

West Pans: excavations at a ceramic production site in Musselburgh, East Lothian

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with contributions from Simon Chenery, Belén Cobo del Arco, Katherine Eremin, Sheila Forbes, Dennis Gallagher, George Haggarty, Suzanne Miller, Robin Murdoch and Jim Tate

ABSTRACT

Excavations were undertaken in 1981 and 1990–1 at the site of the 18th-/19th-century ceramics manufacturing complex of West Pans, near Musselburgh. The foundations of several structures were uncovered although many proved impossible to interpret or date. Several puddling pits, most of them quite small, were identified, as was part of a hovel (the circular structure surrounding a kiln) and the remains of two kilns, one of which might have been for glass-making. Other buildings could have been drying rooms or stores. The large quantities of ceramics from several phases of occupation between the early 18th and the early 19th century included porcelain wasters from the period when William Littler was at West Pans, c 1764 and 1777. Some evidence of the 19th-century village of West Pans was uncovered to the north of the area, on land reclaimed from the sea. To the east of the main site, a watching brief in 2002 and a salvage excavation in 2003 revealed part of a brick structure possibly associated with salt-making, another important early industry at West Pans.

INTRODUCTION

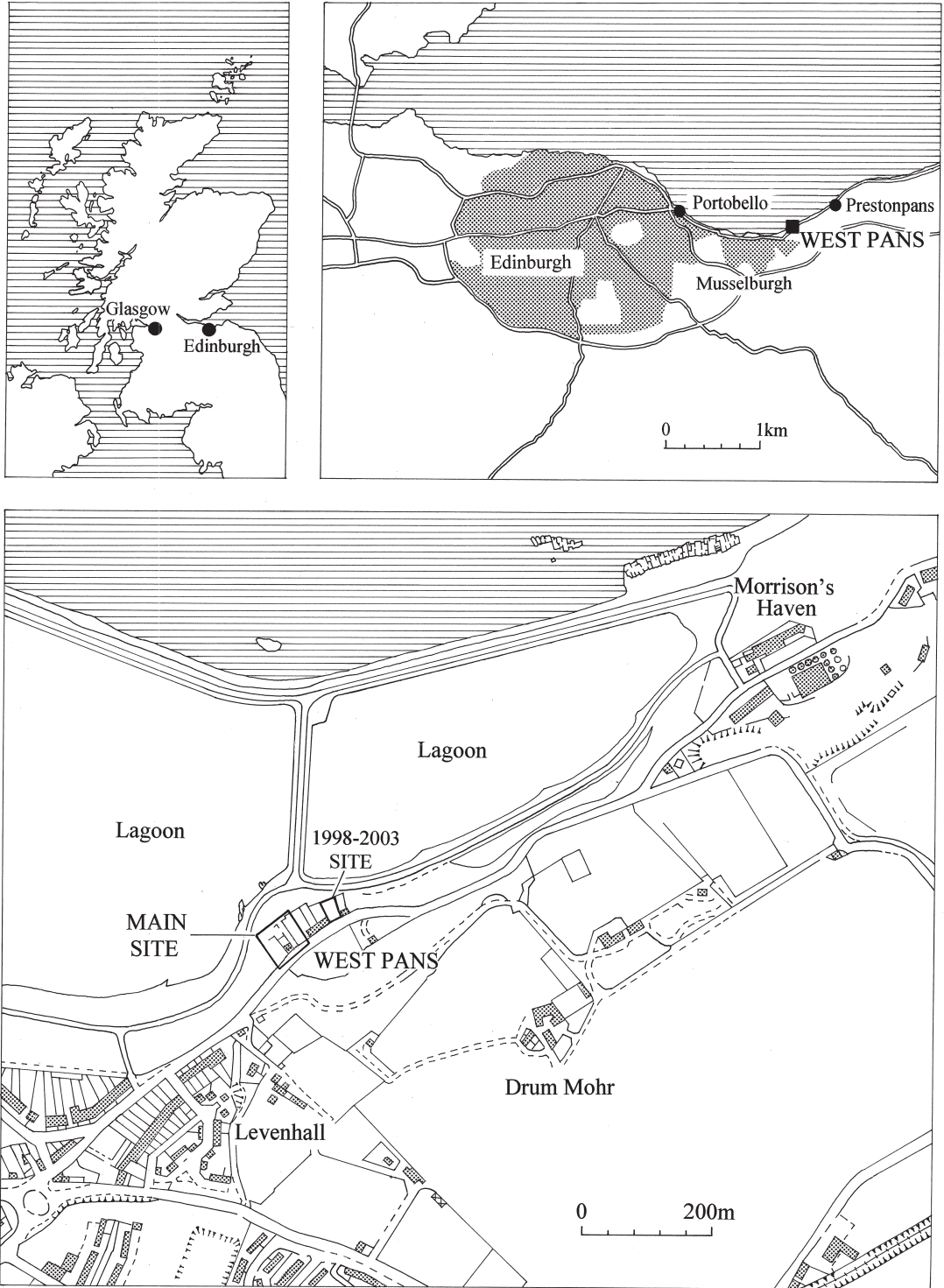
The investigations were a sporadic series of excavations and watching briefs, undertaken as opportunities presented. George Haggarty acted as the link between several investigators on this project, directing some site work himself in 1981 and assisting in 1990–1, when Alan Radley supervised. John Lewis, who had worked on site in 1981, was subsequently commissioned by Historic Scotland to create a report on the excavations – based on available records (mainly drawings and photographs of variable standard) and discussions with some of the excavators. He conferred with George Haggarty over the historical summary and arranged for specialists' reports to be commissioned with the aim of providing as coherent an account

as the fragmentary record allowed. In parallel, George Haggarty has continued to study and publish material from the site, concentrating upon the ceramic assemblage and the history and significance of the site's operation.

THE SITE (ILLUS 1)

West Pans, once a bustling industrial centre, is now a small hamlet located near the south shore of the Firth of Forth, some 1.5km east of Musselburgh, East Lothian and 11km from the centre of Edinburgh. Its few remaining houses, which are centred on NGR: NT 3640 7325, sit on what was once a rocky shore on the north side of Ravenshaugh Road, the B1348 which runs from Musselburgh to Prestonpans. They are divided by a short vennel that runs from the

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ILLUS 1 Location maps

road towards the sea and once to the saltpans on the rocky foreshore. In recent years the rocks have been masked by the construction of large lagoons to accommodate waste ash from a local power station.

The solid geology around this part of East Lothian is of Upper Carboniferous age, mainly sandstone that has been a valuable resource as a building material. It takes a variety of forms, from the soft white rock exposed during the excavations to the very hard Millstone Grit outcrops just along the road from the site. West Pans also sits on the edge of the Midlothian coalfield, formerly an area of great economic importance which supplied the fuel for many enterprises, including the salt, glass, brick and ceramics industries, all of which were significant locally. Another valuable local resource was fireclay, another Carboniferous deposit, from which the refractory linings of furnaces were made. All of these industries were well represented around Prestonpans, a small but significant industrial centre well into the mid-20th century. Its coastal location also provided the means for exporting its produce, which was shipped out from harbours at Leith, Musselburgh and Morrison's Haven, less than 1 km east of West Pans.

The strip of land bordering the main road probably saw intense ribbon development during the late 18th century, when the sea lapped against the rear walls of some of the West Pans properties. It appears that the road was widened by Musselburgh Council at the beginning of the 19th century, as well as being raised at the east end of the settlement. A significant portion of the coastline to the north of the settlement was reclaimed during the various industrial activities, with ash, slag and other waste materials from saltpans, glassworks and potteries being used as infill. Whether this was a deliberate act or merely a convenient means of getting rid of waste is not clear. This process has continued into more recent times through the pumping of large quantities of ash into the lagoons. However, excavation also indicated

that sandy soil had been used as infill in places, suggesting that there was a calculated attempt to reclaim some of the land.

To the south of the road the ground rises to the Pan Braes, a name once describing the area as far as the road junction at Levenhall and from which clay was extracted. The clay was used not just in potteries but also in brickworks, several of which were set up around West Pans, two of which operated on the seaward side of Levenhall during the 18th and 19th centuries. Although the local clays range in colour from mid- and dark grey to mid-brown, they fire red and are easily distinguished from the white-firing clays imported from Devon and Cornwall from the mid-18th century (see below).

THE HISTORY OF WEST PANS

George Haggarty and Sheila Forbes

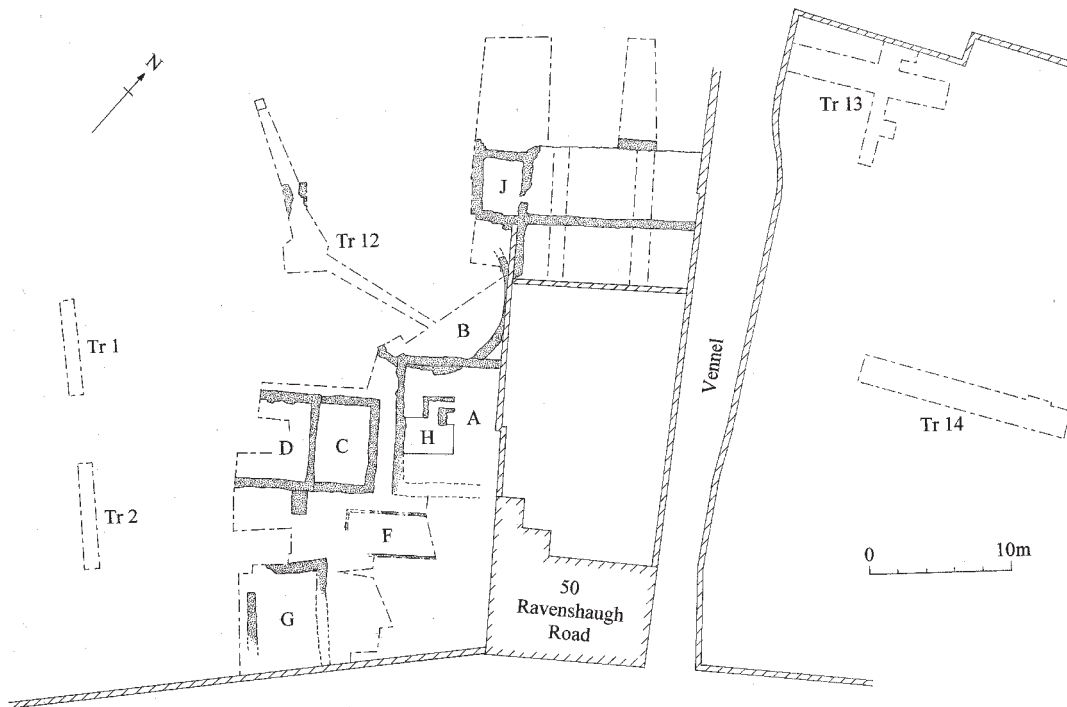
As its name suggests, salt-making was once an important industry at West Pans. What is probably the earliest reference to the site is contained in a charter dated 17 December 1452 and ascribed to the Abbot of Dunfermline (NAS B52/1/15), which refers to saltpans on a rocky shore near Musselburgh. The only stretch of rocky shoreline near the town was at West Pans although it is no longer visible because of land reclamation. West Pans and the 'Kings Pan Craig' are mentioned in many other charters, some of which suggest that salt-making was carried out over a long period of time. A document of 1711 which lists the tenements and houses in West Pans inherited by Edward Jossie from his uncle, Robert Jossie (NLS 27/79 ff 23–8), also mentions nine saltpans and the names of their deceased owners. These were: the king (unspecified), one; Alexander Robertson, two; George Fawsyde, one; Robert Barber, two; George Anderson, one; and William and Edward Merchison, one each. Although we will probably never know when salt-making began at West Pans, it certainly continued into the 19th century (NAS RS 27/1350).

On 1 March 1644 a merchant burgess of Edinburgh, John Jossie (his name is spelt in

several ways in different documents), and his son, Robert, purchased a parcel of arable land from Colonel William Douglas of Kellhead, his wife, Agnes Fawsyde, and their son, William (RMS 9, 1566). Jossie's holdings, which had formed part of the Prestongrange estate, became known as the Drum Mohr (Drummore) estate. This acquisition was alleged to be 64 acres in area but there appears to have been a miscalculation in the original survey, and the same piece of land was later resurveyed when it was found to measure approximately 81 acres (RMS 9, 1530). A later charter tells us that this purchase also included salt pans and ten individual tenements at West Pans (NAS RS 27/79, ff 23–8).

Jossie built a large house, often referred to as the 'West House' in contemporary documents, just east of the vennel in West Pans. It had a yard of '3 Quarters of an acre all enclosed, with a high stone dike, a double dovecote, with

some rocks and Bucket-pots for building of Salt pans and a white-stone quarry within the yard' (NLS Acc 7228/403 6Y). References to 'Jossie's yard' continue to appear in documents into the early 20th century. Jossie went on to establish a glassworks at West Pans only for the enterprise to flounder, leaving him with a loss of £20,000 (Scots), a considerable sum at that time. It seems likely that Jossie's redundant works was reopened a short time later by Cornelius Visitella, a renowned glass-maker who had learned his skills in London under Robert Mansell (Turnbull 2001, 110). The glassworks was still being run by the Visitella family in 1662 (NAS RD 4/6/290; Turnbull 2001, 28). On his death in 1668, Jossie's lands passed to his son, Robert. Robert's nephew and heir, Edward, sold some of his land holdings in West Pans to Andrew Ross, a Musselburgh clothier, in 1729 (NLS, Acc 7228/403 6Y).



ILLUS 2 The site, showing the position of trenches and principal structures exposed in 1981 and 1990–1

These holdings included the mansion house and yard, dovecot, bucket pots and stone quarry (*Caledonian Mercury* 1729).

In 1736, Jossie's old house and yard passed into the hands of Sir James Dalrymple of Hailes (NAS RS 27/162/f 46) and then to Christian, his daughter. At some stage during their 58-year tenure, the house was probably divided before being leased, along with a garden, offices and stables to James Muir; and later as a house, field and garden to John Watson who operated a small pottery from 1786 to 1794, producing redwares from the local clay (NAS B52/12/2; NAS B52/12/3; NAS CS 237 R/4/71).

Christian sold all the ground enclosed by Jossie's old wall to the brothers Baird. In September 1795, they resold it to James Forman who manufactured bricks and tiles at an unknown location in West Pans (NAS B52/14/19). Petitions by Forman in 1810 and 1811 suggest that the West Pans brick and tile works was owned by the town at that time, Forman being the tacksman, and that the stone quarry was also owned by the town but let to another leaseholder (NAS B52/14/19; NAS B52/14/20).

The first documented evidence for clay extraction at West Pans dates from 1688 (NAS B52/3/1) when James Cochran, a local farmer, was granted a feu to mine for the mineral. The first definitive evidence for ceramic production is contained in a 1738 petition by Robert Pate to the Council of Musselburgh (NAS B52/14/1). Pate, who operated a pottery in Edinburgh, requested 20 guineas to establish another one near Musselburgh. He received the money and set up his works near West Pans, the first of many potters to move into the area.

On 16 July 1739, it was decreed that no clay should be sold or gifted without the privileges (endorsement) of the town (NAS B52/3/2, 161). The wording of this document suggests that clay from the Pan Braes was already being exploited. In June 1750, James Thomson started to use local clay in his new pottery in West Pans (NAS B52/3/2, 5th, 297). Although Thomson was a man of some standing, his enterprise

appears to have been in financial trouble within three years of its inception (NAS B52/13/1, 1A3).

Samuel Lambus (or Lammas) may also have established a works at West Pans, having paid £1 sterling in January 1754 for the right to use local clay to make pottery and for bricks only in the construction of his own works (NAS B52/3/2). Other potters mentioned in connection with West Pans at that period are Anthony Hillcott, who leased the area of the Panbraes for 19 years from November 1756 (NAS B52/14/60), and Adam Cubie who is mentioned in 1753 and 1759 (NAS B52/14/3).

Among the lands once owned by Edward Jossie was a tenement and yard to the west of the vennel where John Jossie might have built his glassworks in the 17th century. This area, along with three other parcels of land, was amalgamated by the weaver, Thomas Forrest (NAS RS 27/135/f123) to form the site of future potteries at West Pans. It was bounded by the Musselburgh–Prestonpans road to the south, a narrow road running through the hamlet to the north and west, and a tenement previously owned by weavers Patrick Sanderson and his son, William, to the east (NLS Acc 7228/403).

The most famous potter to operate from West Pans was William Littler who had made his name producing high-quality porcelain at Longton Hall, Staffordshire. After being declared bankrupt in England, he moved to Scotland in 1764 and leased land and a pottery from James Gray, who is described as a 'writer' and the son of James Gray, a salt officer in West Pans, and Janet Forrest, the daughter of Thomas Forrest. Sir James Dalrymple became Littler's landlord on 2 October 1765 when he purchased the land from the Grays (NLS Acc 7228/403 15y). Littler went on to make a variety of soft-paste porcelain forms at West Pans for about 13 years (Haggarty 2008). Unfortunately, he was no more successful in Scotland than he had been in England, suffering his second sequestration in 1774 (NAS B52/11) although he carried on until c 1777 when he returned to England.



ILLUS 3 Period 3 Structure G, including the possible earlier Kiln F560, viewed from the south. To the left are some of the Period 4 drainage channels

Ceramic production using imported clays may have ceased at West Pans for some time following Littler's departure although refined earthenwares were being produced again by the 1780s. The pottery, which changed hands frequently, included amongst its owners Robert Bagnall and Anthony de la Chapelle, who were working at West Pans from c 1784 to 1792 (NAS RS Seq 203 B1/11 box 532). From 1792 to 1793 under William Webster, the works continued operating as the West Pans Stoneware Company with Bagnall as manager (*Caledonian Mercury*, 26 November 1792; *Edinburgh Gazette* 22, 107, 13 September 1793). John Watson also operated a pottery there from 1786 to 1794. William Reid leased the pottery from 1793 to 1801, when he left to establish the Newbigging Pottery in Musselburgh (RS 27/423, 216; RS 27/458; Haggarty & McIntyre 1996; Forbes & Haggarty 2007). It is likely that the West Pans pottery was redundant for a while after Reid's

departure, at least on the evidence of a petition, dated 1804, for James Forman to feu the ground (NAS B52/14/17).

The first person to own a pottery in West Pans during the 19th century was William Smith, from 1804 to 1808 (NAS B52/14/17). Interestingly, a petition, dated 1806, states that 'William Smith, potter at West Pans has discovered clay near to the quarry and requests a feu' (NAS B52/14/18). This suggests that Forman had received the feu on William Littler's old clay workings, which both he and Smith petitioned for in 1804 (*ibid*; NAS B52/14/17), and that Smith had no access to the local red-firing clays when he began potting.

The pottery appears to have lain idle for several years thereafter (NAS CS 44303W/2a), before the partnership of Wilson, Gibson and Smiles leased the site from c 1815 to 1817 (NAS CS 44304W/2a). Financed by Henry Davidson, John Rodgers leased the pottery

from 1818, probably trading as Rodgers & Davidson, although no marked pieces from their enterprise have been found (NAS CS 96/3637). The owners of the pottery, Nicol Watson and a relative, John Watson, sold it along with their salt pans, houses and other property in West Pans to Sir James Suttie in 1832 (NAS RS 27/1350). A later document describes the Watsons as ‘potters’ (NAS 17704).

It is not clear if potting continued at West Pans under Suttie although the 1833 *Gazetteer of Scotland* refers to an earthenware factory there (Chambers & Chambers 1833, 800). However, the entry might have been written some time before the gazetteer’s publication.

THE BACKGROUND TO THE PROJECT

In the spring of 1981, two trenches were opened within the rear garden of 54 Ravenshaugh Road, prior to the construction of a new house at its north end. Trench 13 (in this report the original trench numbers have been integrated with those opened in 1990–1) was located to the immediate north of the house, to determine the nature of three projections on the rear wall of a building shown on an 18th-century map (Laurie 1766). Prior to the investigation, the building was thought to be William Littler’s porcelain factory although it is now thought to have been the large house constructed by John Jossie. Trench 14 was opened in the north-west corner of the garden, whose north wall appeared to have been part of a relatively early structure, perhaps a ceramic factory.

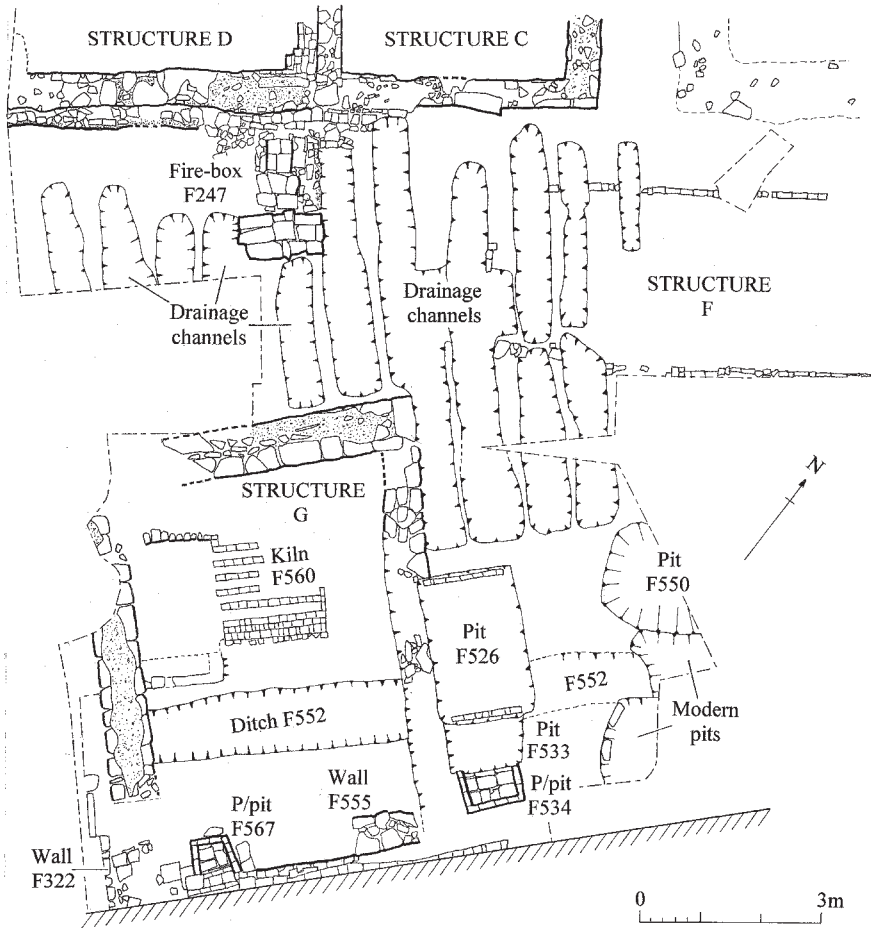
In 1990 the land to the immediate west of the vennel was bounded on its east side by a two-storey house (50 Ravenshaugh Road) and garden belonging to a Mr Galloway. During the 18th century, the house was owned by a family of weavers, called Sanderson (see below) (NLS Acc 7228/403). In the 1950s, the area adjacent to the house was landscaped by the local authority. A former resident of West Pans remembers playing in the remains of a circular kiln, until a tramp took it over as a shelter. In the

autumn of 1990, several trenches were opened in this area, in advance of the construction of a new house. The excavation area was extended to the north and west of the original trench early in 1991, both phases of the investigation being directed by Alan Radley. A total of 13 trenches were opened by the archaeological team but eventually most of the trenches were merged and, for the sake of convenience in this report, the main part of the site has been divided into two distinct areas. It should be noted, however, that the numbering of areas and trenches differs somewhat from that used in the original site archive.

Area 1 comprised the south part of the site, to the immediate west of 50 Ravenshaugh Road, and bordered on its south by the boundary wall that still stands alongside the road. Most of the structures of interest uncovered in 1990–1 were found within this part of the site which measured 20–25.5m north/south by 18m east/west. The south-east corner of Area 1 had been severely disrupted in recent times and was abandoned at an early stage. To the north of the garden of 50 Ravenshaugh Road was Area 2 where evidence was found of the 19th-century expansion of the village of West Pans. This area measured roughly 16m east/west by 9.5m north/south with two northward extensions, 5m and 2.5m wide and each 7.5m long.

The archaeology team also excavated two slit trenches (Trenches 1 and 2) to the west of the main investigation area, while the developer opened another (Trench 12) under archaeological supervision to accommodate a new drain. Trenches 1 and 2 were each 1m wide and measured 7 and 7.5m north/south respectively. Trench 12 was dog-legged and measured approximately 1m wide, running north-westwards from the north end of Area 1 over a total length of about 21m.

With the exception of Trench 12, which was excavated by machine, all trenches were dug almost entirely by hand, mechanical excavators being used to remove some topsoil and recently deposited materials and, on occasion, to sample



ILLUS 4 The principal structures and features uncovered in the south-west part of the site

large features when time was at a premium. Several other service trenches were excavated by the developers in 1990–1 and were covered by watching briefs but unfortunately no information on what was found in them has survived. Furthermore, the entire primary written record of the 1990–1 excavations is missing and the finds and many of the photographs from 1981 have been misplaced. In the absence of much of the original material, recourse had to be made to the memories of those who took part and to such records that did exist.

In 1998, a field evaluation was undertaken prior to the construction of a new building at 64 Ravenshaugh Road, this work being directed by Kirsty Cameron of CFA Archaeology Ltd. A watching brief was undertaken at the same site in 2002 and a salvage excavation in 2003, these investigations being directed by Kirsty Cameron and Bruce Glendinning.

The results of the 1981 and 1990–1 excavations have been combined to form an overall, although far from perfect, chronology of the site whereas the later investigations are treated separately. The 1981 and 1990–1

excavations, as well as the full post-excitation process, were funded by Historic Scotland and its predecessors. CFA's investigations were commissioned by Pryde Homes Ltd on behalf of Mr and Mrs Ritchie, owners of 64 Ravenshaugh Road.

THE EXCAVATIONS

Six principal phases of activity have been identified within the main areas of excavation:

- Period 1: before 1738
- Period 2: 1738–64
- Period 3: 1764–77
- Period 4: 1784–c 1810
- Period 5: c 1810–32
- Period 6: 1832–1945



ILLUS 5 Fire-box of Kiln F247, viewed from the south

These phases have been dated almost entirely on the evidence of ceramics retrieved from the site. A few of the excavated structures and features have been placed with some confidence into these six phases; others can be dated only in relation to structures which themselves are of uncertain age.

PERIOD 1: BEFORE 1738

West Pans saw a considerable amount of industrial activity before the ceramic industry was established there in the mid-18th century. Salt-panning was established there from at least as early as the 15th century (see above) and continued well into the 19th century. Another notable industry was glass-making of which there is no shortage of documentary evidence dating from the 17th century (Turnbull 2001, 103–13). Thus far, little physical evidence of these industries has been found other than the wall of what might have been a panhouse, uncovered in 2003 (see below), and the remains of a possible glass-making kiln, located within the limits of the Period 3 Structure G (see below). The only features that could be dated with any confidence to before 1738 were the fragmentary remains of a building in the 1981 Trench 13 and a probable boundary ditch (F552) at the south end of Area 1.

Structure in 1981: Trench 13 (illus 7)

In Trench 13, which measured 15m east/west by 2m wide, topsoil and deposits of rubble, sand, clay and ash, up to 0.8m deep, overlay the remains of a wall, aligned east/west and built on the edge of what was once a low sea-cliff. The wall, built of mortar-bonded sandstone, was very fragmentary and stood to

no more than one course high. It extended into one of three projections which jutted out from the bedrock, in a pattern very similar to that shown on the building in Laurie's map. Although excavation provided few clues as to the nature of this building, its location suggests that it was probably John Jossie's 17th-century residence.

Running north-eastwards from the edge of the bedrock at the east end of the trench were the remains of a narrow wall, perhaps a boundary wall abutting the corner of the putative 17th-century house. The ground level to the immediate south of this wall had been made up with ash which did not appear to be domestic in origin nor debris from a pottery kiln but more likely waste from a saltpan.

Midway along the trench and cutting buried topsoil were two linear features which continued beyond the north edge of the trench. Each was 0.7m wide, 0.4m deep and filled with rubble. There were no artefacts within this material to help date these features which might have been drainage trenches.

Boundary ditch (illus 4)

This feature, located some 2m from the extant boundary wall and running parallel to it, was 1.1m wide and 0.5m deep. There was no discernible slope along its length, suggesting that it was not a drain. Its exposed length was 8.4m although its east end had been cut by modern pits and it is not clear how far it had extended in that direction. Furthermore, the ditch was overlain by a Period 3 wall towards the west side of Area 1 but was not recorded in an adjacent service trench which formed the western limit of excavation. It should be pointed out, however, that the service trench was excavated by the developer under a watching brief and that it was dug before the ditch had been exposed in Area 1. Therefore, it should not necessarily be assumed that the ditch did not extend that far.

There was no obvious association between this ditch and any other excavated feature, suggesting it was a relatively early feature, perhaps a precursor to the extant boundary wall.

An early date for the ditch is supported by the Period 2 pottery retrieved from the deposits used to infill it.

PERIOD 2: 1738–64

Period 2 dates from James Thomson's arrival at West Pans. Few features could be attributed with certainty to this period, the only definite one being the remnants of a wall (F322) which lay about 0.3m beneath the west wall of Period 3 Structure G. A bicameral building (Structure C/D), which lay 12m south of the extant south boundary wall, probably also dates from Period 2 although the evidence relies only on the building's south wall being overlain by a Period 3 kiln (see below). The only other possible Period 2 feature was a puddling pit (F567) located at the southern extremity of the site.

Wall F322 (illus 4)

The fragmentary remains of a stone wall (F322), aligned north/south, were exposed in the service trench at the west extremity of Area 1. It lay directly below the west wall of Period 3 Structure G but at a considerably lower level. It is quite possible that this structure, which was not investigated further because of the constraints of the project, was the west wall of a building extending beyond the limit of excavation.

Structure C/D (illus 11)

The west side of this rectangular building lay beyond the trench edge and its overall dimensions remain unknown. It was a two-phase structure, the original building (Structure D) measuring internally 5.5m wide (north/south) and at least 5.0m east/west. At some stage it was extended eastwards by the addition of a second chamber (Structure C) which measured 3.7m east/west. The walls of both chambers were 0.6m wide, except the 0.4m-wide partition wall, which is curious considering it had been the east wall of the original building. All of the walls were built of mortar-bonded sandstone rubble, surviving to a



ILLUS 6 Puddling Pit F567, viewed from the north

maximum height of only two courses. Entry into Structure C was through a doorway, 0.8m wide, in its south wall, the only surviving remnant of which was a sandstone threshold. There was no evidence of a doorway between Structures C and D, nor was there any trace of one elsewhere in the original building although one may remain buried in its west wall.

The excavation records make no mention of a floor in either room of this building, perhaps because it had been comprised of soil or clay and therefore difficult to differentiate from other deposits. However, it is more likely that the floor had been constructed of more substantial materials, perhaps tiles, which would have been easy targets for robbers once the building was abandoned. Indeed, several fragments of fireclay tiles were retrieved from the upper deposits within this building.

Against the south wall of the building were the remains of a drain with brick sides and a base of reused fireclay tiles. It was exposed

for a length of 6.5m, petering out alongside the building's east chamber. Against Structure D, one of its sides was the building itself whereas both sides were lined with bricks alongside Structure C, suggesting that the drain was contemporary with the first phase of the building. However, it is also possible that the drain was a Phase 3 feature, ensuring that water did not enter a kiln set against Structure C/D (see below).

Puddling pit F567 (illus 4 and 6)

This small puddling pit was located at the south edge of the site but below the foundation levels of the extant boundary wall and the west wall of Structure G which dates to Period 3. At its base the pit, which was 0.3m deep, measured 0.45m square internally, widening to 0.70m at its top. Its north, east and west sides were lined with bricks whereas its south wall and floor were sandstone. The floor was covered with a deposit of fine white clay, some of it stained

mid-brown, for making slip for decorating pottery rather than for manufacturing the vessels themselves.

PERIOD 3: 1764–77

This relatively short period was the only time that porcelain was manufactured at West Pans, by William Littler who had left Staffordshire following his failed enterprise at Longton Hall.

Four structures or features have been assigned to Period 3, two because of the artefactual evidence associated with them and two on the grounds of their stratigraphic relationships with features dated to Periods 2 and 4. The first group of features consists of:

- the fragmentary remains of a structure (Structure F) towards the south-east corner of the site
- what appears to be a waste pit (F550) in the south-east corner of Area 1.

Those where the artefactual evidence is inconclusive but whose stratigraphic relationships suggest they belong to this period are:

- Structure G, a rectangular building in the south-west corner of the site
- the fire-box of a kiln (F247) overlying the south wall of Period 2 Structure C/D.

Structure F (illus 4)

Structure F, located on the east side of Area 1, was very fragmentary and difficult to interpret. Its north and south sides were defined by single lines of bricks which continued along its west side although the remainder appear to have been destroyed by the insertion of drainage ditches during Period 4 (see below). Its east wall had been removed when the site was landscaped in more recent times. The surviving remains of Structure F measured 6.5m east/west by 2.9m wide and its interior was covered with pale grey clay which is white when fired. The clay had spread over a substantial area to the south and west of the building, perhaps

following its demolition. It is possible that the clay, which was not removed, masked the settings for roof supports as well as the floor of Structure F; otherwise, it is difficult to see how it had been roofed. Although the clay was not fully excavated, porcelain attributed to William Littler was retrieved from it, both within Structure F and beyond its walls.

It is hard to envisage how Structure F had looked. Its walls were very thin and clearly capable of supporting only the flimsiest of roofs, if indeed there had been one. Alternatively, it might simply have been a tank, defined by dwarf walls, used for puddling or settling clay.

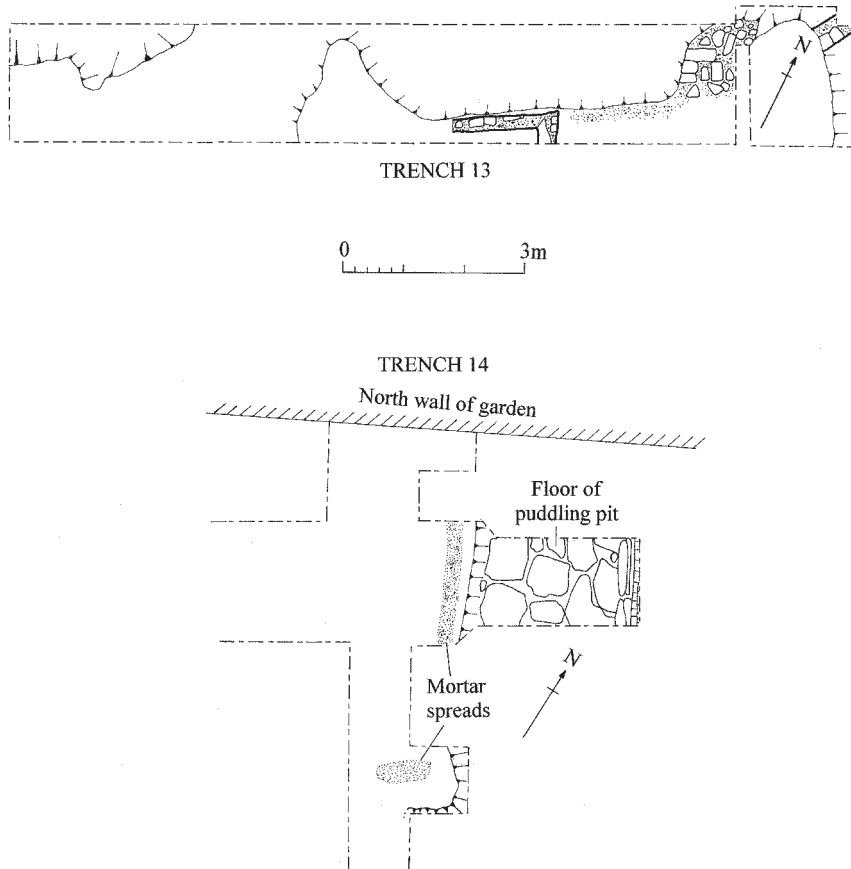
Pit F550 (illus 4)

Extending beyond the east end of Area 1 was a pit (F550), measuring 2.0m north/south by at least 1.2m east/west and 0.8m deep. It was filled with clean, pale grey clay and, above it, a mixture of sand and clay containing large quantities of porcelain and saggars typical of those used by William Littler but nothing that post-dated his occupancy of the site. The pit was not lined and was probably simply a waste pit.

Structure G (illus 3 and 4)

Structure G was located in the extreme south-west corner of the site, its north and west walls surviving as single courses of mortar-bonded, sandstone rubble, 0.8m and 0.6m wide, respectively. Its east wall was identified only from its 0.7m-wide robber trench which retained a few stones of the wall's foundations towards its north end. The building's south wall might have been the present south boundary of the site or perhaps the one represented by a 1m-long and 0.6m wide stump of wall (F555) just outside the south end of the robber trench for the east wall.

The Period 2 structures in this part of the site would have been demolished before Structure G was built. The west wall of Structure G overlay the fragmentary remains of wall F322 while its east wall cut across boundary ditch F552 which had been backfilled with rubble, mortar and



ILLUS 7 Trenches 13 and 14, excavated in 1981

clay. Puddling pit F567 must also have been abandoned before Structure G was built.

If F555 was its south wall, Structure G measured 5.8m north/south by 4.2m wide internally. No trace of its floor was noted by the excavators; perhaps because it was of earth or similar material and not easily recognised, or because it had been completely robbed out, as appears to have happened in many other buildings at West Pans.

Kiln F247 (illus 4 and 5)

This kiln had been built over the east end of the demolished south wall of Period 2 Structure D. Unfortunately, there was insufficient time

to fully investigate the kiln but its remains comprised part of a fire-box, built against the outside face of Structure D, and the brick base of what was probably a chimney inside the building. The fire-box, which measured 2.1m north/south by 1–1.45m wide, survived as four courses (0.3m high) of heat-damaged brick walls surrounding a base of sandstone slabs. It was difficult to interpret the specific function of this kiln although its size and shape suggest that it served some ancillary process rather than for the production of ceramics. The area around the kiln was surrounded by brick rubble, crushed flint and deposits of sand and gravel, all cut by a series of Period 4 drainage ditches (see below).

PERIOD 4: 1784–c 1810

William Littler left West Pans in 1777, after which the site appears to have lain deserted for a time before Robert Bagnall and then William Reid opened potteries there. Reid is thought to have succeeded Bagnall as proprietor of the works, before he moved the short distance to Musselburgh where he built the Newbigging works in about 1800 (Haggarty & McIntyre 1996, 945). Another potter to operate at West Pans during this period was John Watson who, between 1786 and 1794, manufactured redwares within the area investigated in 1981 (see below, Trench 14). Potting probably ceased at West Pans following Reid's departure, only to be resurrected a few years later by William Smith who remained there for only a few years.

The evidence for dating features to this period again relies on the ceramics associated with them. Other than a small puddling pit in

the main excavation area and another, larger one uncovered in 1981, the only features dating from Period 4 were several linear channels aligned north/south towards the south end of Area 1. These channels are interpreted as sumps for draining an area prone to waterlogging because of the extensive spread of clay (dating from Littler's time) that covered much of it.

1981 Trench 14 (illus 7)

The walls in the north-west corner of the garden of 54 Ravenshaugh Road had clearly been modified on several occasions: for example, a 2.4m-wide doorway had been blocked in the west wall. On the evidence of Laurie's map a building, probably a ceramics factory, had stood there in c 1766. Trench 14 was opened in an effort to interpret the structural sequence in this area. The trench was roughly cruciform in shape, its principal arm measuring 11.5m east/west by 2m wide with extensions on its north and south sides.



ILLUS 8 The Period 4 drainage ditches with Structure C/D beyond, viewed from the south



ILLUS 9 Pit F526 with Pits F533 and F534 beyond, viewed from the north

The most substantial feature to be uncovered was at the east end of the trench and comprised the remains of a large puddling pit for red-firing clay. It was 1.4m deep and defined on its west by a vertical cleft in the bedrock, the slope perhaps being exaggerated by the builders. Its east side was lined with bricks set over pitched sandstone slabs. At its top, the pit measured approximately 3m east/west but its north and south sides lay beyond the limits of excavation, leaving its full dimensions unknown. Its base was floored with sandstone flags, over which was very fine, mid-brown clay, presumably residue from the puddling process. Within the rubble infill of the pit were numerous fragments of pantiles, suggesting that the roof of an adjacent building, probably a ceramics factory, had been tiled.

The remains of a building, located to the immediate west of the pit, were defined by traces of three of its walls. One had been incorporated into what is now the north wall of the garden while the east and west walls survived only as

narrow strips of mortar running along the west edge of the pit and along the south arm of Trench 14. On this evidence, the building measured approximately 4m north/south although its east/west dimension remains unknown. A few paving stones some 1.5m from the east wall were probably remnants of the building's floor. Unfortunately, it was not possible to trace the full extent of any of these features or to confirm that they were associated with the structure depicted by Laurie although it is believed that they probably were.

Overlying the structures and features exposed in Trench 14 were spreads of stone and brick rubble, pantiles, industrial waste, sand and loam. The artefacts retrieved from these deposits included ceramics dating from the 18th and very early 19th centuries and one sherd of late 16th-/early 17th-century pottery. A forged coin, dated 1777 and designated GRIII but with erroneous spellings, was found at the west end of the trench along with sherds from flat-based dairy bowls,

decorated internally with white slip and splashes of brown and almost certainly dating to the last quarter of the 18th century. Similar pottery was recovered during the 1990–1 excavations to the west of the vennel.

Within the south arm of the trench was a pit containing pottery different from any found elsewhere in Trench 14 but similar to that retrieved from Trench 13 although, unfortunately, this pottery has been mislaid. While this is far from conclusive evidence, it does suggest that this material might have been associated with the building whose north wall was exposed in Trench 13.

Drainage channels (illus 3, 4 and 8)

The most distinctive Period 4 features consisted of a series of parallel, linear channels running southwards from just outside Structure C/D. A total of 11 channels were fully or partially excavated although more may await discovery

beyond the west edge of the trench. Two had disturbed the remains of the Period 3 kiln F247; others skirted the east side of Structure G while several cut through the impervious clay within Structure F and to its east. None of the channels cut across Structure G, suggesting that the building still stood above ground at this time. Ceramics retrieved from these cuts included large quantities of William Littler porcelain but also material dating from the last quarter of the 18th century but none of later date, indicating that these features probably belong to Period 4.

The channels were typically 5–7m long and 0.6m wide although the excavation records do not mention their depths and give no details of the materials filling them. The termini of most of these cuts were fully defined and it was clear that they did not flow into other drains, their purpose probably being to let water simply soak away. It is possible that these cuts were



ILLUS 10 Kiln F560, viewed from the west

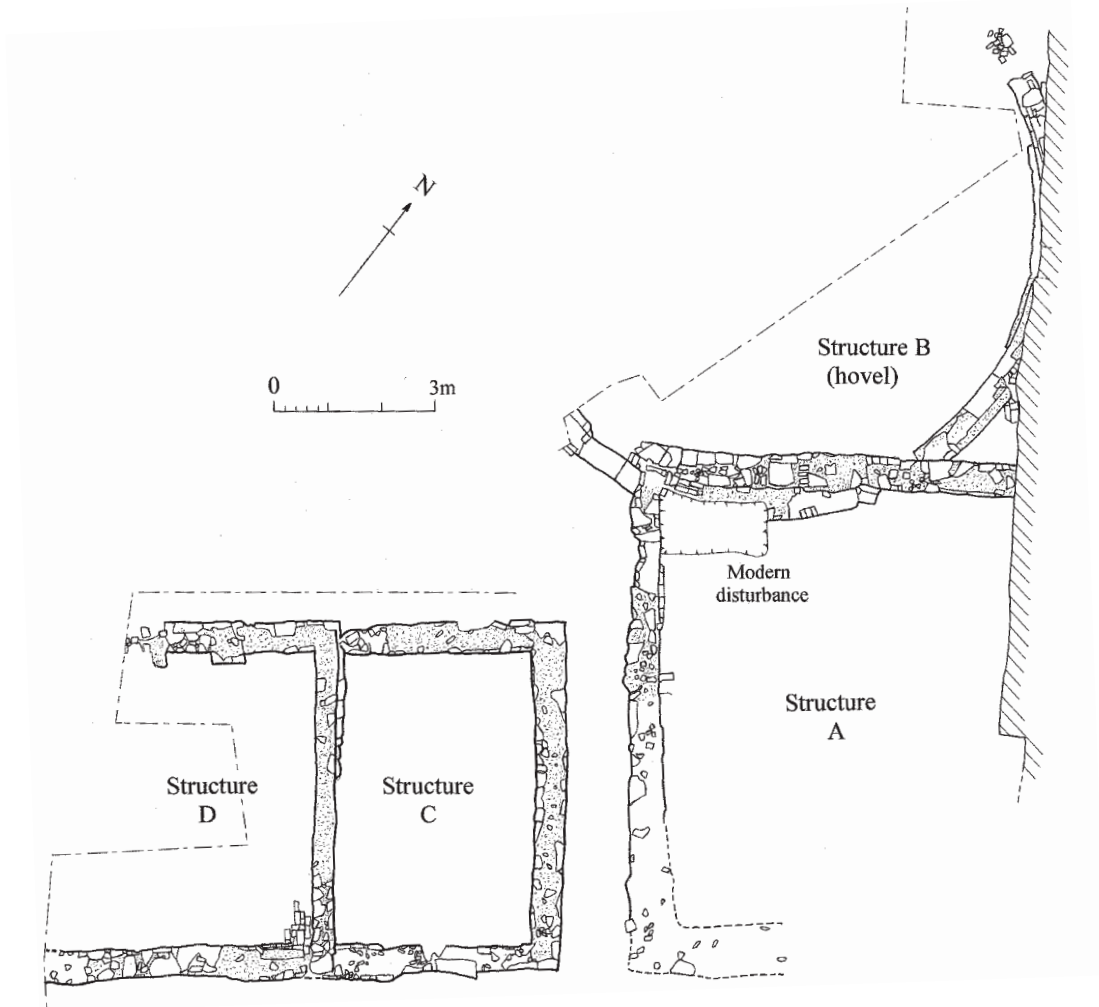
intended to divert water away from a new kiln although no trace of such a kiln was uncovered during the excavation. However, the remains of one might still await discovery, perhaps to the west of Area 1.

Puddling pit F534 (illus 4 and 9)

This pit was set against the north end of the east wall of the Period 3 Structure G. It measured 0.8m east/west internally but it had been truncated on its north side by pit F533 which reduced its width to only 0.57m. Its sides, which

survived to a height of 0.3m, were of brick and its floor was of fireclay tiles or reused saggars, over which was a shallow deposit of white clay, its upper level being oxidized to an orange/brown colour.

Local clay, used for making redwares, did not always need to be puddled whereas the white clays imported from Cornwall did. A deposit of white clay found within pit F534 might indicate that this feature dates to the Littler period but the pit's size suggests that it was used for making slip rather than for refining clay used in the



ILLUS 11 Plan showing Structure A overlying Structure B (the hovel) and the two phases of Structure C/D



ILLUS 12 View from the west of Structures A and B and the west wall of the vennel beyond

manufacture of porcelain. Some of the pottery retrieved from the pit's fill has been dated to *c* 1800, which tends to support a post-Littler date for this feature. It is also worth noting that the base of this pit was below the level of the adjacent wall of Structure G, suggesting that the building was at least unused, and perhaps at least partially demolished, before the pit was dug.

PERIOD 5: *c* 1810–32

After being abandoned for a few years from *c* 1810, the site was occupied by a series of potters, including the partnership of Wilson, Gibson and Smiles and, a short time later, John Rodgers, who remained at West Pans until 1832.

Only two of the excavated features are thought to date to Period 5, both of them pits located against the east wall of the Period 3 building Structure G. However, pottery dating from *c* 1830 was recovered from exploratory Trenches 1 and 2, suggesting that there was

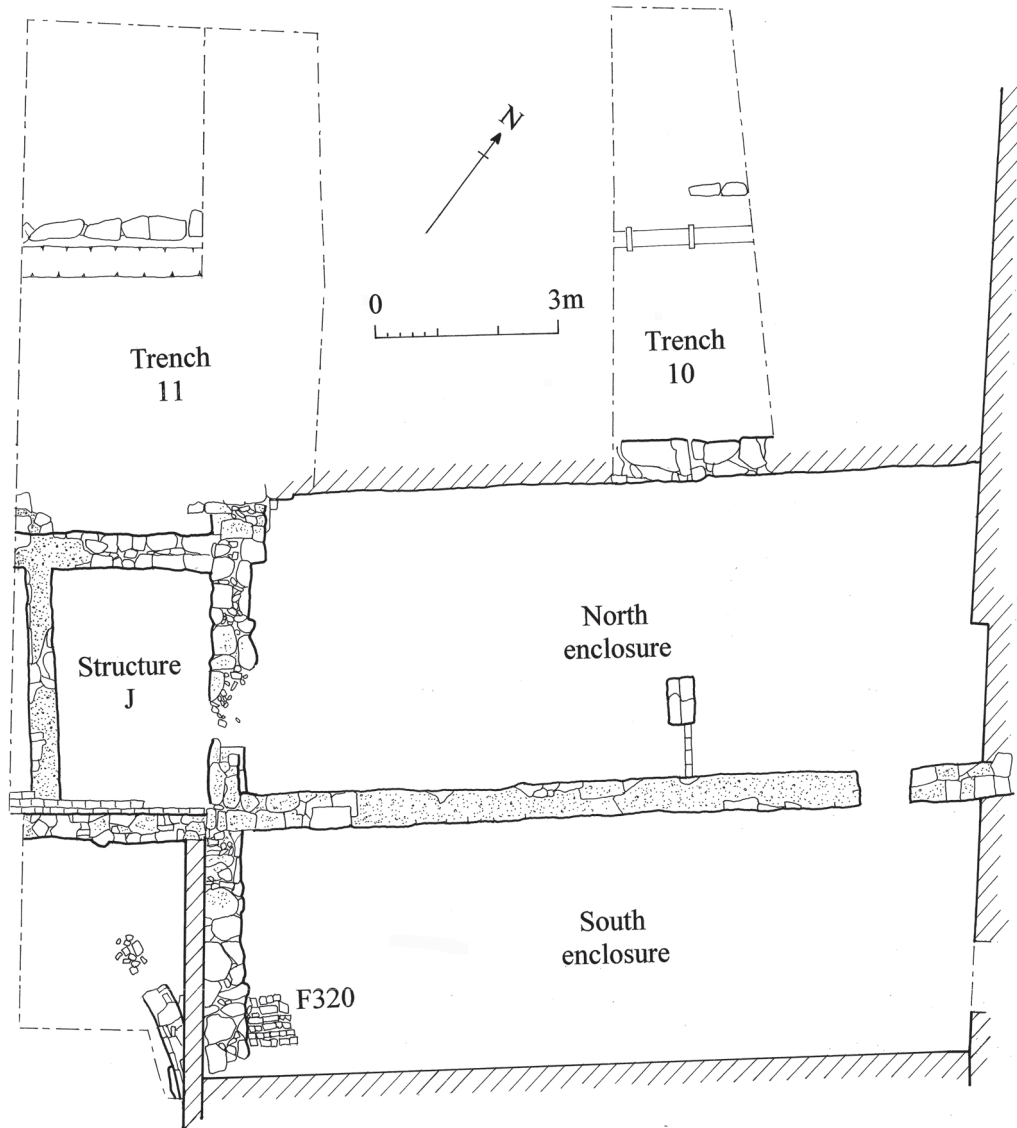
intensive industrial activity to the west of the main area of investigation during Period 5.

Pit F533 (illus 4 and 9)

Pit F533, which cut through the north end of Period 4 pit F534, was 0.7m deep and measured 1.3m east/west by 0.8m wide although its north side had been truncated by pit F526 (see below). There was no trace of any stone or brick lining to this pit, suggesting that it was a settling tank rather than a puddling pit. Deposits of white clay were retrieved from its fill but this material was probably residual and cannot be used as a reliable indicator of date or function.

Pit F526 (illus 4 and 9)

Pit F526, which measured 2.5m north/south by 1.6m wide and 1.1m deep, was located against the east wall of Structure G, but its base was well below the level of its foundations. It cut the north side of pit F533 and clearly dates later than it although the period between these two



ILLUS 13 The excavated remains of the Period 6 village of West Pans

features might not have been long. Indeed, it is quite possible that F526 was simply a larger replacement for F533.

There were remnants of what appeared to be a brick lining on the north and south sides of this pit which, according to the excavation records, was not floored. Among the materials within the

pit were brick fragments, perhaps derived from its lining although they might simply have been infill.

Trench 1 (illus 2)

Measuring 7m north/south by 1m wide, Trench 1 was located some 21m north of Ravenshaugh

Road. Although turf was removed and replaced by hand, the trench was excavated mainly by machine, materials being removed in spits, 0.4m deep. No structures, features or deposits of archaeological significance were uncovered within this trench although large quantities of pottery dating from the period 1810–30 were recovered from it.

Trench 2 (illus 2)

Trench 2 measured 7.5m north/south by 1m wide and was located about 5m south of Trench 1. Topsoil and other very recent materials were removed by machine although underlying deposits were excavated by hand. These materials included 0.4m of industrial debris which overlay sand and clay and, towards the south end of the trench, two possible drains. As in Trench 1, nothing of significance was uncovered although considerable amounts of pottery dated to Period 5 were retrieved from it.

PERIOD 6: 1832–1945

It is not clear from the documentary record whether pottery-making ceased at West Pans in 1832 when the Watsons sold their property to Sir James Suttie although there is a lack of artefactual evidence to suggest that it continued after that date. Almost all features post-dating 1832 seemed to belong either to the northward expansion of the site during the 19th century or to 20th-century activities.

The old village of West Pans (illus 13 and 14)

Somewhat surprisingly, there is evidence that the village of West Pans expanded, rather than contracted, following the demise of the potteries. Evidence for this expansion was found to the immediate north of the former garden of 50 Ravenshaugh Road, in Area 2 which measured 16m east/west by 9.5m wide. Two extensions (Trenches 10 and 11), each measuring



ILLUS 14 Structure J and adjacent Period 6 features, viewed from the south-east

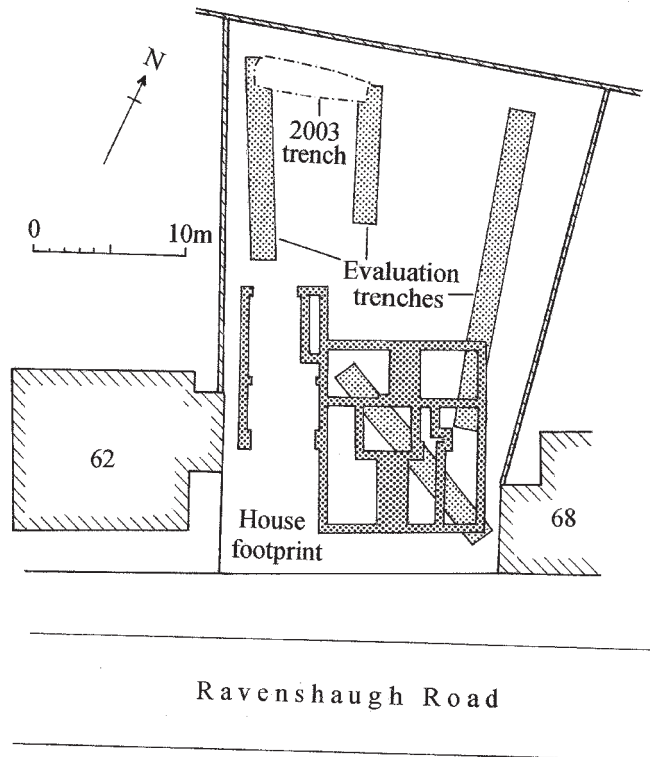
8m long and 2.5m (Trench 10) and 5m (Trench 11) wide, extended from the north side of Area 2. Unfortunately, the excavation record for Area 2 is rather sparse and this account has been gleaned mainly from site drawings.

The impression gained from investigations in this part of the site is one of properties being extended northwards towards the salt pans that stood near the shoreline. The principal evidence for that expansion was comprised of the remains of two walls, aligned parallel with the north garden wall and located 4m and 9.5m beyond it. The innermost wall, which was 0.55m wide and survived to a maximum height of 0.35m, linked the northward extensions of the garden's east and west walls, a span of 12m. A doorway, 0.8m wide, pierced this wall, 1.2m from its east end.

The outer wall survived as a 0.6m-wide single course of rubble masonry forming the northernmost limit of excavation, except for Trenches 10 and 11. Two sondages, each 1m wide and 1.6m deep, were excavated between the extant north wall of the garden and the outermost boundary wall. Both trenches cut through deep deposits of sandy loam with no industrial waste in evidence, suggesting that land reclamation was intended to enlarge gardens or perhaps provide more space for houses in West Pans, rather than to expand its industry.

Against the west side of the north enclosure were the remains of Structure J, the east chamber of a building which extended westwards beyond the trench edge. Structure J measured 4m north/south by 2.7m wide with walls 0.6–0.8m thick. There was a doorway in the east wall although its north jamb was missing. In the south-west

corner of the south enclosure was a level area of bricks (F320), one to two courses high, measuring 0.8 by 0.7m. Although showing no obvious signs of wear, these bricks might have been all that remained of paving, perhaps the floor of a house or a yard, of which all other trace had been removed.

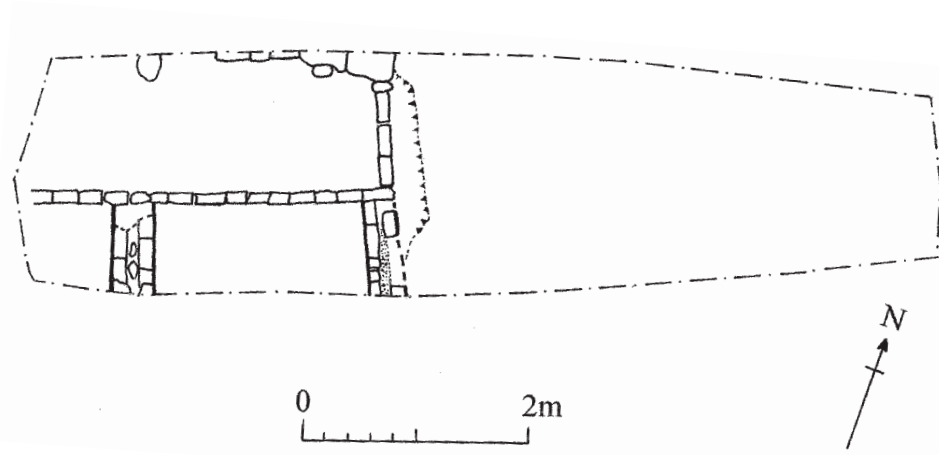


ILLUS 15 Location of CFA excavations, 1998–2003

It is not known whether property boundaries had been pushed further northwards than these enclosures although the findings from Trenches 10 and 11 suggest they had not.

Spread of clay

In the south-east corner of the site, between Area 1 and 50 Ravenshaugh Road, was a thick layer of clay (F701) containing many fragments of coarse redwares, probably dating from the first



ILLUS 16 Features uncovered during the salvage excavation of 2003

quarter of the 19th century. There was no time to investigate this material in any detail and its origin remains unknown. It is quite possible that the clay had been imported from elsewhere to help level the site but the reason for this remains a mystery.

Anderson shelter (Structure H)

Towards the east side of Area 1 were the remains of a World War II Anderson shelter, measuring roughly 3.4m east/west by 2.6m wide, which had been entered by a flight of steps on its north side.

Other modern features

Just north of Structure H was a pit, measuring 2m by 1m, 0.2m deep and filled with modern debris, including asbestos. The pit cut the walls of Structures A and B, both of which were associated with the ceramics industry although neither could be dated (see below). The west side of the pit was hard against the west wall of Structure A whereas its north side had cut through the circular wall of Structure B.

Several other recent features were uncovered, mostly pits or disturbances resulting from the

landscaping of the site during the 20th century. One of these features was a large, irregular-shaped pit, cutting Period 3 pit F550 and filled with sand, gravel, rubble and clay, which contained modern artefacts and which was cut by an even more recent pit.

STRUCTURES AND FEATURES OF UNCERTAIN DATE

There were several structures and numerous features and deposits that could not be placed into the site's main phases of activity. At least some of them would have been contemporary with structures of known (or presumed) dates although it was not possible to tell which ones.

The most important of these structures which, incidentally, could be dated relative to each other, were:

- the remains of a kiln (F560) towards the south-west corner of the site, within the limits of Structure G, a Period 3 building
- the remains of a hovel (Structure B), a circular building that would have enclosed a kiln
- the east boundary wall of the site (the west side of the vennel), part of which had been built over the demolished hovel

- the fragmentary remains of a building (Structure A) overlying the hovel and abutting the east boundary wall.

A few structural elements were also uncovered in Trench 12, located towards the north-west corner of the site and excavated by the developer under a watching brief.

Kiln F560 (illus 3, 4 and 10)

The surviving remnant of this kiln measured approximately 1.7m square and was defined by narrow walls of hand-made bricks on its north and south sides. Its north wall was very fragmentary whereas its south wall, which was built on stone rubble foundations, stood up to four courses high. At the base of the kiln were four dwarf brick walls, each only one brick (120mm) wide, separated by channels also about 120mm wide. The ash pit was on the west side of the kiln and was defined by a narrow masonry wall on its north and a ridge of soil, mortar and pitched stones, probably destruction debris, on its south.

Because of time constraints, it was possible to investigate the ash pit only by excavating a machine trench across it at the very end of the excavation. As a result, the information gleaned from this feature is limited: for example, its full extent was never determined. Waste materials from the kiln included burnt red clay within the structure's interior and grey ash and charcoal which extended into the ash pit where some glassy slag was also found.

The chemical analysis of the slag proved inconclusive as to its origin. The chemical fingerprints obtained from several samples of slag suggested that it may not have been derived from glass-making although there were no clear indications of any other source for this material. Subsequent work on glass from Leith has, however, produced results more consistent with the West Pans slag being a by-product of glass-making (Haggarty pers comm).

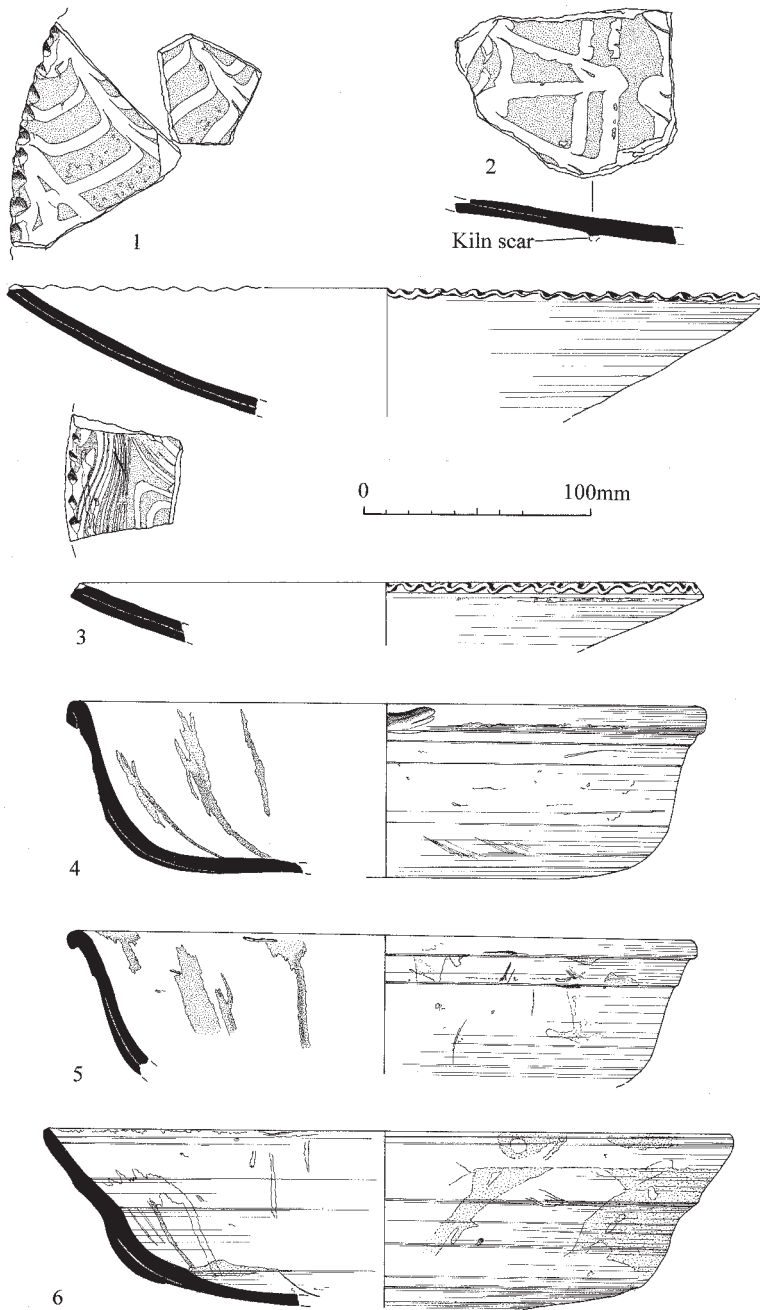
Structure B (hovel) (illus 11 and 12)

The remains of a curved wall, believed to be the outer hovel wall of a kiln, were uncovered at the north end of Area 1, below topsoil, destruction debris and other deposits. No trace remained of the kiln itself, this part of the site having been severely damaged during landscaping operations in the 20th century. The hovel wall was 0.6m wide and built of bricks, measuring typically 220mm by 110mm. Its western half had been removed but enough survived to calculate the building's diameter, which would have been approximately 10.5m.

On the south side of the building were the remains of a doorway, whose threshold of two sandstone flags lay partially buried beneath the north-west corner of Structure A. The site records make no mention of a floor which might well have been robbed out following the building's abandonment or removed during more recent landscaping. It is, however, quite possible that the working area within the hovel had simply been floored with trampled ash and was not noted by the excavators.

The east boundary wall (illus 12)

The east side of Area 1 was defined by a wall that had been much altered on more than one occasion. It included elements of several other structures which had been demolished, leaving no other trace. The boundary wall included the west wall of 50 Ravenshaugh Road and that of the small brick shed which adjoined its north-west corner. Beyond the shed was a stretch of masonry wall, approximately 8m long and about 3–4m high, which had been repaired, mostly with bricks, on more than one occasion. Midway along the length of this wall was a doorway, also blocked with bricks, against which was a short flight of steps. It appears from site photographs (the only relevant, surviving records) that this section of the wall had once formed the west side of a building that must have predated the vennel to its east although it



ILLUS 17 Drawings of redwares from c 1750

is difficult to relate this to the known history of West Pans.

The remainder of the site's eastern boundary consisted of a garden wall built of mortar-bonded rubble, roughly 2.5m high and topped with coping stones. It had been built over the demolished hovel although the relationship between the hovel and other sections of the wall was not clear.

Structure A (illus 11 and 12)

Structure A also overlay the demolished hovel whereas its north wall abutted the tallest section of the east boundary wall. Internally, this building measured 8.25m north/south by 6.75m wide. Its north and west walls, both approximately 0.6m wide, survived as mortar-bonded, sandstone rubble foundations, whereas all that remained of its south wall was a robber trench containing loose rubble and mortar. Indeed, even the robber trench did not extend as far as the boundary wall. It is not clear from the site records whether a floor was uncovered within Structure A although evidently its walls had been built over dark brown, sandy loam which has proved impossible to date.

Features in Trench 12 (illus 2)

Trench 12 was dug by machine in December 1990 to accommodate a new drain to an existing manhole. The archaeological record retrieved from this trench was gleaned mostly from a study of the deposits and features exposed in its sides. The trench ran from a point within the hovel westwards for some 7m before dog-legging towards the north-west for a further 13m. Its width varied from 0.6m to 1.5m except at its elbow where it expanded outward into an area measuring 3m by 2m. The east arm of the trench was less than 1m deep and only topsoil was removed from it.

The north-west arm of the trench was excavated to a depth of 1.6m. In its west section, at a depth of 0.8m, were three courses

of a brick-lined drain which was exposed for a length of 2.5m. Another brick drain, capped with sandstone slabs, cut across the south end of the arm. The only feature of interest visible in the east section was what might have been the base of a drain or perhaps the remains of a floor overlying some mortared masonry at a depth of 0.7m.

EXCAVATIONS AT 64 RAVENSHAUGH ROAD (ILLUS 15 AND 16)

The evaluation of 1998, the watching brief of 2002 and salvage excavation of 2003 produced no evidence of ceramic production at the east end of the village although the scant remains of a brick building uncovered in 2003 might have been associated with another local industry, salt-making.

Within the trenches opened during the evaluation and watching brief, dumps of brick and stone rubble, ash, coal and redeposited sand overlay undisturbed beach sand and, towards the north end of the site, bedrock. As expected, the land sloped downwards towards the north, the ground having been levelled with successive deposits of industrial debris, up to 2.2m deep at the north end of the site.

The only feature of interest uncovered in this area was found at the north-west corner of the site where unauthorised trenching by the developer was followed by a salvage excavation. The trench, intended as a soakaway, measured 7.5m east/west by 2m wide and up to 1.5m deep. At the west end of the trench were the vestiges of a structure comprising the lower courses of several mortar-bonded brick walls, at least some of which sat directly on bedrock. The building extended beyond the limits of the trench and it was impossible to determine its overall ground plan or to interpret its function with any certainty. However, the presence of large quantities of poor quality, unburned coal and ash suggests that these walls

were elements of the coal house and forehouse of a saltpan.

THE FINDS: CERAMICS (ILLUS 17–28)

J Lewis, from information provided by G Haggarty

A comprehensive catalogue of the West Pans assemblage has been compiled as a CD ROM and disseminated by the Northern Ceramics Society (Haggarty 2006, 110). As a result, the account of the ceramics included here is restricted to general notes on some of the more interesting wares recovered from the excavations. Unfortunately, the whereabouts of the assemblage retrieved from the 1981 excavation remains unknown.

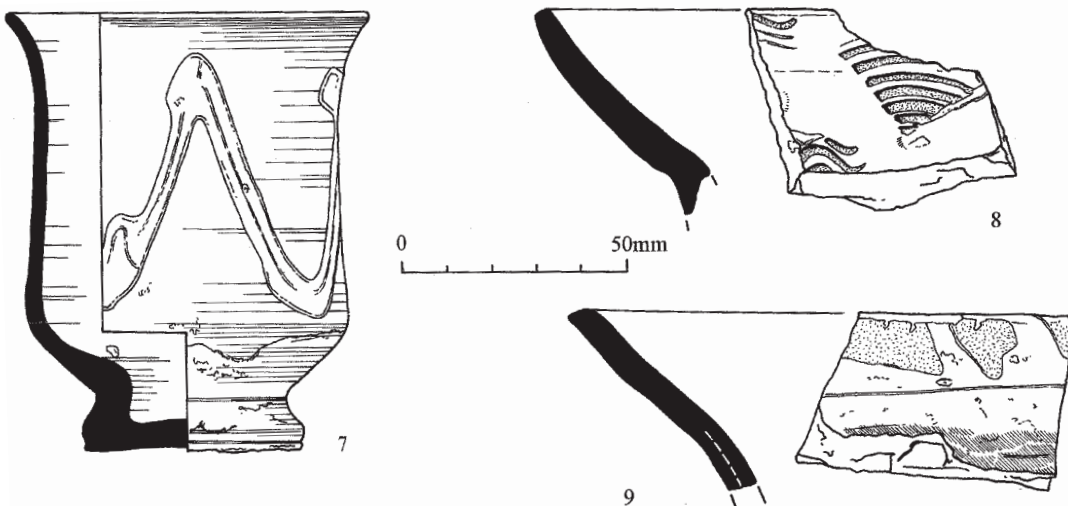
The assemblage was a very large one and included a wide range of wares, most of which date to the 18th and 19th centuries. Perhaps the most distinctive of these is the soft paste porcelain manufactured by William Littler between 1764 and 1777. It is not possible to identify the individual makers of much of the other material. Most common are pearlware and

red earthenware although significant quantities of creamware, along with white earthenware (both bisque and glazed) were also recovered. Smaller amounts of later 19th-century types were also identified, these almost certainly having been brought in by the residents of the village that grew up after ceramic production ceased.

PORCELAIN (ILLUS 19–22)

Soft paste porcelain manufacture in Staffordshire dates from *c* 1751, when William Littler began operations at Longton Hall, a short distance south of Stoke-on-Trent. Parts of those works were excavated in 1959, 1970 and 1971 (Tait & Cherry 1978). Littler was declared bankrupt in 1760 and four years later moved his operations to West Pans (see above) where he continued to make decorated porcelain.

The porcelain assemblage retrieved from the excavations comprise both bisque and glazed fragments in a variety of forms, including bowls, bottles, chamber sticks, figures, knife handles, tea bowls and saucers, cups and mugs, teapots,



ILLUS 18 Drawings of redwares from *c* 1750

dishes and plates often with traces of cobalt decoration.

CREAMWARE (ILLUS 23)

Creamware was made by mixing ball clay and ground flint, the resulting cream-coloured earthenware being fired twice and coated with a lead glaze. It is thought to have evolved in Staffordshire around 1740 where it replaced white, salt-glazed stoneware because it could be fired at lower temperatures, thus avoiding salt corrosion and the rapid deterioration of kiln walls. In addition, its smoother surfaces were easy to decorate. It became the dominant fabric type between 1760 and 1780 but its popularity waned over the next two decades although it continued to be produced until *c* 1825. During that period it became thicker, heavier and whiter in colour. Creamware was usually thrown and turned and was produced at all the important industrial potting centres around the British Isles, making it almost impossible to determine where any particular piece was manufactured.

PEARLWARE (ILLUS 24 AND 25)

The term ‘pearlware’ was adopted from Josiah Wedgwood’s Pearl White, a body and glaze probably marketed by him in *c* 1779 (Lockett 1986, 4) although other Staffordshire potters were already using the name ‘China glaze’ for similar wares (Miller 1987). Pearlware was a twice-fired, lead-glazed white earthenware produced in all the important ceramic manufacturing centres in the British Isles and was prepared by mixing ball clay, Cornish china clay and calcined flint. Before its second firing, it was glazed with lead and a very small amount of cobalt and/or copper. It is thought to have been produced in some quantity by the early 1770s and became increasingly common during the 1780s, growing into the dominant ceramic type between 1790 and 1830.

Very few pieces of pearlware were marked and it is almost impossible to attribute a

particular item to a manufactory or even an area. The majority of the West Pans examples are bowls, cylindrical mugs or porringers (Haggarty 2007). They were wheel-thrown and then shaved and finished on a horizontal lathe. Pearlware was usually decorated, at first often only with blue cobalt, in the ‘tree-fence-house-fence-tree’ pattern, from the crudest sketch to carefully executed scenes. Later, it was often decorated under-glaze with more than one colour, the range limited to those additives that could withstand the 1000–1100°C needed to fire the lead glaze. Antimony was used to produce yellow, and copper was used to produce green colorations. Manganese oxide on its own gave



ILLUS 19 Fragment from the base of a porcelain plate decorated with underglaze painting

a purple-brown colour while mixing it with iron oxide produced a range of dark browns. Mixing iron and cobalt created black.

Of the many forms of decoration on the West Pans pearlware, perhaps the most interesting is painting in 'Pratt colours', named after William Pratt who founded a Staffordshire pottery in 1780 and who is credited with producing relief moulded earthenware, decorated under a lead glaze. The decoration was applied using a limited range of metallic oxides which, at high temperatures, produced various colours including brown, ochre/yellow, green and blue. Pottery decorated in this fashion was made throughout Britain over a long period and was probably produced for the less discerning end of the market.

The majority of the slipwares from West Pans are of good quality and almost certainly of 18th-century or early 19th-century date. Almost all the known forms seem to have been produced, including rare and generally early tea and coffee pots. The coloured slips were made from imported white clay and local red clay, some with colorants (mainly cobalt) added. The evidence suggests that at West Pans slip was applied to unfired leather-hard vessels while still on the turner's lathe.



ILLUS 20 Fragment from a porcelain tea bowl waster decorated with typical West Pans streaky blue painting

RED EARTHENWARE (ILLUS 17, 18, 26–28)

The local red-firing clay was exploited throughout the site's history of pottery-making, with the possible exception of William Littler's stay there. The West Pans material is divided into coarse version and a more refined version, made from clay that had undergone additional preparation. Staffordshire potters first produced twice-fired, red-glazed, fine earthenwares in the mid-1720s, using it to manufacture tea and coffee wares. This technique spread quickly and was widely used over a long period of time. At West Pans the refined wares included many teapots as well as bowls and other vessels, all of which had been finished on a lathe. The coarser wares were almost all storage vessels, such as large bowls, crocks and horticultural items.

WHITEWARE

It is thought unlikely that any of the small number of glazed whiteware sherds were made at West Pans whereas clearly the bisque sherds were. Bisque teapot sherds retrieved from Trench 2 are in a style known as 'oblong moulded' (Miller & Berthoud 1985, 231–7). This material dates to c 1825–30, suggesting that it was manufactured by John Rodgers.

KILN FURNITURE

With the exception of one abraded, industrially manufactured fragment and one abraded, industrially moulded, three-armed stilt (both probably brought in by sea from nearby but later works), the 300 or more fragments of kiln furniture recovered from the excavations were hand-made at West Pans. The following descriptions owe much to David Barker's work on Staffordshire material (Barker 1998, 318–41) and information he kindly supplied after viewing some of the material. The 15 types of kiln furniture are described below.

- 1 Redware straps and grooved saggar pins. The straps were stuck vertically to the inside

- walls of saggars and the clay pins inserted into them, the rims of pots resting on the pins.
- 2 Whiteware straps and grooved sagger pins.
 - 3 Three-armed whiteware stilts. They first appeared in Staffordshire in the third quarter of the 18th century and were still in use at West Pans until *c* 1830 when production ceased there.
 - 4 Whiteware cockspurs. Known as 'hens taes' in Scotland, only six examples were recovered from West Pans.
 - 5 Extruded whiteware rods. A small number of these rods, probably dating to the late 18th century, were recovered from the site.
 - 6 Redware extruded rods. They probably date to the 19th century.
 - 7 Redware hand-made kiln props. Small, crude, unglazed lumps in a creamware fabric were used as kiln furniture at the William Greatbatch Pottery, Staffordshire between *c* 1770 and 1782 (Barker 1998, 333). However, many of the West Pans examples are very large and probably date to the 1820s and 1830s.
 - 8 Turned kiln props. The precise function of these props, of which only two were recovered, is unclear.
 - 9 Three-pronged white trivet. Only one fragment of a trivet was recovered.
 - 10 Small turned cone. Cones such as the one retrieved from West Pans were used in the manufacture of white salt-glazed stoneware during the third quarter of the 18th century.
 - 11 L-shaped stackers. There is a variety of sizes of stackers, none of which was complete. They were usually used for firing utilitarian redwares.
 - 12 Redware thrown and cut props. The nearest parallels to these props were found during excavations at Shelton Farm, Stoke-on-Trent (Barker 1998, 331, fig 26) although those examples were dated to 1750–60 while the West Pans ones were probably made in the early 19th century.
 - 13 Three-armed whiteware stilt. Such stilts, of which only one fragment was found, date to 1750–60.
 - 14 Circular ring/disc and stick stilts. These well-made stilts all date from the Littler period. The central apertures of 'rings' are over 20mm in diameter while those of 'discs' are less than 20mm.
 - 15 Porcelain placing rings. The unglazed placing rings are all made from fine, white, probably porcellaneous, clay. Because of the high temperatures needed to fire porcelain biscuit, these rings were probably placed on the rims of hollow ware vessels to stop them warping. This widespread technique was used throughout the 18th and 19th centuries; at West Pans they probably date to the Littler period.

SAGGARS

Seven different sagger fabrics were identified. Most are in local earthenware and/or fireclay and tempered with various inclusions such as rock fragments, grit and grog. They have vent holes in their bases. One distinctive, small type of sagger was made of well-worked white clay and has a characteristic pattern of five vent holes in its base. These saggars, which accommodated individual pots, are believed to date to the Littler period.



ILLUS 21 Three porcelain tea bowls fused into a solid mass. Two have fine moulded, ribbed decoration while the other is plain



ILLUS 22 Fragment of a moulded tiger lily and bow porcelain bowl decorated with underglaze cobalt blue painting

CLAY TOBACCO PIPES

Dennis Gallagher

This report describes 72 fragments of clay tobacco pipes retrieved from the 1990–1 excavations.

THE PIPES IN THEIR CONTEXT

Five bowls (nos 1–5) can be dated from the second half of the 17th century to the early 18th century. No 1, dating to *c* 1650–60, is transitional in form from that of earlier, biconical pipes and taller, more parallel-sided forms of the post-1660 period. Stylistically, the other bowls date from later in the 17th century. The bowl marked I/C (no 5) was produced by James Colquhoun, one of two successive makers of that name who dominated pipemaking in Glasgow between 1670 and 1730 (Gallagher 1987a, 38–9). It is similar to a pipe retrieved from the wreck of HMS *Dartmouth* which sank in 1690 (Martin 1987, 228, fig 2.9). Colquhoun bowls have a wide distribution throughout southern Scotland although they are less common around Edinburgh where local products predominate.

The bowl marked I/B (no 3) is similar in form to one with the same maker's initials recovered from a context dated to 1698–1700 at the Scottish colony of Darien, Panama (Horton et al 1987, 244, no 12). The identification of the maker is uncertain. Both bowls had been burnished, indicating a high quality product although

otherwise the general finish is careless. There is no milling, the seams are poorly trimmed and bottering is minimal. A basal fragment, marked I/S (no 2) may be the work of John Smith, who was apprenticed as a pipemaker to William Young in 1667 (Gallagher 1987b, 9) although nothing is known of his later career. The basal stamps are all Edinburgh-style marks based on the castle depicted in the arms of the city.

One stem has been adapted to form a whistle or flute. Its wide bore suggests a 17th- or early 18th-century date of manufacture. Another Scottish example of such secondary usage was a 17th-century Dutch stem, recovered from Spynie Palace, near Elgin (Gallagher 2002, 143). Others have been found in the Netherlands, at Zwolle (Tupan 1985, 1) and Nijmegen (Engelen 1988, 141, no 37), and at Birstall, Leicestershire (Brook 1991, 29).

On the evidence of stem bore size, about 40% of the assemblage dates to the 19th century or later. The small number of makers' marks on the pieces indicates production sources in the Edinburgh/Leith area. There are examples of two forms of makers' marks, the stamped stem being the most common type. No 11 is an example from Peter Wilson whose workshop is recorded as being active in Leith from 1847 to 1902. No 12 was probably made by Thomas White, the most prominent Edinburgh pipemaker in the first half of the 19th century, being active from 1825 to 1847. White's pipes were renowned for their high quality.

The other form of mark, represented by nos 7 and 8, is more unusual and consists of two initials in an oval frame on the bowl, facing the smoker. This type of mark was used occasionally by some makers in early 19th-century Scotland, a period of experimentation in marking. No 8 has an early 19th-century example of this mark and was made by Robert Duncan of Leith who appears in directories as an independent maker during the period 1824–26. After *c* 1850 this form of mark was confined almost entirely to the TW stamp which was used during this period to denote a particular type of fine-walled, heeled pipe



ILLUS 23 A selection of late 18th- and early 19th-century creamwares

produced by almost all Scottish makers, rather than a particular manufacturer. The origin of this stamp has been debated although the existence of similar stamps from other makers strengthens the suggestion that it was copied from the work of Thomas White (Gallagher 1989). No 7 may be an example of White's work, rather than one of the many later imitations.

Catalogue

- 1 Elongated biconical bowl, bottered with groove around the rim. Stem bore 2.8mm (7/64"); Scottish; c 1650–60. Probable Period 3 deposit in Structure G.
- 2 Basal fragment in red clay with mould-imparted I/S (or T/S) and a poor impression of a portcullis-style basal stamp. Stem bore

- 2.4mm (6/64"); Edinburgh; possibly John Smith; c 1670–1700. Unstratified deposit in Structure J.
- 3 Tall bowl, bottered but not milled with mould-imparted I/B or possibly T/B. The stamp has a heavily impressed outline enclosing the faint impression of a castle-style stamp. The front seam close to the rim has been left prominent after light finishing. Burnished. Stem bore 3.2mm (8/64"); an Edinburgh/Leith product; possibly John Banks. Unstratified deposit in sondage at north end of site.
 - 4 Basal fragment of a large bowl with a portcullis-style basal stamp. Stem bore 2.8mm (7/64"); Edinburgh/Leith; c 1680–1730. Unstratified deposit in sondage at north end of site.
 - 5 Fragment of bowl and part of stem, mould-imparted I/C; bottered and burnished but with a cracked clay surface and poorly trimmed seams; James Colquhoun of Glasgow; 1680–1730. Unstratified deposit in sondage at north end of site.
 - 6 Fragment of a stem adapted to form a whistle or flute. One end is worked to form a mouthpiece. Stem bore 3.2mm (8/64"); 17th or early 18th century. Unstratified deposit in sondage at north end of site.
 - 7 Spurred bowl with a mould-imparted TW in an oval, facing smoker. Blackened rim shows signs of prolonged use. Stem bore 1.6mm (4/64"); post-1825. Topsoil.
 - 8 Bowl sherd with a mould-imparted RD in an oval. Probably Robert Duncan of Leith. Topsoil at north end of site.
 - 9 Three adjoining fragments of a thin-walled, poor quality, spurred bowl with spur missing. Stem bore 1.6mm (4/64"); post-1800. Topsoil around Structure C/D.
 - 10 Lower bowl and stem fragment with elongated spur. Stem bore 1.6mm (4/64"); 19th century. Spit of uncertain date, but probably early 19th-century, in Structure G.

- 11 Stem fragment with a mould-imparted stamp, showing P. WILSON MAKER in sans serif lettering in a plain, linear frame. Topsoil in Structure B.
- 12 Stem fragment with a mould-imparted stamp, showing ... & Co/ED[INBURGH] in serif lettering. Fill of modern pit.

GLASS

Robin Murdoch

A total of 111 fragments of glass were retrieved from the 1990–1 excavations, most of it dating from the mid-18th to the early 19th century. The majority of sherds (71) are from wine bottles while two are from drinking vessels, 14 are of window glass while 24 are of indeterminate origin.

Of the diagnostic wine bottle fragments, the most common date from the mid-18th century, the majority of which were recovered from within Structure G although they probably post-date the building's demise. Two wine bottle sherds, one from a neck and one from a base, recovered from Area 2 are dated to the late 17th/early 18th century. There are a number of fragments that could be dated to the late 18th or early 19th century, only two of which are in 'black glass' which is coloured dark brown because of the addition of large quantities of iron oxide to the melt. It is worth noting that 'black glass' was common in England from the early 18th century while more traditional shades of green were still popular north of the border a century later.

Finer wares are represented by two basal sherds from wine glasses, one of folded foot type and the other with a plain conical foot. The folded foot was popular until about 1760 and, although it continued to be made for some time after that date, its use became very limited. Usually, folded feet were formed from thin glass whereas the West Pans example is quite substantial and probably dates from the third quarter of the 18th century. The plain conical



ILLUS 24 A selection of late 18th-century underglaze blue painted pearlwares

type of foot tends to be later in date than the folded variety, perhaps dating from the late 18th or early 19th century.

One collection of fragments was particularly difficult to interpret. Retrieved from a deposit within Structure G but dated to Period 4 or later, it was comprised of curved sherds which appeared to be from a rounded container or cover with a diameter of approximately 460mm. These sherds all had some grit part-fused onto their surfaces, suggesting that the original object had been placed over a curved surface which was not particularly clean. One possible explanation is that the putative bowl had been used for mixing the raw materials for slip or glaze.

CLAY ANALYSIS

Simon Chenery

INTRODUCTION

A total of 15 sherds of ceramics were forwarded to the British Geological Survey (BGS) for chemical analysis using inductively coupled plasma mass spectrometry (ICP-MS). The aims of this exercise were two-fold: to compare nine sherds of redwares retrieved from the excavations with others taken from the same area on previous occasions (Chenery et al 2001) as well as with those from other parts of Scotland; and to compare six fragments taken from saggars to see whether the constituent clay was local or imported, from Devon or Cornwall.

THE SAMPLES

The sherds were registered in the BGS Laboratory Quality System and given unique BGS identifiers (Table 1).

The samples were cut using a rotary saw with a diamond blade, the size of fragment being a compromise between providing enough material for the analysis and retaining as much material as possible for future research. The typical mass of each sample was 3–10g, the strip of material used being as perpendicular as possible to rims and bases. Surface contamination, wear and glaze were removed and the sample ground to a fine powder.

Analysis followed the methodology used for similar, previous projects although recently the BGS has been able to include additional elements in their surveys, particularly aluminium, iron, calcium, magnesium, sodium, potassium and phosphorus.

RESULTS AND DISCUSSION

In the redwares, the concentrations of certain elements (sodium, magnesium, potassium, calcium, iron, cobalt, zinc, strontium, barium and thallium) are significantly higher than in the whiteware saggars while the reverse is

TABLE 1
BGS identifiers for clay sherds

| <i>BGS code</i> | <i>NMS accession no</i> | <i>Context no</i> | <i>Description</i> |
|-----------------|-------------------------|-------------------|--|
| 10758-1 | MES1/1131-a | F002 | Redware: unglazed flower pot (c 1820–30) |
| 10758-2 | MES1/1131-b | F002 | Redware: unglazed flower pot (c 1820–30) |
| 10758-3 | MES1/1131-c | F600 | Redware: unglazed bowl (c 1800) |
| 10758-4 | MES1/1131-d | F600 | Redware: unglazed jar (c 1800) |
| 10758-5 | MES1/1131-e | F123 | Redware: unglazed kiln prop (c 1820–30) |
| 10758-6 | MES1/1131-f | F123 | Redware: unglazed kiln prop (c 1820–30) |
| 10758-7 | MES1/1131-g | F104 | Redware: unglazed crock (c 1820–30) |
| 10758-8 | MES1/1131-h | F104 | Redware: unglazed crock (c 1820–30) |
| 10758-9 | MES1/1131-i | F104 | Redware: unglazed flower pot (c 1820–30) |
| 10758-10 | MES1/1131-j | F148 | Small white saggar (glazed) (1764–77) |
| 10758-11 | MES1/1131-k | F148 | Small white saggar (glazed) (1764–77) |
| 10758-12 | MES1/1131-l | F148 | Small white saggar (glazed) (1764–77) |
| 10758-13 | MES1/1131-m | F148 | Small white saggar (glazed) (1764–77) |
| 10758-14 | MES1/1131-n | F148 | Small white saggar (glazed) (1764–77) |
| 10758-15 | MES1/1131-o | F148 | Small white saggar (glazed) (1764–77) |

the case for lithium, beryllium, aluminium, gallium, silver, tin, caesium, lead, thorium and uranium. The higher concentration of aluminium and elements frequently associated with it (beryllium, gallium, thorium and uranium) and the lower levels of sodium, potassium etc in the whitewares suggest a significant kaolin-type clay component, suitable for firing at high temperatures, indicating that the clay for the saggars, as well as for the porcelain, was probably imported from Devon or Cornwall.

There was no discernible chemical difference between the samples taken from vessels or kiln furniture, either of redwares or whitewares.

The presence of lead and tin in samples taken from saggars suggests that chemicals from glazes had permeated the fabrics of the vessels.

ANALYSIS OF INDUSTRIAL WASTE

Katherine Eremin, Jim Tate, Suzanne Miller and Belén Cobo del Arco

INTRODUCTION

Material believed to be waste from either the manufacture of glass or glaze, retrieved from a pit associated with kiln F560, was analysed using

a combination of electron microprobe, scanning electron microscope and optical microscope. This material is extremely heterogeneous and consists of multiple layers. The results of these analyses are summarized below.

ELECTRON MICROPROBE AND SCANNING ELECTRON MICROSCOPE SAMPLES

Six samples were sectioned, mounted and polished for analysis and examination. Four samples (HS1–4) were analysed by electron microprobe and analysed and mapped by scanning electron microscope. A further three (HS5, HS6 and HS12) were analysed and mapped by scanning electron microscope alone. Five to ten analyses were undertaken using the electron microprobe, the results being averaged.

Most samples are inhomogeneous and contain several different areas or layers. A variety of mineral phases are present, including the following:

- euhedral lath-like crystals, rich in calcium and magnesium, probably a diopside-type clinopyroxene. There is no significant difference between pyroxenes from different samples



ILLUS 25 A selection of late 18th- and early 19th-century pearlwares decorated in underglaze Pratt colours

- smaller, cubic crystals, rich in iron and/or aluminium, probably varieties of the spinel family
- fine, sometimes ragged, crystals of calcium phosphate, presumed to be apatite
- rounded quartz grains
- fine laths, rich in aluminium and silicon, which cannot be identified with confidence although they are consistent with an aluminium silicate such as mullite
- fine, unidentified crystals with slightly elevated aluminium levels compared to the matrix.

The rounded quartz grains are assumed to be detrital and inherited from the raw material, probably sandy clay. The morphology of the apatite suggests that the crystals might be dissolving although this is not entirely clear. However, it is likely that the apatite was also inherited from the raw materials. In contrast, the morphology and unusual composition of the diopside-type and spinel-type phases suggest that they crystallized in situ, indicative of

temperatures in excess of 1000°C. The lath-like aluminium silicate also appears to be crystallising and the presence of mullite indicates that a temperature of over 1400°C was attained.

CLAY/CERAMIC THIN SECTION SAMPLES

Four samples of putative ceramic material were cut, mounted and polished as thin sections in order to examine their fabrics. Two have glass-like material adhering to their surfaces. In each case, the 'ceramic' material consists of a fine-grained, amorphous matrix containing quartz grains. The glassy layer, and in some cases the ceramic material, contains abundant fine crystals which might be mullite.

DISCUSSION AND CONCLUSIONS

The evidence from the majority of the samples suggests that mixed aluminium-rich materials, with compositions similar to that expected of ceramic, were melted at high temperatures.



ILLUS 26 A selection of late 18th-century dipped wares decorated with hand-applied sgraffito and bands of lathe turning



ILLUS 27 A selection of early 19th-century dipped and variegated banded wares

The results from the samples provide strong indications as to the sources of the raw materials used in kiln F560. The aluminium-rich compositions of many of the samples and the presence of aluminium-rich spinel, and

probably mullite, within them indicate the use of clay-rich materials, which is more consistent with the by-products of ceramic manufacture than glass. The presence of rounded quartz grains with undulose extinction suggests the



ILLUS 28 A selection of factory-made redware bowls decorated with variegated banding, rouletting and hand painting

use of sandy clay derived from a metamorphic source although the geological origin of this material remains unclear. The samples are notable for their high phosphate and mixed alkali contents, consistent with coastal origins for the raw materials.

The only sample which may be true glass is a glassy area on sample HS6; all other 'glass' contains abundant crystals and has high levels of aluminium. The putative glass from HS6 has a mixed alkali composition and relatively high levels of magnesium, phosphorus, sulphur and chlorine, perhaps resulting from the use of coastal plants such as seaweed for the alkali source and fairly high levels of aluminium, iron and titanium which may derive from the use of impure, clay-rich sand for the source of silica.

The presence of spinel and diopside (possibly mullite) suggest heating to high temperatures although it should be noted that the quartz shows no sign of transition to its higher temperature forms.

Most of the material would be consistent with the high temperature vitrification of ceramics and could represent debris from ceramic and glaze working, rather than the manufacture of glass.

DISCUSSION

The excavations of 1981 and 1990–1 revealed just a small part of the industrial complex of West Pans. Nearly everything uncovered during the investigations was associated with the ceramics industry that flourished there during the 18th and early 19th centuries. A possible exception was kiln F560, which might have been used for glass-making, perhaps during the 17th or early 18th century although this was probably unlikely (see below). Nevertheless, West Pans was an important industrial centre for many years where not only ceramics but salt, glass and textiles were manufactured. In most cases, the remains of abandoned enterprises, whatever industry they were associated with, would have

been swept away to make way for new ones, leaving little trace for later investigators to find. However, some buildings were probably reused by new owners, particularly if their business was the same as or similar to that of their predecessors.

Traces of the glass and salt industries probably still lie buried at West Pans. Bearing in mind how extensive and long-lived pottery making was, considerable remains of this industry might also await discovery, particularly to the west of the 1990–1 excavation area. However, it should also be noted that 20th-century landscaping destroyed much of the archaeological record, particularly in the south-east corner of the 1990–1 excavation area where imported materials were deposited and further north where the circular hovel, and perhaps other structures, had been truncated.

Interpreting the results of these investigations has been beset by many problems, especially the loss of many of the excavation records. However, the difficult conditions experienced by the excavators in 1990–1, when time was severely restricted by bad weather and the short days of midwinter, also contributed significantly to the situation. There were many instances where insufficient time could be allocated to features whose importance became clear only with the benefit of hindsight. One such feature was the ash-pit of kiln F560 where there was time only to sample its contents and, even then, only in a machine-cut trench.

There would have been several kilns serving a variety of functions within a ceramics factory, including bisque-firing, glaze-firing, drying wares and for ancillary processes such as glaze-making and calcining flint. The excavation uncovered the remains of several buildings but it has proved impossible to interpret the functions of almost all of them. The outer structure (the hovel) of one kiln was uncovered but the kiln itself had been totally swept away and there was no surviving evidence by which to date the structure and nothing to relate it to any other building, except Structure A which overlay it.

It is disappointing that, although the site yielded large quantities of ceramics, the majority was retrieved from residual contexts and has proved of limited use in placing the various structures and features in clearly defined phases. Furthermore, the sheer volume of the ceramic assemblage has meant that it was not practical to include a full report of it here although a comprehensive, illustrated account of this material has been produced (Haggarty 2005).

Early maps and documents tend to confirm that the vennel that separated the two principal areas of excavation also marked the boundary between the lands of property owners and tenants from at least the mid-17th century when John Jossie built his house to the east of it. The wall surrounding his land stands, albeit much altered, to this day. In 1981, fieldwork was concentrated within those grounds where some structures were uncovered although most of the ceramic production at West Pans seems to have been concentrated to the west of the vennel.

WEST PANS BEFORE THE POTTERIES

To date, little material evidence of industries other than the manufacture of ceramics has been found at West Pans. One of the most important, and almost certainly the longest surviving, industry that sprang up on the site was salt-making which continued over a long period at numerous locations along both shores of the Firth of Forth. The salt industry reached its peak during the late 18th and early 19th centuries although it carried on into the 20th century at Prestonpans, a short distance east of West Pans. Pan-houses, girnels and probably other buildings would have stood close to the shore with bucket-pots (tidal reservoirs) located in the intertidal zone. Land reclamation, thought to have started in the 18th century, probably covered the remains of many of the earlier salterns while others continued operating well after that time.

Another occupation, albeit a small-scale one, carried out at West Pans during the 18th century was weaving. The only visible evidence of this industry is now 50 Ravenshaugh Road, once owned by the Sandersons, a family of weavers.

With the exception of porcelain manufacture, perhaps the most interesting industry sited at West Pans was glass-making. Glass was first manufactured there in the mid-17th century by John Jossie who probably also made salt. Later in the same century Cornelius Visitella and his family took over glass-making at West Pans. While none of the excavated structures or features can be said with certainty to be associated with this industry, there is a possibility that kiln F560 might have been (see below).

THE EARLY POTTERIES

Clay was extracted from the Pan Braes from the late 17th century and used for brick-making and perhaps also for potting around that time. Several sherds of 16th- and 17th-century glazed pottery (mostly oxidized wares) were retrieved from the site in 1990–1 although there was nothing to suggest that any of this material had been made at West Pans. Pottery was definitely being made at or near there from c 1738 when Robert Pate set up his works; others followed suit shortly afterwards. It is not known whether Pate's enterprise was located within the excavation area or at another location in West Pans. Several potteries were set up at West Pans during the 1750s but neither the documentary evidence nor the excavation findings makes it clear whether more than one was operating at the same time. Furthermore, it is impossible to tell which, if any, of the potters who operated those various works constructed the features allocated to Period 2.

The most substantial of the Period 2 structures was Structure C/D although it should be noted that this building could not be dated accurately and it is possible that it predates Period 2. It has been dated to this period because the firebox (F247) of a Period 3 kiln had been built over its demolished remains although again the dating of

the firebox could be questioned. The full extent of Structure C/D remains unknown, as does its function. No evidence of any industrial process such as firing, drying or clay-puddling was found within its walls, suggesting that it was a workshop, store or perhaps an office. Another question concerning Structure C/D is presented by the drain that ran along its south face: was it associated with this building or with the kiln that overlay it? The drain appears to have stopped midway along the building's extension (Structure C) with no sign of it continuing in any direction from that point or of a sump leading off it. On such evidence it is difficult to see how the drain functioned effectively although it might be reasonable to expect a drain around the outside of a kiln to prevent steam accumulation within it causing an explosion or at least reducing its efficiency.

Before the walls of 50 Ravenshaugh Road were harled in 1991, the tops of some of its ground-floor windows were visible just above the level of the adjacent pavement. From this it is clear that the road level has been raised quite considerably at some stage, probably in the 19th century. On the evidence of puddling pit F567, which extended beyond the line of the extant south boundary wall, the road has also been widened since the 18th century, perhaps at the same time as it was raised. This pit would probably have been under cover, perhaps contained within a building bounded on its west by wall F322. There is little doubt that it was an early feature and, like wall F322, lying below the level of Period 3 Structure G.

WILLIAM LITTLER AT WEST PANS

William Littler seems to have had limited business sense but he did make a lasting impression on the ceramics industry in Scotland, as well as on those who purchased his wares and continue to collect them. It was also once assumed that porcelain was imported from Staffordshire and merely decorated at West Pans, an idea totally disproved by excavation. Even though it could

be argued that the considerable quantities of bisque sherds recovered from the site are derived from imported vessels awaiting decoration, the remnants of three tea bowls and a fragment of kiln furniture all fused together (illus 21) that were retrieved from an ashy deposit outside Structure F clearly indicate otherwise. This collection was the probable result of a mishap within a kiln and would certainly not have been brought into the factory from another works.

Considerable quantities of Littler's porcelain and other contemporary ceramics were retrieved during the 1990–1 excavations but identifying which of the excavated structures and features belong to Period 3 proved difficult. The buildings thought most likely to be Littler's are Structure F, Structure G and the one that housed kiln F247. Other candidates for placing in Period 3 are Structure A and Structure B (the hovel) although clearly these two buildings could not have co-existed.

The circular space within the hovel measured roughly 10.2m in diameter, which is slightly larger than the 8m of one excavated at Longton Hall, Staffordshire. However, such comparisons can be misleading. The West Pans hovel might not have been associated with a porcelain kiln; and it is not known how many other kilns were operating at the same time. There are thought to have been three kilns for making porcelain at Longton Hall towards the end of its productive life in 1760 (Tait & Cherry 1978, 17). The excavation records make no mention of a floor within the West Pans hovel, probably because there never was one as appears to have been the case at Longton Hall where the hovel was left deliberately unpaved (ibid, 21).

The three structures most easily ascribed to Period 3 remain poorly understood. Structure G was reasonably well defined and its relationships with earlier features were established with some certainty. This is particularly true of the Period 2 wall F322 whose remains lay directly beneath the west wall of Structure G. However, the building's function remains totally unexplained, no trace of a floor or any other contemporary feature within

its walls being identified by excavation. The fire-box of kiln F247 was well defined yet nothing remained of the building that had surrounded it, other than the probable base of a chimney nearby. It was too large to be the fire-box of a kiln for producing ceramics, at least according to the evidence from Longton Hall where fire-boxes for roughly contemporary kilns measured approximately 0.9m by 0.75m (ibid 1978, 11, fig 7), compared with the 2.1m by 1.45m for F247. One possibility is that F247 was the stove for a chamber in which clay vessels were dried before firing. The remains of a building, interpreted by the excavators as a drying room, were uncovered at Longton Hall where the absence of vitrified surfaces tended to support such an explanation (ibid, 17). The same could also be true of West Pans. Another possibility is that this was a glost kiln for making glaze.

Structure F was even more of a puzzle. Only its side walls and a very short section of its west wall survived and they comprised only single lines of bricks, suggesting that this was an insubstantial structure with brick footings supporting timber walls and a low roof, or perhaps that it was an unroofed enclosure. The deposit of pale grey clay covering its interior and extending beyond its walls suggests that Structure F was used for storing or treating clay. Furthermore, the clay itself, as well as the sherds of porcelain (but no other ceramics) pressed into it are strong indications that Structure F dates to William Littler's time at West Pans.

Littler's factory (and those of other potters) would have consisted of a complex of buildings and other smaller structures, sometimes spread over a relatively large area. They would have included: kilns; drying rooms which sometimes used the residual heat from adjacent kilns; workshops, including a clean one for painters; stores; settling tanks and puddling pits. It proved impossible to equate any such structures with those exposed by excavation. It might be tempting to place Structure A or the hovel into Littler's period but those buildings could not be dated and caution must be exercised here.

It is possible that kiln F560 dates to Littler's time. Its interpretation is very much open: chemical analysis of slag recovered from its ash pit suggests that, although this material was glassy in nature, it was probably not produced in a glass kiln. Neither did it resemble the usual type of waste from making glaze although, in this case, it might simply have been from a type of glaze exclusive to Littler.

The two puddling pits (F534 and F567) both contained residues of white clay, suggesting that they might have been associated with Littler's porcelain factory. However, these pits are both rather small and could well have been used to make white slip, placing them either before or after the Littler period but probably not in it.

THE LATER POTTERIES

Littler's departure from West Pans in 1777 saw the end of porcelain manufacture there but the production of good quality ceramics carried on for some time after that date. Refined earthenware continued to be made by a variety of entrepreneurs from the 1780s until about 1830, many of their wares being recovered during the excavations. Unfortunately, however, excavation could not distinguish which potter made which wares or even link any of the material to specific features. The only features that appeared to date from the late 18th and early 19th centuries were a few processing pits, drainage cuts and dumps of waste pottery. While these did little to help interpret any of the excavated buildings, the pottery did at least provide a valuable insight into the range of goods manufactured at West Pans during its last 50 years of production.

AFTER THE POTTERIES

John Rodgers was the last potter positively identified as operating at West Pans. His works, which were actually owned by Nicol and John

Watson, were sold to Sir James Suttie in 1832. It is not known for certain whether ceramics continued to be made after that date although, on the evidence of the pottery assemblage, it did not. Salt-making, however, appears to have carried on for some time after that date: when the Watsons sold their property it included salt pans as well as a pottery (NAS RS 27/1350). Indeed, an early 20th-century photograph shows several roofed cottages at West Pans as well as much larger structures that might well have been salterns and perhaps other buildings associated with that industry.

The cottages shown in the photograph were probably the ones depicted on the first edition Ordnance Survey map, bordering the road that meandered through the village at that time. Remnants of one of those cottages, as well as boundary walls contemporary with it, were uncovered towards the north end of the 1990–1 excavation area. Most of the artefacts retrieved from within and around those structures post-dated the demise of the ceramics industry at West Pans and most likely were imported for the occupants of the cottages, some of them probably salt-workers.

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UNPUBLISHED SOURCES

RD Register of Deeds

RS Register of Sasines

NAS RS 27/79 ff23–8 Disposition of Robert Jossie to Edward Jossie of land in West Pans, dated 19 July 1711

NAS RS 27/162 f46 Disposition of the Mansion House in West Pans by Christian and Charles Hay to Sir David Dalrymple, dated 20 June 1736

NAS RS 27/135 f123 Disposition of James Forrester to Robert Watson of land in West Pans, dated 4 January 1749

NAS RS Seq 230 B1/11 box 532 Bagnall/de la Chapelle sequestration

NAS B52 Musselburgh Records

NLS Newhailes MSS 7228/403

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