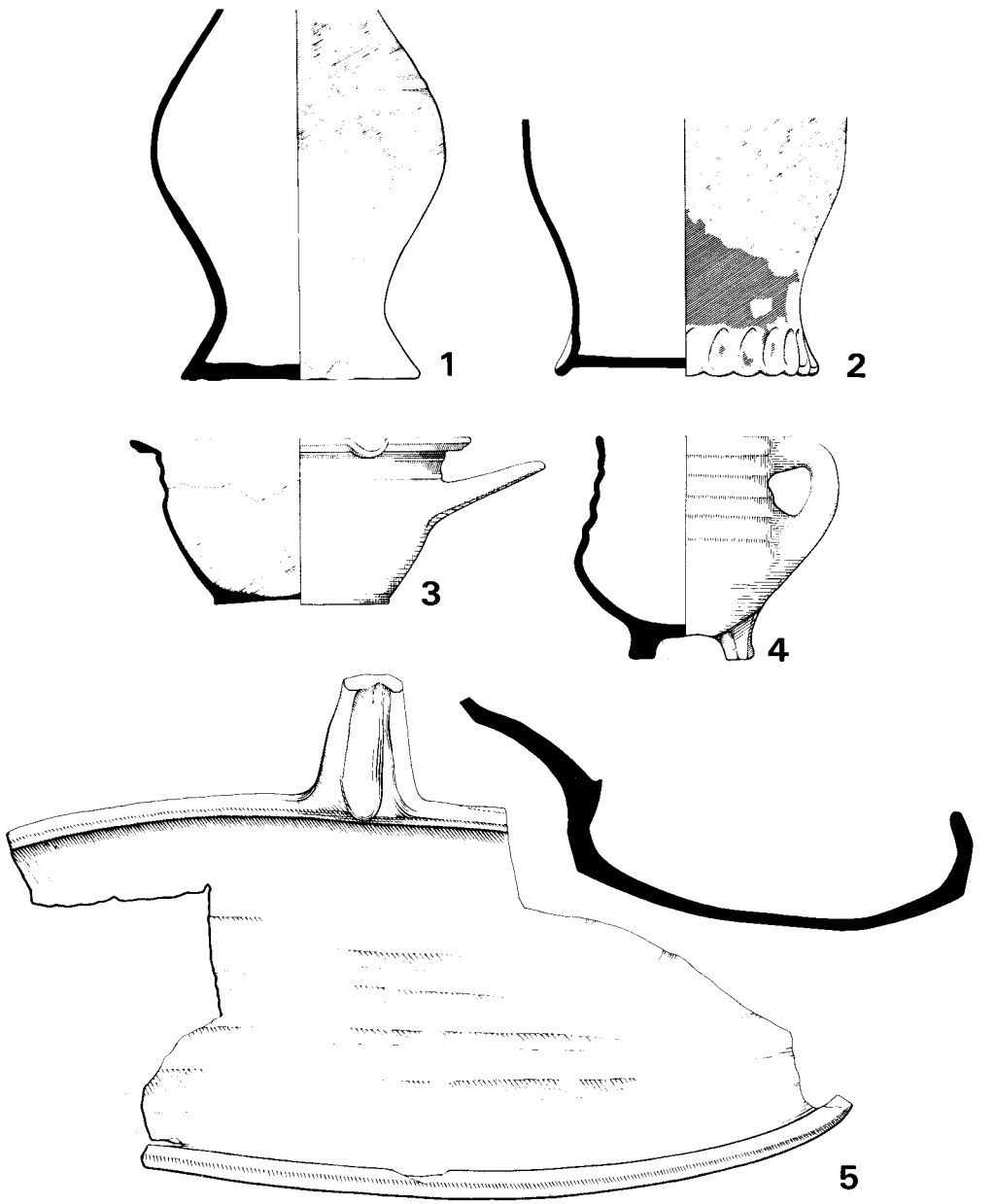


Fig. 6. Broad Sanctuary: Medieval and Post-Medieval Pottery Nos 1–5 (1/4).

dential occupation and what we would now term light industrial use over a long period.

The small quantity of pottery makes it very difficult to differentiate dates for each phase, as does the overlapping in use of many sorts of pottery at this time. The residual material found suggests the long occupation of the site, and, in some cases, the long use of the object, particularly where a useful and possibly highly prized import is concerned. Little of the pottery could be reconstructed to useful profiles, and a large number of different vessels were represented.

All the material is deposited at the offices of the Inner London Archaeological Unit, Imex House, 42 Theobalds Road, London W.C.1. and may be consulted there.

Phase Ia

A total of approximately 125 sherds were recovered from the features of this phase, making a minimum vessel count of approximately 110. The residual sherds, including a small sherd of lemon yellow glazed white ware from northern France, come from cooking pots and jugs, and range in date from the 13th through the 14th to the 15th century. The phase is dated by the presence of some small sherds of the fine Surrey/Hampshire green glazed white ware produced at Farnborough (Holling 1971), a fragment of a sharply curved salt-glazed stoneware handle from a small Raeren mug (Steinzeug 1971 (343)), and a piece of the base of an Italian maiolica jug similar to one excavated at Southampton (Platt and Coleman-Smith 1975 (1348)). These sherds are all small in size and present a problem in that without their presence the phase could happily be dated somewhat earlier. Perhaps only slight disturbance took place at, say, the beginning of the 16th century and these sherds might be considered intrusive.

Phase Ib

No dateable finds were retrieved from this phase.

Phase II

Nearly 30 sherds were recovered from this phase, representing probably only six vessels; two blackened grey-ware cooking pots of the South Hertfordshire types of fabric, three sandy white ware jugs with mottled green glaze and one 'West Kent' ware jug.

One of the cooking pots possessed a stabbed rim sherd and this, and the sherd of 'West Kent' ware, were somewhat abraded, and could be considered residual, leaving the dating of the deposit with the Surrey/Hampshire ware jugs of the 15th century (Holling 1971) (Fig. 6, No. 1).

Phase III

This phase yielded no finds.

Phase IV

This phase contained approximately 500 sherds, and is dated by a number of examples of Surrey/Hampshire ware jugs (Holling 1971) of dates from the 15th to the early 16th century (Fig. 6, No. 2), as well as the less closely dateable lead glazed red sandy wares made at a number of kilns near London during the late 15th and early 16th centuries including one almost complete pipkin with a straight handle (Fig. 6, No. 3); and a Siegburg and a Raeren stoneware sherd of the same dates. However, this phase contained a high proportion (approximately 60%) of residual material of 'West Kent' and South Hertfordshire and other wares.

Phase Va

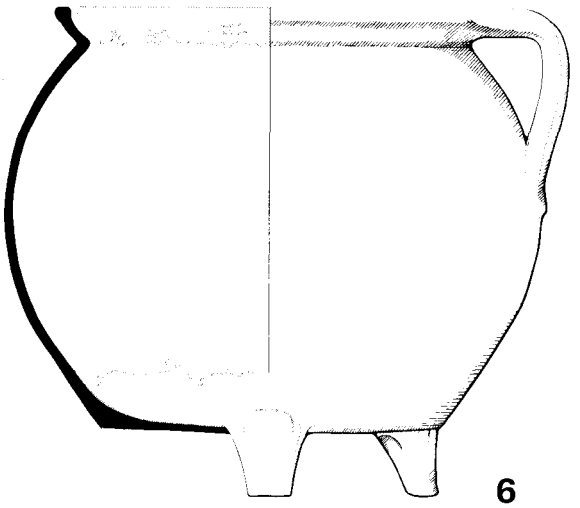
This phase produced nearly 50 sherds, representing possibly 40 vessels, though a number of those vessels are very similar. The sherds appear all to come from plain slipped and glazed jugs except for two very small green glazed Surrey/Hampsire ware which, it is suggested, could come from a fine, possibly lobed, bowl made at the Farnborough production site in the 15th century (Holling 1971). One of the two jug bases is of the heavily thumbed type in a dark pink-buff sandy fabric (also a product of the Surrey/Hampshire kilns) which is found in many London contexts, for example at the Custom House site (Thorn 1975), Westminster Abbey (Black 1976) and described by Rackham (1973). The other in a fine sandy pink fabric with a light grey core has a footring similar to some of the northern French medieval jugs. It has a white slip and, it is presumed, was partially glazed in a mottled green glaze. It also has parallels from other London excavations of the period (the 13th to the 15th centuries), again, for example, at Westminster Abbey (Black 1976). Two fragments of jug handle, possibly from the same vessel, are from a 'West Kent' vessel, but are much abraded and should be considered residual.

Phase Vb

Seventy sherds of pottery were found in this phase, representing about 60 different vessels. The date range shown by the pottery is from the 13th century (sherds of coarse 'shelly' ware, one with a thumbed applied strip, similar to examples found during the Westminster Abbey Misericorde excavations (Black 1976)), to the late 15th century (a number of sherds of the mottled green glazed Surrey/Hampshire ware) and a single small rim sherd of the fine mottled green/yellow glazed Surrey/Hampshire ware produced during the 16th century.

Phase VI

This phase contained by far the largest number of finds of all sorts, including over 1,000 sherds of pottery and one fragment of tile. The pottery contained residual sherds similar to those in other deposits, that is, South Hertfordshire wares, 'West Kent' wares, early Surrey/Hampshire wares, the sandy 'London' ware, and so on, but the important dating evidence is provided by sherds of jugs and pots of the early 16th century, for example slipped pancheons, and bowls, some with the grouped pinched pedestal feet typical of the Dutch and Dutch emigre potters, pipkins of all sizes, a plain bung-hole cistern with the grouped pinched feet, all in a fine red sandy fabric; the slip-painted unglazed ware, dark grey surfaced with a red core in a fine sandy fabric thought to have been made in or near London (Guildhall Museum



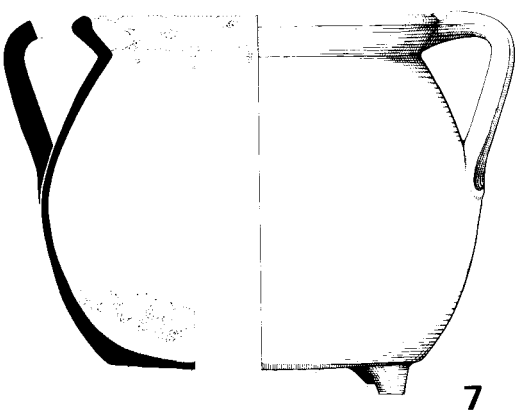


Fig. 7. Broad Sanctuary: Post-Medieval Pottery Nos 6–7 (1/4).

1908, Plate LXIX No. 5); the 'Inns of Court' Surrey/Hampshire ware jugs (Matthews and Green 1969); and the imported pottery, Siegburg and Raeren sherds. A notable find was a large proportion of a dripping pan (Fig. 6, No. 5). Two examples of the red sandy ware is of particular note: nearly complete (when reassembled) large pipkins with an interior lead glaze and a blackened (through use) exterior (Fig. 7, Nos. 6 and 7). It is not possible to tell what length its feet were in one case, but of interest are the sharply angled handles, reminiscent of the metal cauldron prototypes. The flat bottoms would usually suggest an English rather than a Dutch source, where it was common to produce sagging bases to pipkins.

The tile is of late 13th or early 14th-century date, bearing chequers diagonally quartered and skewed. It is similar to, but not identical with, examples found at the tile factory at Danbury (Drury and Pratt 1975).

Phase VII

This phase contained approximately 120 sherds, and represented about 105 different vessels. Although there was a certain amount of residual material, it was a lower proportion than in other phases. The majority of sherds come from vessels made at the end of the 15th century and the beginning of the 16th century. They include the handle of a dripping pan (similar to that found in phase VI (Fig. 6, No. 5), sherds of a pierced vessel (probably a colander rather than a fuming pot) and a nearly complete small tripod pipkin (Fig. 6, No. 4) and a number of other sherds in the red sandy fabric of the Dutch potters at Aardenburg and elsewhere in the Netherlands, and at Woolwich (the first production, Pryor and Blockley 1978) and no doubt at a number of other kilns around London. The group also contains the base of a Siegburg mug.

THE SMALL FINDS

by Wendy McIsaac

The small finds described and illustrated below are from Ditch 101 (Phase VI). This contained the largest group of objects. Items found in other features are referred to where appropriate, but have not been illustrated.

Iron

1. Knife. Broken point, pointed tang, copper alloy strip, separate blade from tang. 16th century. Fig. 8, No. 1.
2. Knife. Strip tang with iron rivet. 16th century. Fig. 8, No. 2.

In all, 13 knives were recovered from the site: four from Ditch 101 (Phase VI) as listed above; two from Ditch 107 (Phase Ia); five from Ditch 100 (Phase IV); one from Feature 109 (Phase Vb); one from Feature 144 (Phase VII). Most had the long narrow blades typical of the 16th century. Probable cutler's marks could be made out on a couple of the blades with the help of X-ray photographs. None of the knives were found with a handle although the organic material in the deposits was generally well preserved.

3. Half of a pair of shears. The protuberance just in front of the blade suggests an early 16th-century date. Fig. 8, No. 3.
4. Doorkey. This type is found in 16th-century contexts but continued to be manufactured into the 17th century. Fig. 8, No. 4. A similar key was found in Ditch 100 (Phase IV).
5. Rowel spur of silvered iron. If this was made in England it is probably medieval. Fig. 8, No. 5.
6–9. A group of implements pointed at one or both ends, probably used for piercing. Fig. 8, Nos 6–9. a similar tool came from Ditch 109 (Phase Vb).

Copper Alloy

10. Buckle probably from a belt. First half of the 16th century—possibly before 1530. Fig. 8, No. 10. A large rectangular buckle with pin was found in Ditch 100

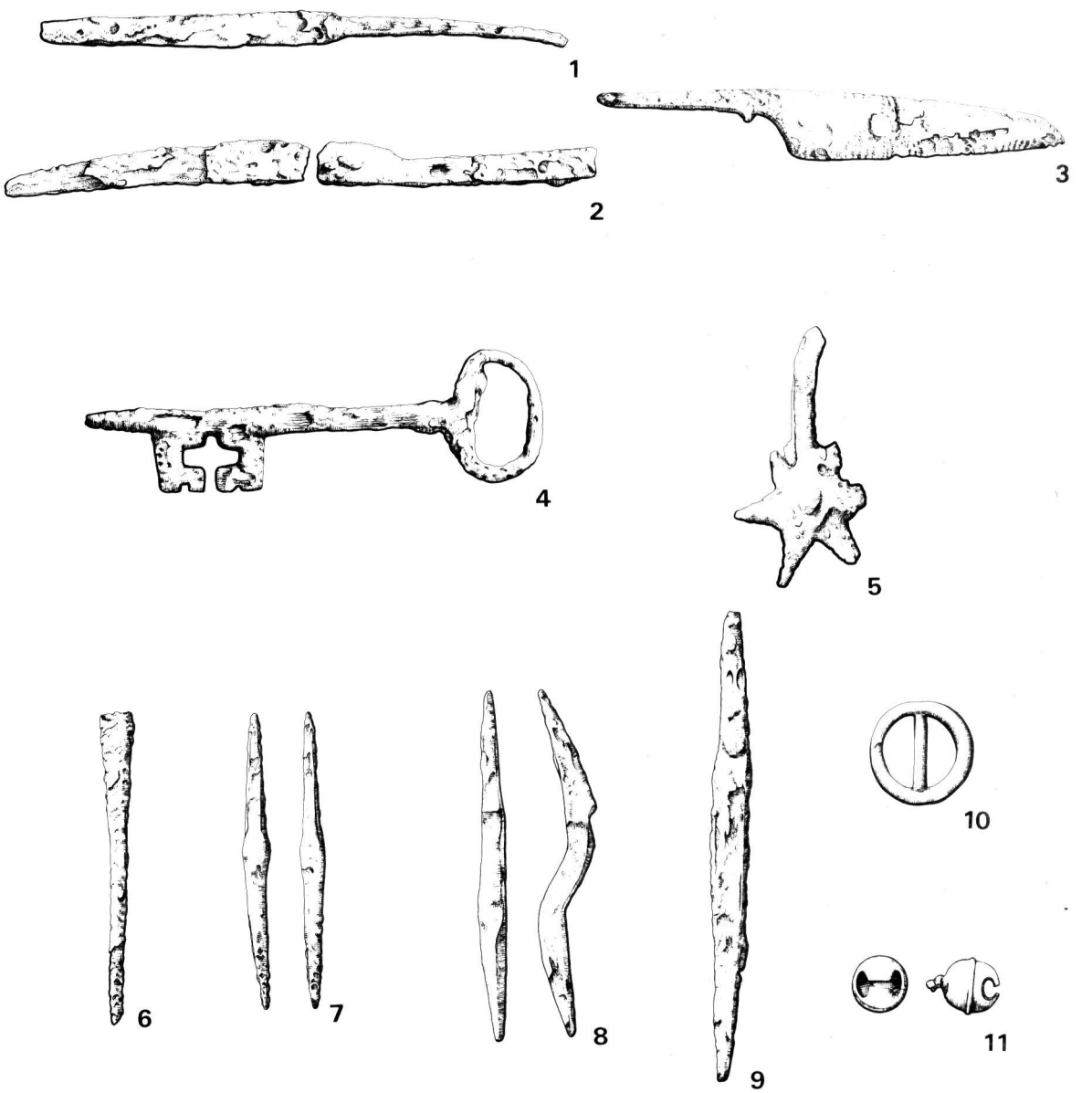


Fig. 8. Broad Sanctuary: Iron (Nos 1–9) and copper alloy (Nos 10–11) small finds (1/2).

(Phase IV). Similar types of buckle are found in the 17th century; however, the pottery found in this phase suggests a 16th-century date.

11. Bell. Inside are the remains of the now mineralised iron clapper. Most likely for use on a hunting bird. 16th century—possibly the first half of the century. Ditch 101 (Phase VI). Fig. 8, No. 11.

12–19. Seven pins with coiled heads, ranging from 25mm to 45mm in length. These fit well with a 16th-century date although their manufacture carried on into the 17th century. Ditch 101 (Phase VI). Not illustrated.

20. A more elaborate pin was also recovered. This had a head formed of thin pieces of copper alloy over a mineralised inner core. The stem appears to be a separate piece rammed into the core of the head. 16th century. Ditch 101 (Phase IV). Not illustrated.

Coin and Jettons

1. From an unstratified context.
   Coin. Roman. Nero.
   Identified by M. J. Hammerson.
2. From an unstratified context.
   Identical to Catalogue No. 1 in Barnard (1916, 187 and Pl 23, 1) except 3 fleur-de-lys in shield instead of 2 fleur-dey-lys quartered. All other details identical.
   O. Leg. A saltire AVE MARIA GRACIA.
   Illustrated jetton with difference of arms as noted is of the period of Philip le Hardi, Duke of Burgundy: 1363–1404.
   Identified by Anne Jones.
3. From Feature 99 (Phase II).
   An Anglo-Gallic jetton (the piercing on the obverse side is a distinctive feature of Anglo-Gallic jettons), *cf.* Barnard (1916, 104 and Pl 2, 51).
   O. A lion rampant within a tressure of nine curves.
   R. Annulet enclosing a pellet and surrounded by four fleur-de-lys in cross.
   Anglo-Gallic jettons were probably made at English mints in France and it is unlikely that they are later than 1453, the year of the final expulsion of the English from France. Comparisons with Anglo-French money suggest that they were not stamped after the end of the 14th century.
   Identified by Anne Jones.

The Leather

The water-logged nature of the deposits allowed leather to be preserved to a reasonable standard. A number of fragments and scraps were recovered, and those which are identifiable appear to consist of parts of shoes and straps. It is not possible to comment on the amount of wear on the fragments of shoes, except that none showed excessive wear, and it is suggested that the scraps at least might be evidence of local leather working. Indeed, the iron piercing tools lend support to that theory. Leather was found in Ditch 107 (Phase II), Ditch 100 (Phase IV), and Ditch 101 (Phase VI). An analysis of (where identifiable) pointed-, square-, and round-toed shoes shows again, as does the pottery, that although the excavation revealed a sequence in the stratigraphy, the finds appear to show a very short time span in the last stages of dumping and land-reclamation in the ditches.

	Phase II	*Phase IV*	*Phase VI*
Pointed		5 + 1?	?
Square			2
Round	1		1

The significance of the toe shapes is that pointed toes were general at the end of the 15th century until the beginning of the 16th century when square toes came into fashion, followed by round toes. As nowadays, however, some overlap in these fashions prevents very close dating.

THE ANIMAL BONES

by Alison Locker

A. The Mammal bones

The following species were identified from 3 main ditches dated to the 16th century; horse (*Equus* sp.), ox (*Bos* sp.), sheep (*Ovis* sp.), pig (*Sus* sp.), fallow deer (*Dama dama*), dog (*Canis* sp.), cat (*Felis* sp.), rabbit (*Oryctolagus cuniculus*) and hare (*Lepus* sp.).

Measurements were taken whenever possible according to von den Driesch 1976 and are available in the full report, Ancient Monuments Laboratory Report No. 3850, kept at Fortress House 23, Savile Row.

The chart below indicates the number of bones for each species in each ditch. The categories ox and sheep include ox and sheep sized fragments respectively; since ox and sheep were the two most frequently occurring species it is very likely that these fragments do indeed belong to these two species. All loose teeth and rib fragments have also been included in the count.

OX: Ox comprised 35% of the total, most parts of the skeleton was represented, 7% of which were mandibles. These were heavily chopped through the diastema, around the alveoli of the molars, or under the alveoli.

horse	*ox*	*sheep*	*pig*	*f. deer*	*dog*	*cat*	*rabbit*	*hare*	*unident*	
1	348	360	46	3	17	10	14	–	170	Ditch 101
1	82	123	4	1	5	1	2	–	41	Ditch 100
1	38	41	4	–	1	1	1	1	7	Ditch 107
3	468	524	54	4	23	12	17	1	218	Total 1,324

Two partially complete skulls were chopped around the area of the neurocranium, possibly to facilitate the removal of the brain. Chop marks were also common around the occipital condyles and the homion, which may be evidence of the removal of the head from the rest of the carcase. All the major meat bearing bones were chopped, frequently across the joint surfaces and around the mid shaft area. Rib fragments and vertebrae were heavily chopped, and os coxae were frequently chopped around the acetabulum.

Few of the mandibles were complete enough to apply the Grant method of ageing, but most were mature with all molars in full wear. The epithyses of most long bones were fully fused.

Withers heights were calculated (using Fock 1966) from seven complete metacarpals giving a range of 113.2 to 123.3cms, and ten metatarsals giving a range of 120 to 130cms. Unfortunately there were too few metapodials to separate them into groups by sex.

No horncores were recovered from these ditches, which may suggest that they were being taken elsewhere for horn working, unlike sheep for whom many horn cores were present.

SHEEP: again a relatively high proportion—10%—of mandibles was present. Some of these were also chopped across the diastema and occasionally near the third molar.

On the skull the horncores had all been chopped off individually, and in one case sawn off. One pair of horncores was larger and more robust than the rest and probably belonged to a ram; these had been removed as a pair by chopping through the frontal bones. The occipital condyles were frequently chopped in the same manner as ox.

Butchery was noted on all the major meat-bearing bones around the joint surfaces and about the mid shaft. On a few sheep humeri knifecuts were made encircling the midshaft. This has also been observed in other late medieval contexts at Maison Dieu (Wall in press), Nonsuch Palace (Locker in preparation), and Baynards Castle (Armitage 1977 unpublished). The purpose of this is unclear, but it seems unlikely that this is the result of skinning since the bone bears a lot of flesh at this point, but it could be the preliminary stages of bone working later abandoned on these particular bones. As with ox the os coxae were heavily chopped around the acetabulum and at the proximal end of the femur.

Twenty-six mandibles were aged according to Grant, their numerical values ranging from 32 to 42, indicating that the sheep were all fully mature, which is also supported by complete epiphyseal fusion in most of the long bones. This might suggest that the primary function of these individuals was not meat but wool, milk or breeding.

PIG: The pig only forms 4% of the total, and as is usual contains a much higher relative proportion of immature bones than ox or sheep. This is thought to be for two main reasons, firstly the pig has no other important economic function other than as a meat producer and therefore should be slaughtered as soon as it has achieved an optimum meat yield. Secondly it has a high fecundity rate which means fewer individuals need be kept for breeding.

One of the skulls was split saggitally, and on another the neurocranium was chopped away, presumably for the removal of the brain. Many of the long bones were chopped at their joint surfaces and around the mid shaft.

The other mammals that may have con-

tributed to the diet were poorly represented. Fallow deer was identified from three broken metapodials and a cast antler. Only a few bones of rabbit and one of hare was present.

On the femur of a dog the greater trochanter was covered in exostosis. Two shoulder heights were calculated using Harcourt (1974) on 2 humeri. These gave heights of 49.1cms, and 48.7cms.

The cat bones included two skulls. No knifecuts were observed on these or any of the long bones so it seems unlikely that these cats were skinned.

B. The Bird Bones

A total of 60 bird bones was recovered, and included the following species; domestic fowl (*Gallus* sp.), duck *cf.* mallard (*Anas platyrhynchos*), goose (*Anser* sp.), pigeon (*Columba* sp.), ? swan (*Cygnus* sp.), crow/rook (*Corvus corone/frugilegus.*).

The chart below shows the species present in each ditch.

All the mature bones were measured, and all these species were probably eaten except crow which may have been a scavenger around the site.

C. The Fish Bones

Thirteen fish bones were recovered and the following species were identified; conger eel (*Conger conger*), cod (*Gadus morhua*), gurnard (*Triglidae*), turbot (*Scophthalmus maximus*). These were all recovered by hand picking on site which may well have reduced the chances of recovering the smaller species.

conger eel	*cod*	*gurnard*	*turbot*	*unident*	
1	1	—	1	3	Ditch 101
—	3	—	—	1	Ditch 100
—	1	1	—	1	Ditch 107
1	5	1	1	5	Total

All these species are marine and could be caught in the North Sea. Conger eel is commonly caught by lines and traps off rocky coasts, and cod is a deep-water fish, caught on lines and up until the 18th century was probably marketed salted or dried. It was not possible to identify the gurnard as to species as the skull bone was similar to Tub, Red and Grey gurnard, all of which have been eaten. The turbot is common in the southern North Sea and has long been prized as a food fish.

The biology notes are all based on Wheeler (1978).

D. The Shellfish (and snails)

A total of 309 fragments of shellfish was recovered, including the following; oyster (*Ostrea edulis*), cockle (*Cardium edule*), mussel (*Mytilis edulis*) and whelk (*Buccinum undatum*).

oyster	*cockle*	*mussel*	*whelk*	
242	14	8	2	Ditch 101
25	2	4	1	Ditch 100
1	—	—	—	Ditch 107
278	16	12	3	Total

Twenty eight Cepaea and one Planorbid were also present. All the shellfish were probably eaten and oysters are known to have been a very cheap source of food at this time. Each valve of the bivalves was counted separately.

GENERAL CONCLUSIONS

This faunal assemblage suggests a mixture of debris types. Household domestic waste is suggested by chopped bone that probably came from individual joints of meat, and chops. Butchers' waste may be represented by the many mandible and skull fragments which are usually removed at source by the butcher during 'primary' butchery. Thirdly the disposal of non dietary waste is suggested by the presence of horse, dog and cat whose partial corpses were incorporated in these deposits.

Dom. fowl	*duck*	*goose*	*pigeon*	*? swan*	*crow/rook*	*immature*	*unident*	
16	3	8	2	1	6	6	5	Ditch 101
8	1	—	—	—	—	—	2	Ditch 100
2	—	—	—	—	—	—	—	Ditch 107
26	4	8	2	1	6	6	7	Total

Further site watching in 1981 produced 52 mammal bones (plus a few oyster valves). These were recovered from a 16th-century ditch (F25), three barrel wells (F5, F16, F7) one of which cuts the ditch, and two pits (F1, F3) of 16th/17th-century date. Mainly ox and sheep were found. Primary butchery waste was suggested by four sheep skulls chopped axially from the foramen magnum, and transversely across the frontals, and an ox skull cleaved axially. Also present were horse, pig, dog, fallow deer and hare. These finds were consistent with the earlier excavated material.

Essentially these deposits are dumps of urban organic waste whose sources are varied. The livestock may have been brought some distance to the site specifically for slaughter which would account for the sheep and ox being consistently mature, in comparison with the different age groups one might expect to encounter when dealing with a single population.

These deposits of decomposing material in close proximity with the possible dumps of cess material indicated by the pollen analysis (Scaife 1980) must have been a rank, putrid neighbour for the occupants of the houses indicated on contemporary engravings.

POLLEN REPORT

by Robert G Scaife

The interpretation of pollen spectra obtained from urban archaeological contexts presents a variety of problems relating to the possible sources and modes of incorporation of pollen into the sediments analysed. Broad Sanctuary is such a case, where pollen and spore assemblages occur as a function of both natural and human factors. The result is that a remarkably high diversity of pollen types occurs which may or may not be explainable in terms of normal pollen dispersion by wind or insect.

Though the ditches have been divided into phases in the excavation report (above) they effectively formed one feature and have been treated as such in this report. A section of organic sediments filling the channel was sampled for pollen analysis at 6cm intervals. Standard pollen extraction techniques were used (Moore and Webb 1978). The results obtained are presented diagrammatically (Figs 9 and 10) with pollen totals calculated as a percentage of total pollen (TP) which comprised a total of 300 grains per level. Spores were recorded outside of the sum and were calculated as a percentage of total pollen plus spores for each level. A total of 87 pollen and spore taxa was recorded which are divisible into a number of naturally or anthropogenically derived categories. These are listed below and briefly discussed.

1. The tree component

Betula	
Pinus	Juglans
Taxus	Fagus
Tilia	Quercus
Ulmus	Fraxinus

These are all present in diminutive frequencies of 0–5% TP, and possibly, therefore derive from non-local growth of these genera. *Quercus* (oak) attains the highest value (6%TP) and may be representative, along with *Betula* (birch), *Fagus* (beech) and *Fraxinus* (ash) of woodland growing in the region. Alternatively, these pollen taxa may derive from stream transportation from areas high-up in the river's catchment area.

2. Shrubs

Corylus
Salix
Prunus type
Rubus type
Sambucus

These are similarly present in low numbers but their source of origin may not necessarily be from long distances. With the possible exception of *Corylus* (hazel) these shrubs may be more typical of waste ground in urban areas. Certainly in the case of *Sambucus* (elderberry) its seeds are frequent components of urban plant macrofossil assemblages because of its high fidelity with urban dereliction. Consistent pollen records of *Salix* spp. (willow) throughout the sediment sequence presents the problem as to whether local autochthonous growth is represented or whether this pollen was transported from upstream. The entomophilous nature of this

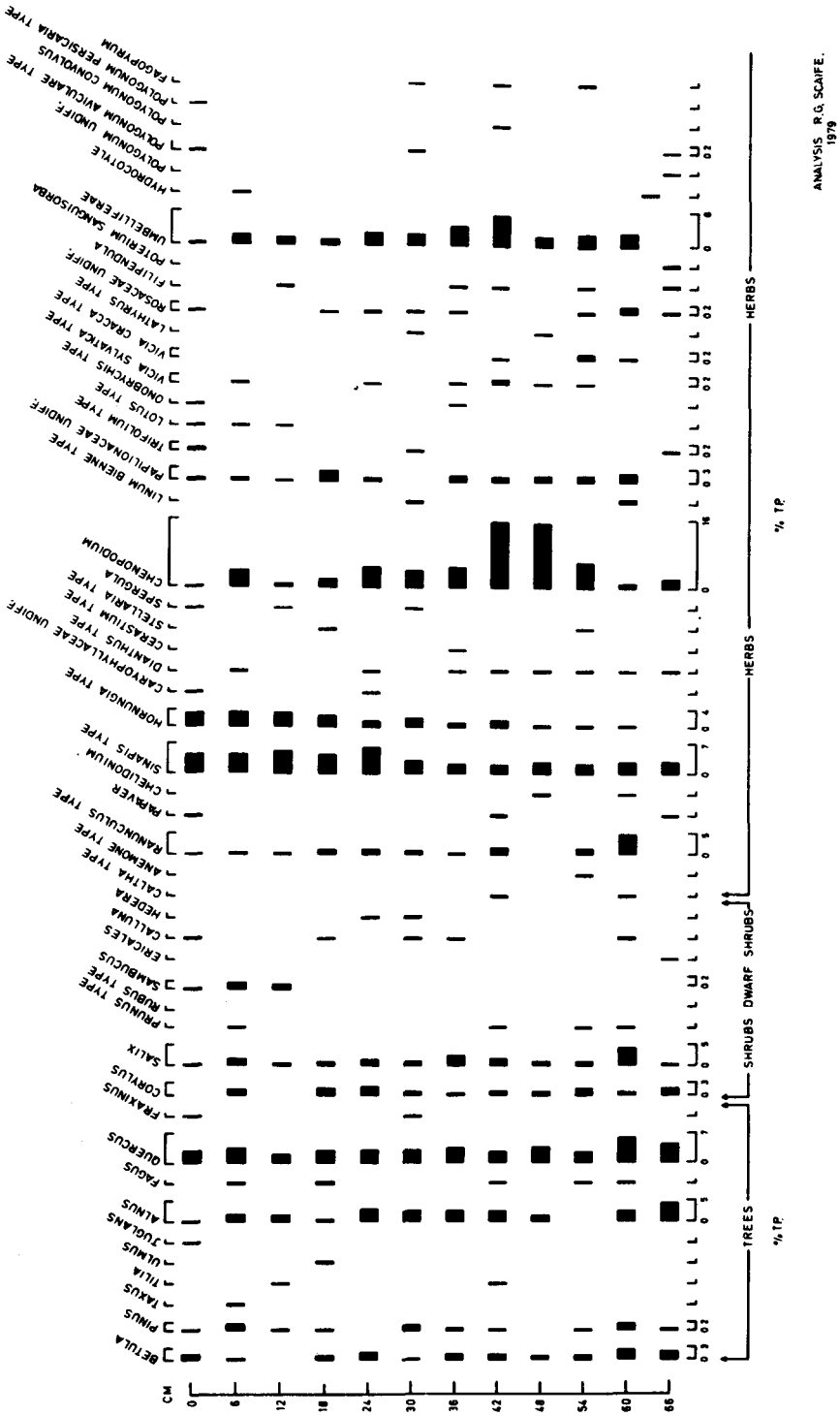


Fig. 9. Broad Sanctuary: Pollen diagram.

genus usually results in its under-representation in pollen totals and it seems likely therefore that areas of *Salix* were prevalent in Broad Sanctuary.

3. Dwarf shrubs
   - Ericales
   - Calluna
   - Hedera

Low frequencies of ericaceous (heath) taxa may be derived either naturally or as suggested by Scaife (in Macphail 1981), be liberated from animal bedding brought into the urban area.

4. Aquatic and mire
   - Caltha type
   - Filipendula
   - Alisma type
   - Succisa
   - CYPERACEAE
   - Hydrocotyle vulgaris
   - Typha angustifolia/Sparganium type
   - Typha latifolia
   - cf. Stratiotes
   - Sphagnum

These marginal aquatic and mire taxa may be constituents of the marsh area and of plant species growing along the stream margins, both at Broad Sanctuary and upstream.

5. Ruderals
   - Ranunculus type
   - Papaver
   - Chelidonium
   - Dianthus type
   - Cerastium type
   - Stellaria type
   - Spergula type
   - Chenopodium type
   - PAPILIONACEAE
   - ROSACEAE
   - Polygonum spp.
   - Urtica type
   - Anagallis arvensis
   - Solanum dulcamara
   - SCROPHULARIACEAE
   - Plantago spp.
   - LABIATAE
   - Galium
   - COMPOSITAE

In this category a very marked floral diversity is evident. These are essentially herbaceous plants typical of disturbed waste-ground areas such as might readily be encountered in urban areas and as to be expected, form the predominant pollen group found in these sediments.

6. Ethnobotanical types

Certain interesting pollen types were recorded in the analysis, which may be attributable directly to anthropogenic factors.

(i) *Linum bienne* type (flax): three pollen grains of this type were recovered. This pollen type includes both *Linum bienne* and *L. usitatissimum* and it seems likely that the latter type is represented here. This may therefore be attributable to the usage of flax during this period, the pollen being derived from localised growing, or from the processing of this commodity. A further possible alternative may be its derivation from linseed oil waste.

(ii) *Cannabis sativa* (Cannabis): low numbers of pollen grains of *Cannabis* were recorded. These may have derived from the production of hemp. Pollen separation of *Cannabis sativa* from *Humulus lupulus* (hop) was carried out on pollen morphological criteria.

(iii) *Fagopyrum* (buckwheat): three records of *Fagopyrum* are present. The origin of these is problematical, but the use of this plant in the production of flour may be noted. Palynologically this is an interesting record, as this taxon has rarely been recorded in Britain (Godwin 1975).

7. Enigmatic types

Gramineae (grasses) and Cyperaceae (sedges) form the dominant individual pollen types in the spectra from Broad Sanctuary. Their derivation is again enigmatic and various possible sources for the pollen may be postulated. Both Gramineae and Cyperaceae may be autochthonous constituents of the flora growing on or around the area of Westminster. Alternatively the pollen may derive from floor covering in houses or stables which was removed and dumped on waste-ground areas. It is likely that much hay fodder may have been introduced into the area for feeding domesticated animals. Removal and dumping of animal waste materials (including dung) could similarly have been a prominent source of these pollen taxa. The similarity of the pollen morphology in the different genera of

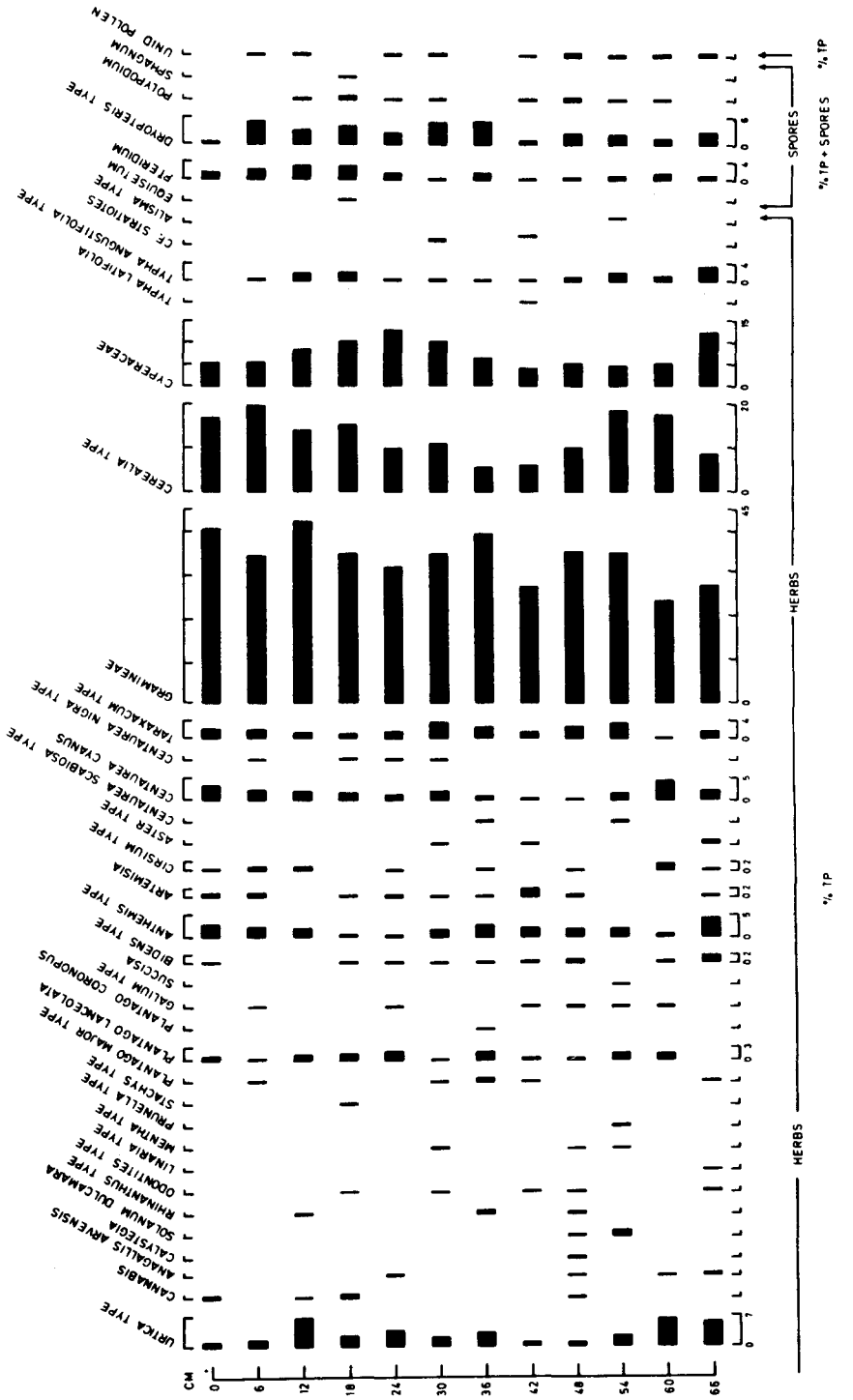


Fig. 10. Broad Sanctuary: Pollen diagram.

Gramineae and Cyperaceae does not, unfortunately allow more detailed separation into groups having a similar ecology. This would, if it were possible, allow more specific origins to be postulated.

8. Cess component

Papaver	Nematode eggs: *Trichuris*
Chelidonium	Ascaris
Sinapis type	
Hornungia type	
Anthemis type	
Centaurea cyanus	
Cereal type	

This is an especially interesting group, in that the high cereal pollen percentages (see Fig. 9) may derive from faecal material. The transport of cereal pollen in cereal bracts has been discussed (Robinson and Hubbard 1977) and such pollen types have been found in pollen spectra in samples obtained from cesspits (Greig 1981). It is possible that pollen of associated arable weeds such as listed above may have been incorporated in the same way. A cess component in the uppermost sediments (0–33cm) is also suggested because of the presence of the eggs of the intestinal parasites *Trichuris* (whipworm) and *Ascaris* (roundworm). These have similarly been frequently found in cesspits and latrines (Taylor 1955, Pike and Biddle 1966, Greig 1981 and Scaife unpublished). These parasites are associated with man and his domestic animals, especially pigs.

Although the sediment texture and pollen content of the deposits strongly indicate a high cess component, the possibility that these pollen types come from animal feed and waste offal cannot be precluded. In either case, there is substantial written evidence that streams in London were running sewers (Ziegler 1969) into which a wide range of urban waste was disposed of.

It is evident that a great diversity of pollen types is present, possibly representing varying modes of incorporation into the sediments of the Broad Sanctuary sequence. As seen above, the interpretation of such an assemblage is a function of both natural and human dispersion factors. Consequently, as seen, the interpretation of the pollen spectra can be difficult and itself a reflection of the diversity of urban habitats, surrounding plant communities and anthropogenic causes.

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