

Excavations at the former Lauder Technical College, Dunfermline

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ABSTRACT

A rescue excavation on the site of the former Lauder Technical College revealed a stretch of the precinct wall, probably dating from the 14th century, of Dunfermline Abbey and, underlying it, an earlier boundary ditch. Within one of the burgage plots laid out against the precinct wall were the remains of a medieval corn-drying kiln and a structure thought to be a loom stance, dating from the early 19th century.

INTRODUCTION

HISTORICAL BACKGROUND

Dunfermline had evidently achieved burgh status by about 1130 (Duncan 1975, 465; Lawrie 1905, 3), two years after work had begun on the great Benedictine abbey which replaced the earlier monastic house founded by Queen Margaret in c 1070 (RCAHMS 1933, 107). The precise location of this early settlement is open to speculation: it seems to have failed by the end of the 12th century when it may have been absorbed into the new township that evolved around the abbey (Duncan 1975, 472). By the end of the 13th century, the abbey had become one of the greatest monasteries in Scotland. Only a few years later, in 1303, it was attacked and its claustral buildings demolished by King Edward I who also commanded that a defensive ditch be dug around the burgh. The course of that ditch has yet to be traced (Webster & Duncan 1953, 16).

The restoration of the monastery was under way by 1329 but in 1385 both town and abbey were put to the torch yet again, this time by King Richard II's army. Religious reformers demolished parts of the abbey in 1560 (Cowan & Easson 1976, 58) and in 1624 most of the buildings within the burgh were destroyed by fire. Notwithstanding these setbacks, the burgh continued to prosper and by 1500 a thriving community with numerous tradesmen dwelt within its boundaries (Gourlay & Turner 1978, 3; Henderson 1879, 81). By the 15th century at the latest, the manufacture and processing of textiles, particularly wool and linen, appears to have been well organized. Textile manufacture continued to be very much a cottage industry well into the 16th century: in succeeding centuries production became increasingly more mechanized and more organized. The town's close association with the textile industry – and also coal mining – continued into the 20th century.

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LOCATION (ILLUS 1–3)

The solid geology of the area consists of rocks of the Limestone Series of the Lower Carboniferous Group (Cameron & Stephenson 1985, fig 1). Overlying the bedrock are deposits of grey-brown glacial till comprising mainly clays and silts. Relatively stone-free clays tend to predominate on and around the excavation site.

From the centre of Dunfermline the ground slopes down towards the Firth of Forth, some 4.5 km to the south. The excavation site (centred on NT 093872) was on this slope, in the south-east corner of the medieval burgh and about 200 m ESE of the abbey. Whereas the gradient could be expected to assist surface drainage (at least to some degree), the clayey nature of the subsoil tends to override any such benefit. As a result, numerous rubble- and box-drains had been cut into the clay throughout the site. Most, if not all, of these drains are thought to be comparatively late in date; although to prevent waterlogging similar remedies would have been employed during medieval times.

The site lay within the precinct of the former Lauder Technical School (later College) which comprised: two substantial grey sandstone constructions (the Carnegie Building and the High School) which date from 1899; a red sandstone building, known locally as the 'Red Tech', built in 1910 and fronting New Row; and several later 20th-century buildings of lesser architectural merit. In 1970 the college was transferred to a new location on the outskirts of town: some of its original buildings were reused for other purposes and some abandoned altogether.

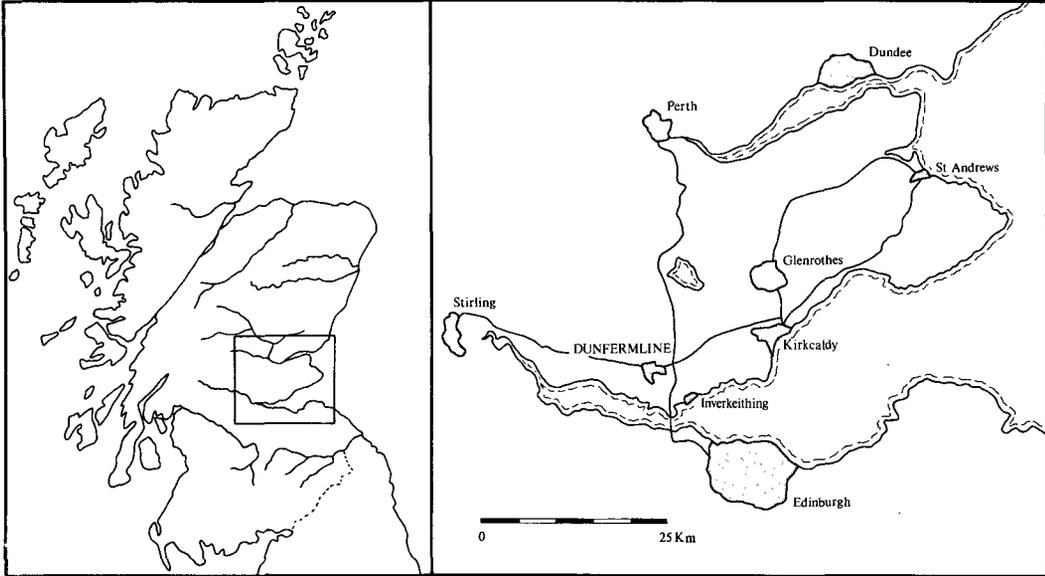
The area of investigation, roughly the northern half of the school grounds, was irregular in shape with maximum dimensions of about 145 m east/west and 56 m north/south. It was bounded on the east by New Row, on the south by a bowling green and a car park to the front of the High School and the Carnegie Building, on the west by a private house and garden and on the north by the grounds of the Carnegie Dunfermline Trust. Between the Carnegie Building and the High School there was a flight of stone steps which linked the yards on the north and south sides of the main school buildings.

EXCAVATION STRATEGY

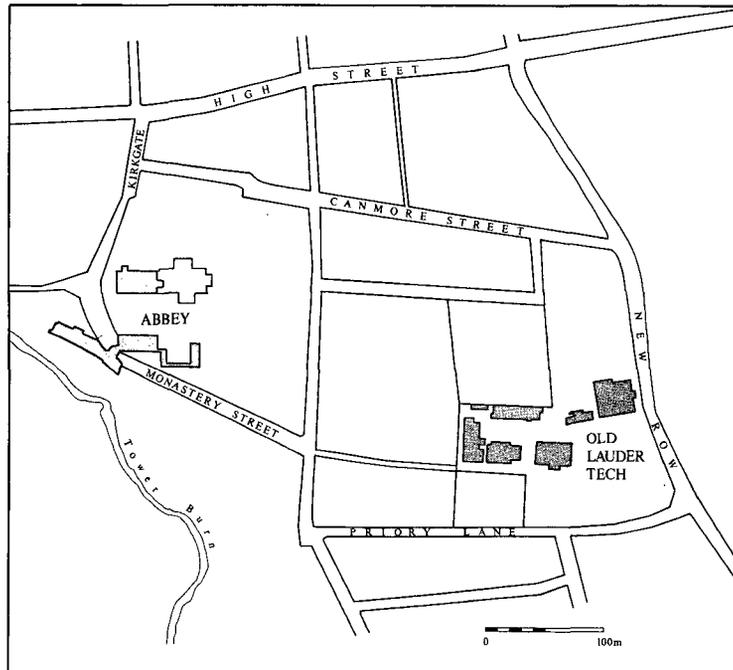
Early in 1993 work began on the redevelopment of the old school. Central to this project was the demolition of all its standing buildings except the High School and the Carnegie Building. Thereafter new residential apartments, including some sheltered housing, were constructed on the site and the façade of the 'Red Tech', which had been demolished by hand, was rebuilt. The potential disruption to the archaeological record caused by demolition and construction work was increased by the insertion of an access road linking the new buildings with New Row and the installation of services throughout the complex.

It was known that a section of the abbey precinct wall ran along Priory Lane, returning northwards through the grounds of the school. Much of the development site was located to the west of this wall, within the former precinct of the abbey. Although this part of the precinct was some distance from the abbey church, it may have contained peripheral monastic structures, fishponds or perhaps gardens and orchards. The 'Red Tech', located further east, was thought to have been built over some of the burgage plots that are known to have existed on New Row by the late 15th century (see below).

Thus the decision to redevelop the school grounds was perceived as a threat to the archaeological record of both the abbey and the burgh of Dunfermline. Consequently, an



ILLUS 1 Location of Dunfermline



ILLUS 2 Central Dunfermline, showing the locations of the abbey and the former Lauder Technical College

assessment of the site's archaeological potential was carried out before demolition and building work began.

Trial trenching, carried out by the Scottish Urban Archaeology Trust (SUAT) in January 1993, revealed the foundations of a masonry wall, thought to be the monastic precinct wall, to the rear of the 'Red Tech'; and what appeared to be medieval garden soils within two other trenches to the north of the Carnegie Building and the High School. Trenching to the front of the 'Red Tech' revealed an active sewer pipe which proved impossible to circumvent, thus halting investigations in that part of the site. Based on the evidence uncovered by SUAT, a more extensive programme of excavation was then undertaken: the project was funded by Fife Regional Council, Fife Enterprise, Historic Scotland and the Carnegie Dunfermline Trust and implemented by Scotia Archaeology Limited. Notwithstanding, there was no time to complete a full-scale investigation of the entire threatened area before the developers (*Nicol Demolition & Dismantling Limited* and *Bald Construction Limited*) began operations.

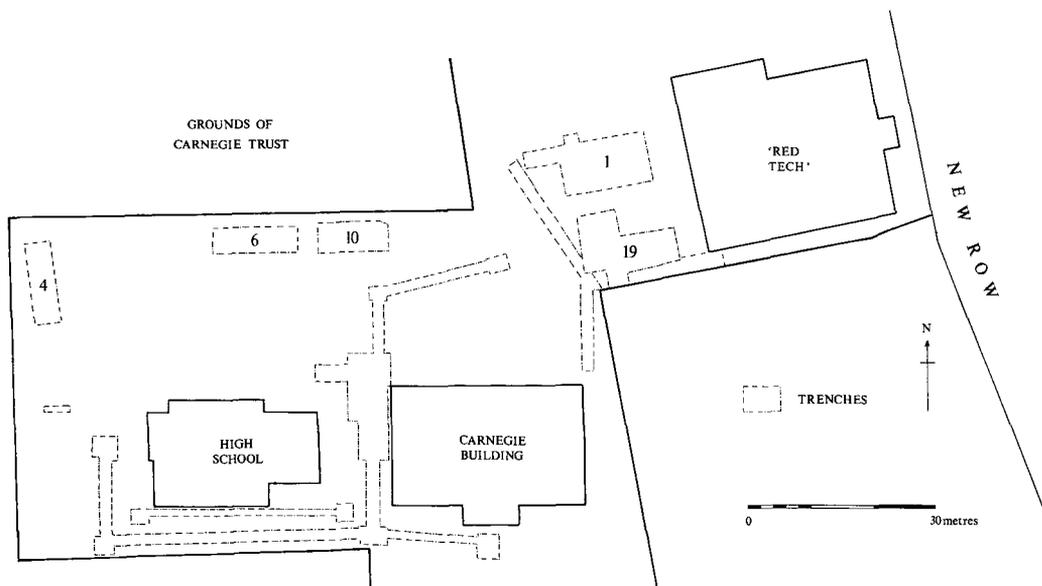
The excavation continued over a period of three months from late January to late April 1993. Much of this period was spent monitoring the machine excavation of service trenches; although from time to time opportunities arose whereby parts of the site could be excavated by hand. In all, 21 definable trenches were opened, five of which were excavated by hand. Several of these trenches were connected during the latter stages of the excavation, when large areas of the site were stripped by the builders. Within the largest of the hand-dug trenches (Trench 1), which measured 22 m east/west by 10.5 m wide, up to 1.65 m of tarmac, rubble, clay and garden soils, all containing late 19th-century artefacts, overlay features of archaeological interest. Because of time limitations, investigations within this trench were restricted to the area adjacent to the 'Red Tech' wherein were uncovered features and deposits associated with the late medieval occupation of New Row; and to the west end of the trench which included further evidence of burgage plots as well as a section of the abbey precinct wall and an earlier ditch.

To the immediate south of Trench 1, and separated from it by an interval of only 3.5 m, was Trench 19 where evidence of two phases of medieval cultivation, a corn-drying kiln and a structure thought to be associated with the post-medieval textile industry were uncovered. Investigations within Trench 19 were not completed because of time limitations and appalling weather conditions; the trench being waterlogged before many of the features could be recorded adequately and before the area was relinquished to the developers. Another hand-dug trench (Trench 4), located in the extreme north-west corner of the site, contained the fragmentary remains of what is interpreted as an abbey outbuilding. Two other trenches (6 and 10), adjacent to the northern boundary of the site, contained little evidence of pre-19th-century activity.

In only one of the 16 machine-dug trenches was any feature of significance identified. This feature proved to be a ditch which ran approximately north/south, parallel to the monastic precinct wall. Only a very cursory examination of this ditch was possible within the short space of time the trench lay open; although the same ditch was exposed within an extension to Trench 1, dug at a later date (see below).

There was no other occasion when any feature of interest was seen to be damaged during the 1993 redevelopment of the site and it is felt that little of archaeological importance was actually lost during this process.

Most of the many textile looms housed within the 'Red Tech' were scrapped. The majority of these looms, which were made in northern England (including Blackburn, Burnley and Derby), dated from the early decades of the 20th century.



ILLUS 3 The principal buildings of the former Lauder Technical College and the locations of the main excavation trenches

THE RESULTS OF THE EXCAVATIONS

There was nothing to suggest that any part of the site had been occupied prior to the foundation of the abbey in the 12th century, although it is not impossible that 19th- and 20th-century developments have obliterated such evidence. In all likelihood, evidence of the medieval and later occupation of New Row was destroyed during the construction of the 'Red Tech', whose foundations extended well into the subsoil. It was also noted that the foundations of a modern brick building had cut across a medieval masonry structure identified within Trench 4 (see below). Further damage had resulted from the construction of the High School, the Carnegie Building and perhaps some of the other school buildings.

The stratigraphic sequences on either side of the precinct wall were very disparate below 19th-century levels. As a consequence, it was impossible to relate the medieval levels inside the monastic precinct with those associated with the medieval burgh; hence these two principal strands of the site's archaeological record are described separately herein.

THE ABBEY PRECINCT

Although 80% of the site was located within the former precinct of the abbey, the material evidence of monastic occupation was limited to three groups of features located in three separate parts of the site. These features comprised: parts of the eastern section of the precinct wall (exposed in Trenches 1 and 19), an associated path and, underlying the path, an earlier boundary ditch; the remains of a masonry building, possibly of two phases, in the extreme north-west corner of the site (Trench 4); and, midway between them (in Trench 6), a large pit of unknown function and uncertain date.

No trace was noted of any timber buildings, although such evidence would have been all but impossible to detect within the machine-dug pipe trenches. However, even in those trenches excavated by hand no such evidence was discerned.

THE DITCH (ILLUS 4–5)

The edge of the ditch was located at the west end of Trench 1 although its significance was not appreciated until it was identified in a nearby, machine-dug pipe trench. There was no opportunity to investigate the ditch within the pipe trench, other than to record its approximate north/south alignment which was cut at an oblique angle by the excavation trench. The extension of Trench 1 a further 5.0 m westwards allowed a section to be cut across the ditch. Even then, there was only enough time to machine excavate the 2.5 m-wide trench and to clean and record its sections before the trench had to be backfilled.

Overlain by up to 1.65 m of recently deposited materials, the ditch measured 2.0 m wide at the top, narrowing to 0.90 m at its rather flat base which lay only 0.85 m below the estimated contemporary ground level. The dimensions of this ditch suggest that it may have served simply to define the monastic boundary, although a ditch with a similar profile, excavated recently at the ecclesiastical Palace of Spynie in Moray, almost certainly formed part of that castle's defensive system (Lewis forthcoming). Although there was no evidence of a rampart or a palisade associated with the ditch at Dunfermline, either or both could have been swept away when the precinct wall was built to the immediate east of the ditch or perhaps at a later date. Whatever its primary function, the ditch probably also served as an open drain, a role it attempted to replicate during the brief period it was open in 1993! Although the ditch was exposed within Trench 1 and within the nearby pipe trench, it did not extend into Trench 19, probably because its course veered westwards near this point. No trace of the ditch was noted in any of the machine trenches and it must be wondered if its course extended below the school's Carnegie Building.

It has been mooted that the ditch was merely a natural water-course. If it was, on the evidence of its profile, it was probably scarped at some stage. It is reasonable to expect that streams flowed downhill from the spring line that runs east/west near the present High Street. What appeared to be such a stream bed was located within a machine trench below the east end of the former 'Red Tech' building although there was no opportunity to investigate this feature in any detail.

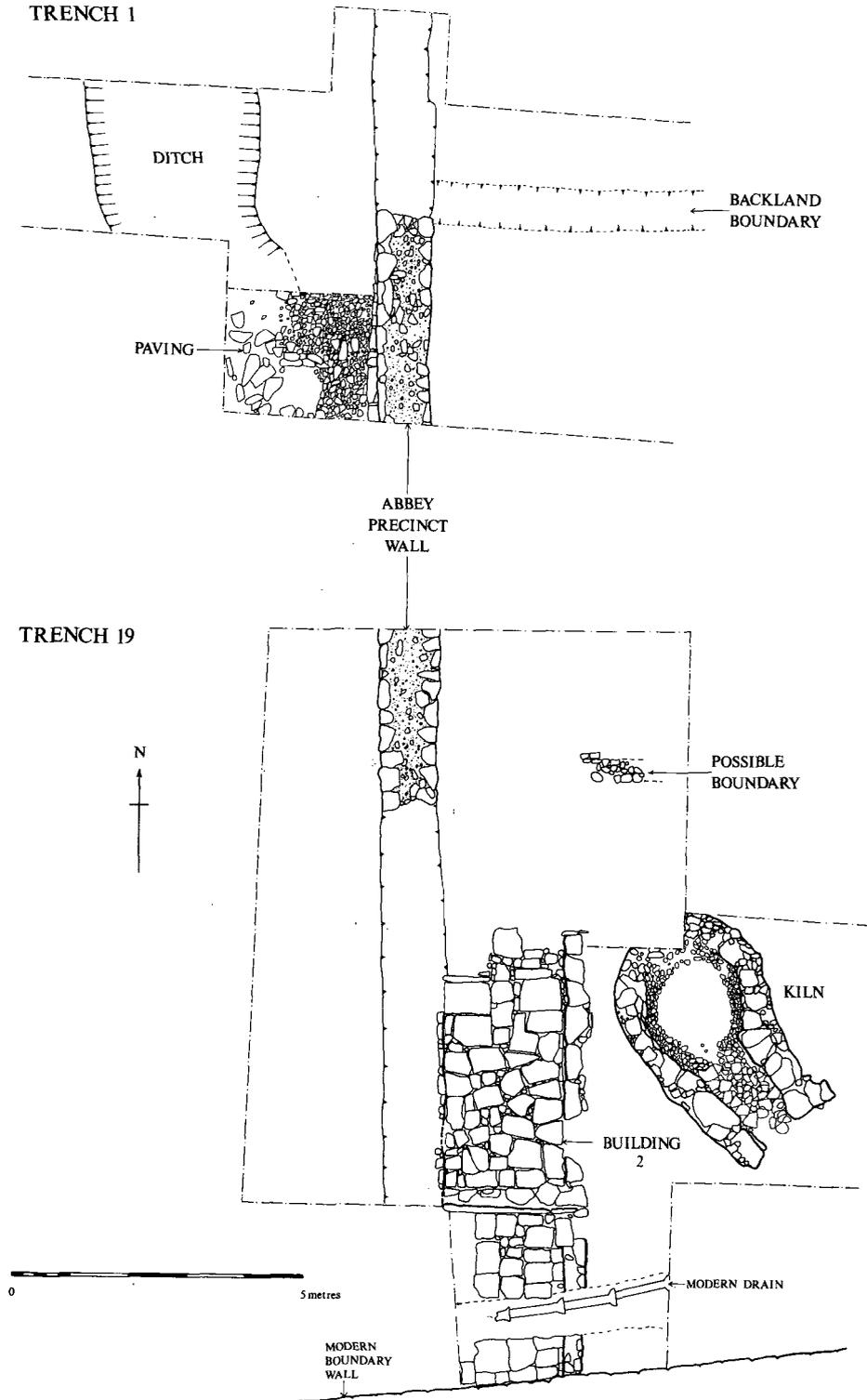
The primary fills of the ditch comprised 0.20 m of blue-grey clays, materials washed in while the ditch lay open. There was no evidence of when the ditch was cut and no positive indication as to how long it lay open although it appears to have been infilled deliberately and the area levelled in readiness for the construction of the precinct wall (see below).

THE PRECINCT WALL AND ASSOCIATED FEATURES (ILLUS 4)

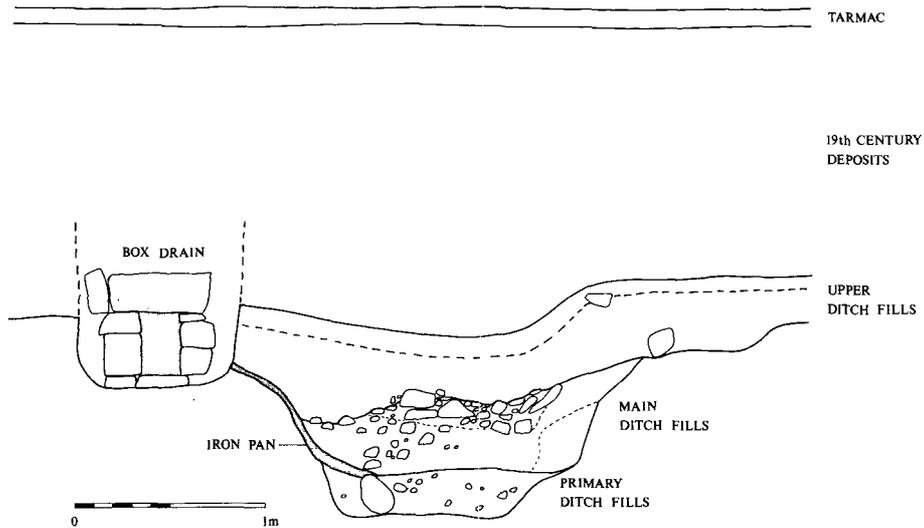
The construction of the wall was preceded by the deliberate infilling of the ditch, mainly with clayey soils and rubble, those materials having since subsided under the weight of overlying deposits (illus 5). A single sherd of green-glazed pottery recovered from the bottom infilling deposit indicated that the ditch was abandoned in the 14th or even the 15th century.

The precinct wall was identified both in Trenches 1 and 19, which were separated by a gap of only 3.5 m. In Trench 1 it lay to the immediate east of the infilled ditch although in places its course could be traced only by a robber trench. The wall measured 0.90 m wide, stood to a maximum height of 0.50 m and was built of two faces of roughly dressed, mortar-bonded, sandstone rubble enclosing a core of smaller rubble. Its east face was near vertical whereas on its west side the first two courses were stepped out slightly.

The base of the wall rested on a thin layer of silty clay and crushed sandstone which extended westwards over the infilled ditch, thus defining the relationship between these two probable boundaries. Bedded into this layer was a layer of small, unworked sandstone flags which extended westwards from the wall, over the edge of the infilled ditch. These flags are interpreted as the remnants of a path which perhaps continued around the inside perimeter of the precinct wall. They were reasonably level near to the wall whereas they sloped downwards towards the west where they overlay the ditch, probably because of subsidence within its infilling materials.



ILLUS 4 Trenches 1 and 19 showing the boundary ditch and precinct wall of the abbey, a corn-drying kiln and Building 2 within one of the backlands behind New Row



ILLUS 5 Section across the boundary ditch

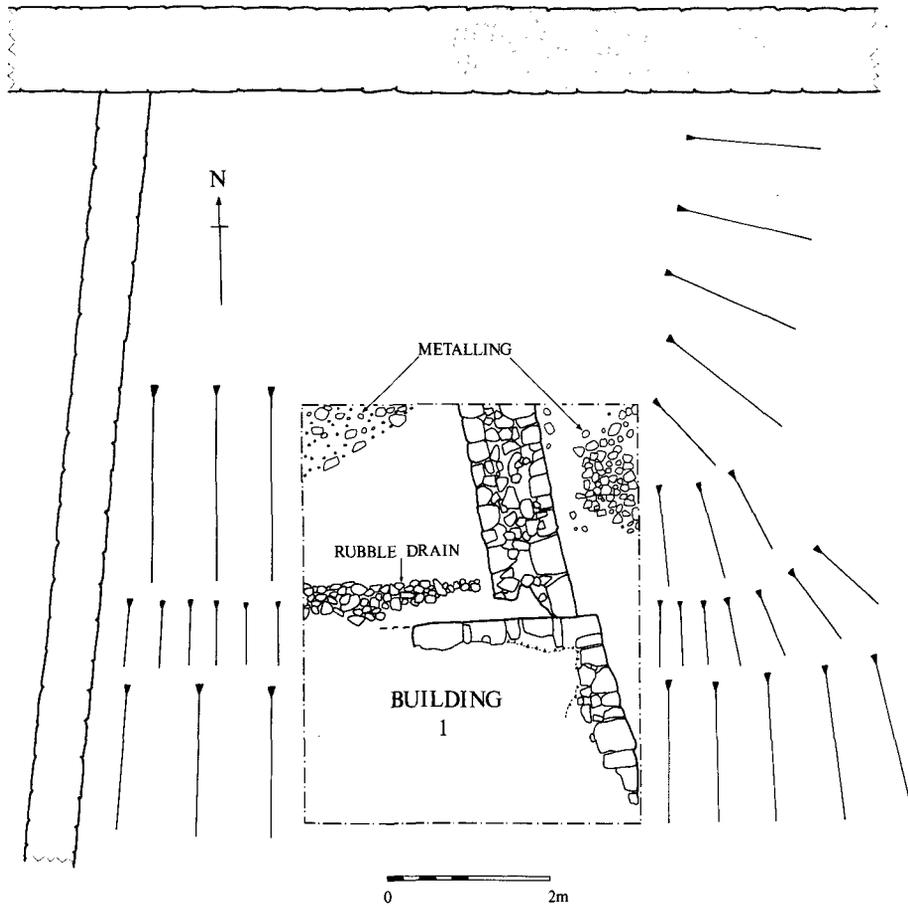
THE PIT

Towards the north end of Trench 6 was a sub-circular pit, measuring 1.30 m by 1.10 m, with gently sloping sides and a fairly flat base. It was 0.40 m deep although originally it may have been cut from a higher level. There was no trace of lining materials other than the clayey subsoil into which the pit was cut and there was no indication of its function; or even whether it was associated with the V-shaped, stone-sided drain that extended into its south-east corner. The pit was infilled with grey-brown clay and angular, sandstone rubble, the latter perhaps derived from the truncated drain. Within the clay were eight conjoining sherds from the base of a ceramic vessel with a smooth, grey-brown fabric of uncertain provenance. Unfortunately, it has proved impossible to date this material.

BUILDING 1 (ILLUS 6)

Only a short period of investigation was possible in the extreme north-west corner of the site which bordered on the grounds of the Carnegie Dunfermline Trust to the north and a private house and garden to the west. Trench 4 was originally 13 m long (north/south) but only in its northern 4.5 m did anything of archaeological interest survive, the rest of this area having been disturbed during the construction of one of the school buildings. The overburden, up to 1.0 m deep in this part of the site, had been deposited during the 19th century to support a flight of steps which gave access to the grounds of what was then a branch of the Bank of Scotland.

The main structural element surviving in this trench comprised the badly truncated corner of a masonry building (Building 1). Only 2 m stretches of its north and east walls remained and, even then, only their outer faces were intact, each standing to a maximum height of about 0.40 m (one to two courses). The east wall was of rubble construction whereas the north wall was built mainly (but not wholly) of ashlar blocks, presumably reused from earlier, demolished abbey buildings. Each wall was clay-bonded and set into a shallow bedding trench that was cut into what appeared to be buried garden soil. Curiously, the two walls met at an angle of about 110° although they were certainly tied into each other and there is little doubt that they were contemporary.



ILLUS 6 Trench 4

Abutting the north wall of Building 1 at right angles, 0.10 m from its north-east corner, was another wall, constructed of two faces of substantial sandstone rubble which were clay-bonded and which enclosed a core of smaller stones and clay. This wall was 0.90 m wide and stood to a maximum height of 0.35 m (two to three courses). The working relationship between this wall and Building 1 has not been explained: the building may simply have been extended at some stage; alternatively the secondary wall may have served as some sort of boundary, subdividing parts of the outer court of the monastery, such as its gardens or orchards.

Spreads of cobbles and gravel in the north-west corner of the trench and to the east of the secondary wall are interpreted as metalling which, being outwith Building 1, were perhaps the remnants of roads or paths.

A rubble drain, consisting of rounded and sub-rounded cobbles, ran along the outside of the north wall of Building 1 and may have been contemporary with it. Each of the three walls sealed humic loams (perhaps buried garden soils) containing sherds of pottery with white gritty fabrics which cannot be dated any more accurately than 13th–15th century. Even less certainty surrounds the function of Building 1 from which no pertinent information was forthcoming.

OUTSIDE THE ABBEY PRECINCT

PRE-BURGHAL ACTIVITY

The earliest feature uncovered outside the abbey precinct consisted of a series of cultivation furrows (probably ploughmarks), located within a sondage that straddled the precinct wall at the north end of Trench 19. These furrows, which cut into the subsoil, were aligned north/south, parallel to the precinct wall, and varied in width between 0.10 m and 0.25 m; unfortunately, there was insufficient time to excavate them and their depths remain unknown. For the same reason, it was not possible to extend the sondage to the west of the wall although a cursory examination of that area suggested that the glacial till had not been disturbed, indicating that the area of cultivation was demarcated by the monastic boundary and therefore predated the foundation of the abbey.

BURGAGE PLOTS

Material evidence of burghal activity was, as expected, confined to Trenches 1 and 19. Although exploratory trenching to the front of the 'Red Tech' had proved unproductive because of a modern sewer pipe, it was anticipated that some indications of medieval frontages might survive below the northern half of that building which, unlike its southern half, was not cellared. This proved to be a false hope because the school building sat directly upon undisturbed glacial till which at this point was approximately 1 m above that within the backlands. It was also noted, during the excavation of a pipe trench across New Row, that the bedding materials for the modern road surface lay directly on the subsoil. These two facts suggest that during five centuries or more of occupation on New Row the levels of roads and buildings remained fairly constant while there was a considerable accumulation of materials within the backlands of the burgage plots.

The most convincing evidence for a division between these backlands consisted of a linear cut, 0.70 m wide and 0.25 m deep at the excavated level, which extended eastwards from the abbey precinct wall in Trench 1. This shallow ditch was infilled with humic loam containing large quantities of coal and sherds of 16th-/17th-century pottery; although this may not be an accurate indication of the date when the feature was abandoned. There was no evidence of a hedge or fence associated with this narrow trench although such evidence may have existed only at a higher level and been removed during more recent occupation.

Towards the northern edge of Trench 19 there was an indication, albeit inconclusive, of another possible boundary. This consisted of a short row of rounded boulders which, rather than forming the boundary itself, may have been the result of cleared stones being deposited against a fence or hedge which, in turn, was removed at a later date. These boulders were located midway between the boundary gully in Trench 1 and the (?19th-century) wall which formed the southern limit of Trench 19 and which was built on an earlier masonry wall of uncertain date. Alternatively, the boulders may have been associated with the path leading to Building 2, a possible loom stance depicted on the OS map of 1856 (illus 8).

Although it can be assumed that the soils separated by the boundary ditch in Trench 1 (and perhaps those divided by the line of boulders in Trench 19) were within different backlands, they were indistinguishable from each other. They comprised 0.35 – 0.40 m of almost stone-free, orange-brown, silty loam containing artefacts and ecofactual remains fairly typical of medieval garden soils. These remains included substantial quantities of medieval pottery, mostly unglazed, white gritty wares; several carbonized cereal grains, tentatively identified as wheat and oats; and fragments of charcoal. An atypical characteristic of these soils was the almost complete absence of animal bones of which only a few fragments were recovered.

Until the recent development of the site, those parts of the backlands contained within Trench 1 appeared to have been given over mainly to the growing of crops whereas two structures associated with late medieval or post-medieval industries were uncovered within Trench 19. Both structures were cut into medieval levels and were located towards the east end of one of the backlands. They consisted of a corn-drying kiln and, apparently post-dating the kiln, a small, rectangular building thought to be associated with Dunfermline's early textile industry.

THE CORN-DRYING KILN (ILLUS 4)

The kiln, located some 3 m from the abbey precinct wall, was aligned NW/SE and measured 4.2 m long and up to 2.6 m wide overall. Its bedding trench, which did not extend far beyond the walls of the kiln, had been cut through medieval garden soils and other disturbed deposits containing 15th-century pottery. Similar pottery was recovered from the fill of the kiln's foundation cut. Because of time restrictions and severe waterlogging towards the end of the excavation, only a cursory examination was possible of the deposits that underlay the kiln; and it would be unwise to date its construction on the evidence of a few sherds of pottery which may have been in residual contexts.

The kiln walls, built of clay-bonded, unworked sandstone rubble and basaltic boulders, were approximately 0.60 m wide and survived to a maximum height of 0.60 m. Neither the masonry nor the clay exhibited any adverse effects of firing. Some of the walling within the flue was of orthostatic construction whereas the lining of the bowl comprised up to five courses of flattish rubble. The flue was 1.6 m long and 0.80 m wide and was floored with rough sandstone flags. Internally, the circular bowl measured 1.60 m in diameter and was unfloored apart from a few small cobbles around its inside edge.

Within the central part of the bowl and within the flue there were thin deposits of black silt containing carbonized seeds of barley and oats as well as numerous small seeds from weeds of cultivation. Approximately 11% of the barley grains had germinated, suggesting that at least some of this cereal had been malted and probably used for brewing. Burnt heather leaves were abundant and small diameter wood charcoal, possibly from heather stems, was also present: these may indicate one of the sources of fuel that fired the kiln.

The rubble and clay that infilled the kiln were probably derived from the collapse of its walls. There was no trace of roofing materials such as flags or turves, suggesting that either the roof had been removed when the kiln was abandoned, the structure had been covered with less permanent materials (?heather thatch) or it did not have a permanent roof.

EARLY MODERN FEATURES

To the west of the precinct wall there were no structural remains, other than drains, that could be dated to the period between the dissolution of the abbey and the construction of the Lauder Technical College. The rubble drains in Trenches 6 and 10 may have carried ground water away from the premises of the then Bank of Scotland (illus 8). Alternatively, these drains may have been associated in some way with the 'old bleachfield or abbey gardens and park' referred to in 18th- and 19th-century title deeds (Val Roll 1850), as perhaps were the numerous rubble drains and crude box drains located immediately west of the precinct wall in Trench 1.

What appeared to be a well was uncovered in the side of the pipe trench adjacent to Trench 1. Examination of the first edition OS map suggests that this was the 'pump', located some 7 m west of the abbey precinct wall (illus 8).

BOUNDARIES

Overlying the base course of the demolished abbey precinct wall in Trench 19 were the remains of another wall, built of mortar-bonded rubble with a few inclusions of brick fragments. This secondary wall, which extended 4.7 m into the northern part of the trench, was only 0.50 m wide and survived to a maximum height of 0.68 m. The construction of this rather narrow wall probably followed the natural demise of the precinct wall for it would be reasonable to assume that, because it served as the western limits of the plots that were ranged along New Row, the abbey boundary was spared the ravages that followed the Reformation.

The medieval backland boundary ditch, located in Trench 1, was succeeded by a narrow wall of identical alignment whose robber trench was infilled with rubble containing sherds of 19th-century pottery. This wall is thought to be the selfsame structure that ran from the abbey precinct wall to the north end of a large building that straddled two former backlands and which is illustrated in the first edition Ordnance Survey map of 1856 (illus 8).

Building 2 (illus 4 & 8)

Located a mere 0.40 m from the kiln was a masonry structure (Building 2) whose function remains uncertain but which is thought to have been associated in some way with the textile industry. On the evidence of the apparent relationship between partially excavated deposits, this structure appeared to post-date the kiln. According to the first edition Ordnance Survey map, it was still visible in 1856, although its superstructure was not necessarily still standing at that time. There was no indication on the map as to the function of Building 2.

Building 2 lay in the south-west corner of a backland, against the abbey precinct wall (or its replacement) and, on its south, against a wall that divided this property from its neighbour. Only two courses of the structure's east wall and even less of its north wall remained. Both walls were built of clay-bonded, sandstone rubble, the former being 0.50 m wide; while the width of the latter can only be estimated as 0.80 m.

Internally, Building 2 measured 6.8 m north/south by 2.0 m wide and was divided into two unequal chambers by a wall of pitched sandstone slabs which is unlikely to have stood to any great height. Both rooms were floored with sandstone flags, some of them neatly squared with their joints packed with clay, sand and gravel. The larger chamber was set 0.40 m below the probable medieval ground surface whereas the smaller room was more or less level with it.

It is suggested that the smaller room provided a platform from which an operative might have controlled whatever process was carried out in the main chamber. There was no definitive evidence as to the nature of this process although it may well have been associated with weaving.

Projecting 1.0 m into the north side of the structure was a dwarf wall on either side of which the floor sloped steeply upwards to meet the north wall of the building. It has been suggested that these sloping flags were associated in some way with the insertion or removal of materials into or out of the structure's main chamber although there was no indication of what those materials might have been. Samples taken from the surface of the flags and from the gaps between them yielded no information of value.

THE FINDS

THE POTTERY

Robert Will & George Haggarty

The ceramic assemblage contains sherds of pottery dating from the 13th to the early 20th century. Most of the modern material was discarded, only representative samples of other vessels being retained.

MEDIEVAL WARES

Of these 436 sherds, most were formed of a local examples of what is known as Scottish east coast white gritty ware, a broad pottery type with a very long lifespan ranging from the mid-12th century (Cox 1984) to the late 15th century (MacAskill 1983). The problems of dating this material and of its provenances have been discussed extensively elsewhere (Brooks 1980; Crowdy 1986; Haggarty 1984). Thus far no kiln site has been identified in Fife; although some possible kiln-wasters were recovered from Inverkeithing (MacAskill 1983, 541). There may also have been a production site near Tentsmuir or Leuchars, on the evidence of the huge number of sherds found during field-walking in that area (Laing 1967, 143). For an updated account of the evidence relating to Scottish east coast white gritty ware see Haggarty & Will (forthcoming).

Most of the Dunfermline white gritty wares date from the late 14th or early 15th century. However, a few smoke-blackened sherds from cooking pots may be of 13th-century date.

Eight conjoining sherds from the base of a vessel were retrieved from the pit in Trench 6. This example of a reduced white gritty fabric had a fairly smooth texture and was grey-brown in colour. The lack of distinguishing features and the badly abraded surface made it impossible to date this material or to deduce its source.

One sherd of late 13th- or early 14th-century Yorkshire ware was identified. There were many pottery kilns operating in Yorkshire during this period and vessels from those factories have been recovered from a number of sites along the east coast of Scotland (Watkins 1987, 107).

POST-MEDIEVAL WARES

Thirty-six large sherds from reduced, green-glazed jugs of probable 16th- or 17th-century dates were recovered from the site, a few of the sherds being retrieved from the black, organic residue within the corn-drying kiln. This type of pottery is very common throughout Scotland.

There were also 21 sherds of partially oxidised wares dating from the 16th or 17th century. Although a wide range of vessels was manufactured in this fabric, all the Dunfermline sherds were from jugs. The only production site for these wares identified thus far is at Throsk in the upper Forth Valley (Caldwell & Dean 1992).

IMPORTS

Two sherds from Low Countries tripod-handled pipkins and one from a hammer-headed platter with slip decoration were recovered from probable residual contexts. These wares were produced at several sites in the Low Countries and North Germany during the 17th and 18th centuries, the precise source of the material being very difficult to establish because the source clays are almost identical. Sherds of these wares tend to occur only in very small numbers in Scotland, the largest assemblage so far published being from Scalloway Castle, Shetland (Lindsay 1983, 567). Another substantial group was recovered from Papa Stour, also on Shetland (B Crawford, pers comm).

MODERN WARES

The 19th- and 20th-century material that was retained includes industrial stonewares and terracotta and white earthenwares, the latter representing several vessels and styles.

There are 23 very small sherds of blue, hand-painted, tin-glazed Anglo-Dutch wares, dated to the period c 1720–80.

A base sherd with the backstamp 'J J & Co' and the print name 'Bosphorous', can be attributed to Jamieson's of Bo'ness which operated between 1826 and 1854. Another sherd, decorated with a fish, which has been engraved through the glaze, is probably from Alloa. Ten conjoining sherds from a late 19th-century earthenware chamber pot with brown 'mocha' decoration were retrieved from a high level in Trench 1.

CLAY TOBACCO PIPES

Dennis B Gallagher

Only nine fragments of clay pipes were recovered from the excavation, all of them from relatively recent contexts. The majority of these fragments date from the 19th or early 20th century: a bowl fragment and a stem fragment can be dated to the 17th century.

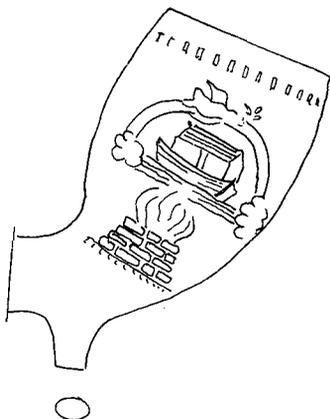
CATALOGUE

Bowls

- 1 Fragment of a bowl wall, in a buff fabric, bottered; no measurable stem bore diameter; late 17th century.
- 2 Spurred bowl with mould-imparted milling and a depiction in relief of Noah's Ark, a rainbow with dove bearing a branch and, below, flames arising from an altar (illus 7).

Marked Stems

- 3 Stem with T W & C^o/EDIN^R in relief: 4/64"; Thomas White of Edinburgh; 1825–70 (Gallagher 1987a).
- 4 Stem with ...WILLIAMSON/DUNFERM.. in incuse sanserif lettering; 5/64"; members of the Williamson family are recorded as pipe manufacturers in Dunfermline, 1866–1903.
- 5 Stem with W.RICH.../...ERMLINE in incuse sanserif lettering; 5/64"; William Richmond is recorded as a pipe manufacturer in Dunfermline, 1852–1903 (Horgate 1980).
- 6 Stem fragment decorated by pellets and the number 866 in relief; 5/64".



ILLUS 7 Clay pipe bowl. Scale 1:1

DISCUSSION

The only complete bowl (no 2) recovered from the excavation is decorated with hitherto unrecorded Old Testament scenes. It depicts Noah's Ark with a dove bearing an olive branch and a rainbow. Below is an altar with flames, probably depicting the sacrifice offered by Noah after the flood, when God established a covenant with him. The rainbow was to be the eternal sign of this covenant, 'the sign I have established between myself and all living things on earth' (Genesis 9:17). The bowl is of a thick-walled, spurred type; similar bowl forms with figural designs, by William Richmond of Dunfermline, are illustrated in Horgate (1980, 9). This particular design contains the same symbols as those on a processional banner of the Ancient Order of Free Gardeners, now held in the People's Palace, Glasgow (M Donnelly, pers comm).

The assemblage includes a stem fragment (no 3) by Thomas White of Edinburgh who was the dominant pipe manufacturer in eastern Scotland during the first half of the 19th century (Gallagher 1987a). The two stems (nos 4 & 5) by Dunfermline makers Williamson & Richmond reflect the spread of the industry from the main centres of Glasgow and Edinburgh during the later 19th century when, as in many other towns, pipemaking was established in Dunfermline.

Stem no 6, which bears the number 866, is atypical of Scottish marking. The number represents a mould number; but no number as high as 866 is recorded in the lists of Scottish moulds in 1900 (Gallagher 1987b). The fragment may be of French manufacture.

PALAEOENVIRONMENTAL ANALYSES

Tim Holden, Dorothy Rankin & Alan Duffy

Of the samples that were analysed, six proved to be of archaeological value. Two of these (Samples 1 & 2) were retrieved from basal deposits within the boundary ditch of the abbey; two (Samples 3 & 4) were associated with the corn-drying kiln; and one each was taken from the presumed medieval and 19th-century garden soils (Samples 5 & 6 respectively) within the burgh plots at the east end of the site.

SAMPLES 1 & 2

These samples, taken from the primary silting deposits within the abbey boundary ditch, can be considered as a pair. Both contain uncarbonized seeds of *Rubus* sp (blackberry/raspberry) which have very thick outer coats and which survive longer in the soil than do the seeds of species with less robust coats. They are also notorious contaminants of sediments, being carried down the archaeological profile by worms and insects. This phenomenon has been discussed in some detail by Keepax (1977). It is possible that these seeds arrived into the deposits a little before the school was built, around the turn of the present century, after which much of the excavation site was covered with tarmac. It is thought unlikely that the deposition of these seeds was contemporary with the infilling of the ditch during the medieval period.

Presumably, less robust plant remains, either incorporated in medieval times or arriving as later contaminants, would have decayed, probably when the ditch fills dried out periodically. This is consistent with the low loss-on-ignition results, which indicate that very little organic matter survived. The presence of fungal sclerotia and a charred *Rumex* (sorrel) seed does not alter this interpretation: sclerotia are very robust and carbonized seeds would not decay.

SAMPLES 3 & 4

These samples were retrieved from beneath the bowl (Sample 3) and at the mouth of the flue (Sample 4) of the corn-drying kiln. Sample 3, in particular, contained a wide variety of carbonized plant remains. There is no evidence to suggest that these charred assemblages were associated with a building that had been destroyed by fire. It is more likely that these remains had built up over a period of time and that they represent an accumulation of charred debris from several firings of the kiln.

The plant remains in the two samples are very similar in range, comprising cereal grains, small seeds from weeds of cultivation, fragments of heather, small-diameter wood charcoal and fragments of waterlogged wood.

Cereals

Barley (*Hordeum vulgare*) forms 76% of the caryopses identified to genus; most, if not all, of it is hulled. Approximately 50% are straight-grained, as would be expected from a two-row variety although, in this case, the total number of grains within this sample may be too low to make such an assumption. No chaff or other detritus associated with the early stages of barley processing was recovered although lemmas and paleas still adhered to some of the carbonized grains. Approximately 11% of the barley grains have germinated with their embryos clearly protruding.

Grains of oats were also recovered from both samples although identification to species is not possible because only the grains and poorly preserved chaff, and not their diagnostic parts, have survived. There is no conclusive evidence of other cereals although some grains are badly distorted and cannot be identified with confidence.

Drying kilns were used to parch barley and oats to make their hulls brittle prior to hummeling (removing the awns), to dry grain before storage or grinding, and as part of the malting process. The presence of germinated barley grains implies that at least some of the grain was used for malting, a process which requires the grain to sprout before being killed by heat. The low proportion (11%) of germinated grain, together with the presence of oat seeds, are probable indications that the kiln was used for more than one purpose.

Non-domesticated species

Both samples are similar in composition although Sample 3 contains larger numbers of identifiable remains. Many of the seeds cannot be identified because of charring and post-depositional degradation.

Calluna vulgaris (ling heather) is well represented in both samples: plant parts include flower buds, flower heads, individual leaves and stem fragments with leaves attached. Sample 3 also yielded a total of 2.3 g of heather charcoal. The presence of flower heads, leaves and wood indicates that complete branches of heather were brought to the site. Ling heather is a species of well drained, acid soils and would have been transported separately from cereals. Most likely it was used as fuel for the kiln although it may also have been used to roof it or to form the bed upon which the grain was laid.

Other remains identified to species included: *Polygonum aviculare* (common knotgrass); *Polygonum lapathifolium* (pale persicaria); *Rumex acetosella* (sheep's sorrel); *Chenopodium album* (fat hen); *Stellaria media* (chickweed); *Raphanus raphanistrum* (wild radish); *Chrysanthemum segetum* (corn marigold); and *Lapsana communis* (nipplewort). All of these species are associated with cultivated land, commonly occurring among cereal crops. Similarly, the seeds identified to genus, including members of the *Brassica/Sinapis* group, are associated with growing crops and the marginal areas of land attached to cultivated fields.

SAMPLE 5

Among the carbonized plant remains recovered from the medieval garden soil are several cereal grains, tentatively identified as wheat and oats, and some weed seeds. Fungal sclerotia are also present. The few bone fragments that were found are too small to identify.

SAMPLE 6

This sample, taken from a well-worked, 19th-century garden soil, contains a wide range of ecofacts. There are numerous carbonized plant remains, comprising mainly weed seeds and fungal sclerotia; although one grain, tentatively identified as barley, was also retrieved. Many tiny fragments of bone were recovered; only one of them, a tooth from a large mammal, is identifiable. Many of these fragments have been burnt.

DISCUSSION

THE ABBEY PRECINCT

Although most of the excavation site was located within the former abbey grounds, it contained only a small proportion of the monastic precinct: it is therefore understandable that little evidence of structures was uncovered within this somewhat remote corner of the monastery.

Furthermore, the buildings standing within the outer court of a monastery were usually those that suffered most after the Reformation. Churches were often adapted to the needs of the local community, guest houses and other lodgings frequently assumed new roles as private, residential accommodation and claustral ranges survived as romantic ruins; but the more distant parts of abbey grounds usually reverted to agriculture in rural locations or were built upon in towns, as was the case in Dunfermline. Within outer courts would be found those buildings associated with the secular needs of a monastery, such as granaries, doocots, mills, smithies and warehouses. There might also be gardens, orchards, fishponds and even vineyards (although Scotland's climate usually ruled out the latter).

The outer boundary of a monastery was usually defined by a wall, which was often preceded by a ditch, as at Dunfermline. At the Augustinian priory of Thornholme on Humber side, the precinct was first demarcated by a temporary fence: this was replaced shortly after by a ditch which itself was superseded by a wall (Coppack 1989, 188). The excavators found no trace of any such fence at Dunfermline (although the evidence could easily have been swept away in antiquity): there the ditch was the earliest precinct boundary uncovered. If the ditch was contemporary with the main constructional phase of the abbey, then it must have lain open for some considerable time (until the 14th or even the 15th century) before being replaced by a fairly substantial stone wall. The course of that wall has been traced on the west, north and east sides of the abbey whereas its precise route remains unconfirmed on the south side of its precinct.

It was possible to follow the ditch only for a short distance although there was little doubt that, beyond the southern limit of Trench 1, its course diverged from that of the precinct wall. However, the evidence is too insubstantial to argue that there had been a major change in the alignment of the abbey boundary or that the precinct had expanded at some stage. Certainly there was nothing to suggest that the abbey lands had ever contracted under pressure from urban growth, at least on its eastern side.

There were very few traces of medieval structures within the excavated part of the precinct, only the flimsy remains of Building 1 and a wall abutting it in Trench 4. Little can be said about Building 1 other than, on the evidence of the reuse of ashlar masonry, that its construction seemed to post-date the demise of other abbey buildings which themselves may have been destroyed either in 1305, on the orders of Edward I, or in 1385 by Richard II. The secondary wall in Trench 4 may have formed part of an extension to Building 1 or, conceivably, it could have served as a boundary, perhaps dividing off parts of the abbey precinct, such as a garden or an orchard, as was the case with a similar structure at Grove Priory, Bedfordshire (Baker & Baker 1989, 270).

Outlying areas of a monastery were frequently given over to gardens and orchards and it would not be unreasonable to expect such an arrangement at Dunfermline, even though the depth

of humic soil to the west of the precinct wall was considerably less than that within the backlands of New Row. The greater depth of soil within those plots was the probable result of four centuries of fairly intensive cultivation whereas the area to the west of the wall is thought to have lain reasonably undisturbed until the construction of the Lauder Technical College. There may also have been a certain amount of topsoil stripping in the western part of the site; whereas the ground level towards New Row had been raised considerably by the deposition of large quantities of rubble and other debris before that area was covered with tarmac.

THE MEDIEVAL BURGH

It is regrettable that there was little opportunity to investigate the extent of the ploughmarks revealed within the sondage in Trench 19. There is no question that they predated the (?15th-century) burgage plots but it is not clear whether this land was cultivated prior to the construction of the precinct wall. However, it is thought likely that these ploughmarks, which were parallel with the precinct wall (and at right angles to the long axes of the backlands), post-date the construction of the wall but predate the laying out of the burgage plots.

New Row probably functioned as a thoroughfare from early medieval times, perhaps from the late 11th century, taking traffic from Queensferry and Inverkeithing to Dunfermline and destinations further north. As a consequence, parts of this route may have been settled, albeit sporadically, from relatively early times. By the late 15th century the west side of New Row was laid out in burgage plots. At the north end of the street this settlement had probably resulted from the market area expanding beyond Causagait (now High Street) (Beveridge 1917, 116). In many cases, these plots were defined on their western sides by the limits of properties fronting the south side of Causagait (Beveridge 1917, 337); whereas further down New Row the precinct wall of the abbey served as their western boundaries. This is supported by the evidence of excavation, particularly within Trench 1, where the shallow channel that ran eastwards from the outside face of the abbey precinct wall has been interpreted as the boundary between two medieval backlands. Only 10 m of this channel could be traced: beyond that it had been destroyed either during the construction of the 'Red Tech' or perhaps even earlier.

It is difficult to calculate the precise sizes of the medieval plots arranged along the west side of New Row from the evidence available although reasonable estimates can be made for properties in other parts of the burgh. For example, in Causagait frontage sizes varied between 20 ft 9 in (6.32 m) and 25 ft (7.62 m), the mean being 22 ft 6 in (6.86 m) (Torrie 1990, 52). Cartographic evidence indicates that by the early 19th century there was considerable variation in size between properties on New Row although widths of about 10 m were quite common (Wood 1823). The evidence of excavation suggests that there were similarly sized plots at an earlier date. The distance between the shallow boundary gulley in Trench 1 and the two-phase wall at the south end of Trench 19 was 20 m, with the line of boulders in Trench 19 being midway between the two. There was certainly nothing to suggest that the burgage plots in this part of New Row were of similar widths to those in Causagait; had this been the case, one of the backland boundaries would have cut across the corn-drying kiln (as well as Building 2) but there was no evidence of this from excavation.

THE CORN-DRYING KILN

The kiln was typical of those that have been investigated at several Scottish locations over the past few decades. Corn-driers appear to have changed little between the 11th century and well into post-medieval times (Close-Brooks 1980, 341; Gibson 1989, 226). Indeed, in the more remote

parts of the country, kilns similar to medieval types were still in use during the early years of the 20th century (Fenton 1976, 97). In each case a bed of straw (or similar material) was set on a lattice of sticks over the top of the kiln bowl. Grain would then be laid upon the straw and dried by a current of air passing over a fire located within the flue.

It would be all too convenient to date the Dunfermline kiln from the 15th-century pottery retrieved from the fill of its foundation cut. The conditions prevailing at the end of the excavation precluded the opportunity to examine the kiln in detail or to investigate the deposits into which it was set. Because the kiln is not depicted in the first edition Ordnance Survey map of 1856, all that can be said about its date is that it was in operation some time between the 15th and mid-19th centuries.

The Dunfermline kiln was similar in size to medieval examples excavated at Abercairny, Perthshire and Chapelton, Angus (Gibson 1989, 220; Pollock 1985, 363) and to another, of probable late 18th-century date, located near Spynie Palace, in Moray (Lewis, forthcoming). Evidently, the optimum size and form of corn driers were resolved at an early date and retained for a considerable period thereafter. Changes were inevitable during the agricultural improvements of the 18th and 19th centuries, when larger kilns were built to cater for the increasing demands of the grain mills although smaller kilns continued to be operated for domestic use. There was no trace of any building directly associated with the Dunfermline kiln, indicating that it was probably a free-standing structure.

As might be expected, the kiln appears to have been used primarily for drying grain prior to its storage and/or processing into meal. Evidently some of the barley was used for malting, the germination process being halted when the grain was dried or roasted. This diversification of function points to the kiln being privately owned and used on a domestic basis. It is not clear how this kiln was roofed. Some had permanent roofs of stone or slate whereas others were covered with less durable materials such as turf or thatch. There were no obvious remnants of a stone roof associated with the kiln at Dunfermline although such a resource would probably have been removed after the last firing. It is not inconceivable that, as well as fuelling the kiln, heather branches were used to roof it.

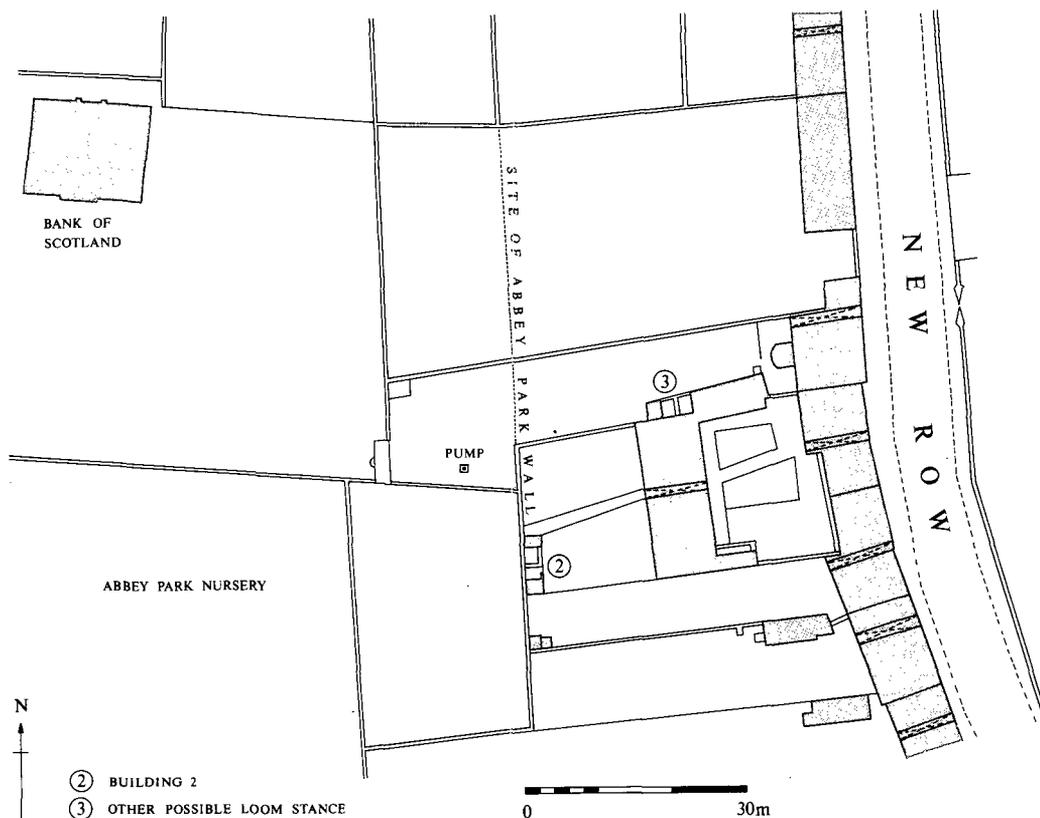
THE POST-MEDIEVAL BURGH (ILLUS 8)

There were probably few alterations to the basic layout of burgage plots in Dunfermline until the industrial developments of the 19th century. Even then those modifications were often relatively minor ones, sometimes amounting to little more than the construction of small workshops within the backlands of burgage plots.

It would be reasonable to assume that much of the abbey precinct wall was spared during the ravages that followed the Reformation because the wall served as the boundary of the plots ranged along New Row and elsewhere in the burgh. Inevitably, the wall would have had to be repaired on occasion and, on the evidence from Trench 19, stretches of it were rebuilt altogether.

BUILDING 2

The first edition Ordnance Survey map of 1856 depicts a feature similar in form and size and in an identical location to Building 2. Although the artefactual evidence implied that Building 2 was a late medieval or early post-medieval structure, the Ordnance Survey map suggests that it dates from a period considerably later than that. The map shows a path leading from New Row to



ILLUS 8 Part of New Row in the mid-19th century. (Based on the 1st edition Ordnance Survey map)

Building 2, via what appears to be a pend between two of the buildings fronting New Row and another through a larger property straddling two former backlands. It might be reasonable to assume from this that Building 2 was still operational in the mid-19th century.

There is no specific reference to this structure in documentary sources, probably because it was not considered important enough to mention. However, there are some pointers to its possible function. According to the Valuation Rolls, this area housed some or all of the following during the mid-19th century: loom stances, a loom shop, a smithy, a wareroom, a byre, a stable, a closet, a back house and a shed (Val Roll 1850). Houses and loom stances were the only structures in this area in 1873 and, because Building 2 is still represented on the Ordnance Survey map of 1896, it can perhaps be assumed that it was one of them. The most likely interpretation is that it was a loom stance, as perhaps was a similar structure, some 25 m to the north-east (illus 8). According to 18th- and 19th-century sources, the staple textile manufactured over a considerable period within the parish was linen; it was produced on looms very similar to those used to manufacture woollen cloth (*Stat Acct* 273; NSA 886). By 1788 there were 900 looms within the burgh, a figure which increased to 1200 over the following four years.

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All data retrieved from the excavation has been lodged with the National Monuments Record of Scotland.

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