EDINBURGH CASTLE RESEARCH:

EDINBURGH CASTLE'S ROLE AS A GUN HOUSE

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

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David H. Caldwell

In a series of questions and answers, this report seeks to provide an overview of the gunnery establishment, arsenal and gun house based in Edinburgh Castle, particularly in the late 15th and 16th centuries. It provides detailed information on Mons Meg, the gun carvings in the gatehouse to the castle, gun casting and the use of guns on ships. Two Appendices provide information on gun specifications and a list of gunnery personnel.

How the Master Melter, Robert Borthwick left his name on a bell of 1528 in Kirkwall's cathedral

Q. *What is the earliest evidence for guns in the castle?*

A. 1384. In that year saltpetre and sulphur – with charcoal, the ingredients of gunpowder – were bought by the government for the royal castles, and also an instrument called a gun, specifically for Edinburgh Castle (*ER* 3: 672). There can be no doubt that this was a gun in the sense of a military machine projecting pieces of shot. There were already two specialists based in the castle who may have had appropriate knowledge and experience to look after and use this weapon. One was Theoderic or Dederik, probably of Flemish or German origin, a carpenter and maker of machines; the other an unnamed *artilarius*, in this context meaning a keeper of crossbows and other engines (*ER* 3: 87, 117, 118, 659, 660).

The Scots must have been aware of this new technology long before 1384, having guns fired against them by the English as early as 1327 when

campaigning in Weardale in the north of England. Nevertheless, they appear to have been very slow to adopt it. The reason for this may relate to the attitudes of King David II, who comes across as a strong-willed man, but neither a great military leader nor innovator. He had even spent a number of his formative years, from 1346 to 1352, as a prisoner in the Tower of London, which housed the main English military workshops and arsenal, with gunners employed to look after and manufacture guns.

The payments recorded in 1384, in the reign of Robert II, may relate to military preparations in anticipation of the troubles likely to ensue on the expiry of the 14-year truce made with the English in 1369. They may reflect the 'modern' military thinking of the leading Scots now ready to mount raids into England (Caldwell 2007).

Q. *How did the gun house develop?*

A. A key function of the castle from earliest times was as an arsenal. Certainly, from the beginning of the 16th century, and probably much earlier, the main munitions stores and workshops were centred on Edinburgh Castle, and that is where the gun foundry was established.

Guns and munitions were kept at Linlithgow Palace in the reign of James II and there was a gun house (*domus bumbardie*) in Stirling Castle, first recorded in 1475 (*ER* 7: 275). The main royal fortresses, especially Edinburgh, Stirling, Dunbar, Dumbarton, Inchkeith and Blackness, had guns and gunners at various times from the 16th century onwards, and munitions were often also kept in the King's Wark in Leith (e.g. *AMW* 1: 233).

War engines were being made in Edinburgh Castle in the 1340s, and spears and arrows were also being manufactured there in the 15th century (*ER* 1: 494, 508; 6: 498, 582). The earliest evidence for gun casting is in the early 1470s when it was being done at or near the Blackfriars in Edinburgh. In 1508, other gun casting was being undertaken in Stirling, possibly in the

castle, but by 1511 the foundry had been transferred to Edinburgh Castle, where it was to remain (Caldwell 1983: 427).

There were many reasons why Edinburgh Castle was a good place to locate the main royal arsenal, including its reputation for being impregnable, access to facilities and skills located in Edinburgh, proximity to the port of Leith and its role as a royal residence and centre of administration. Access for large siege guns was probably a particular difficulty for the royal castles. In the case of Edinburgh, a decision was made to create a long, broad, relatively gentle passage, now represented by the cobbled road that winds from the Outer Entrance through the Portcullis Gate around to Foog's Gate and the entrance to the cellars under the Great Hall. This must surely pre-date the decision to locate gun casting in the castle. It might even have been prior to 1489. In that year, Mons Meg was located at Edinburgh Castle before being taken to the siege of Dumbarton Castle (*TA* 1: 115). From then on, it is clear that the castle also housed the main supply of royal artillery.

Q. *What was the nature of the gun house and the work done there?*

A. 'Gun house' is a term used loosely, as it often seems to have been done in the past, to encompass the weapons stores, workshops and gun foundry in Edinburgh Castle. It was the main Scottish arsenal and the earliest significant foundry for producing large bronze guns in Britain. We limit the scope of this answer, however, to a description of the gun founding.

The foundry producing guns in the 1470s was at or near the Blackfriars in Edinburgh. The gun casting in 1508 was done somewhere within Stirling Castle. In an inventory of 1585, mention is made of the munition house in the end of Stirling's great hall (built by James IV c.1500) and the munition house in the laigh trance, which was divided into an inner and an outer house (NRS E96/5). It is possible that the gun casting could have been carried out in or near the hall's undercroft. For most of their existence,

however, the royal gun foundry and workshops were in Edinburgh Castle, and the royal guns were kept there, too, apart from pieces on active service or employed to defend other royal fortresses.

The castle's inaccessible position meant considerable effort was involved in lugging heavy equipment and supplies up into it, and there was no running water that could be used as a source of energy for working bellows, hammers and the machinery for boring out guns. Wind seems to have been little considered in Scotland at this time as a source of power, the main alternatives to water being horse- or manpower. Although horses were used in the 1530s to drive the grinding and polishing wheels of the armour workshops at Holyrood Palace (*AMW* 1: 101–2), there is no evidence of such mechanisation being employed in the castle where the mill for making gunpowder was specifically described as a man-operated mill. It would have been impossible to produce cast iron without a blast furnace with water-driven bellows, and the impracticability of setting up such a furnace in the castle may even be considered as a contributory factor in limiting Scottish technological development in metalworking at this time.

The technology of founding bronze guns changed little in most respects from the 16th to the 18th century and, from the evidence of the materials used and methods of work contained principally in the *Treasurer's Accounts*, it is possible to recognise much of the method described in the 16th-century treatises by Biringuccio and Cellini, and also later expositions like the 18th-century account and illustrations by Diderot and the paintings of Verbruggen (Smith and Gnudi 1959: 234–48; Ashbee 1967: 111–34; Diderot 1767: pls XI–XIX; Jackson and de Beer 1973).

The furnace for melting the guns was rebuilt in 1515, being made of tiles from Tranent in East Lothian, supplied by Auld Julian the Italian (*TA* 5: 18, 19). Like its predecessors, it was probably not a reverberatory one – a type already well developed by the mid-16th century and described by Biringuccio (Smith and Gnudi 1959: 281–8) – but is most likely to have been a cupola furnace in which the metal and fuel were melted together, sufficient heat being provided by hand-operated bellows. The molten metal

collected in a receiver below the level of the *tuyères* and was drained off by a tap-hole at the bottom. This is essentially the system outlined by Biringuccio in the second chapter of the seventh book of *Pirotechnia*, concerning methods and procedures used for melting metals, in which he describes melting in a hearth or bowl shaped like a washbasin with a plug in the bottom. Charcoal was first set to burn in it, then the metal added and gently brought to its liquid state by the working of one or two pairs of bellows. The metal could then be drained off, by the removal of the plug, into a mould. Biringuccio claims he had seen a master cast of a bell of about 1,000 pounds in a furnace of this sort, which was like a clay-lined basket, but other furnaces were of brick in the shape of a little tower (*ibid*.: 289–90).

There are no descriptions of the furnace built in 1515 or its predecessors, nor is there much useful information on how any of them were worked. Our assumption that they were cupola furnaces rests on the following grounds. The 1578 inventory of Edinburgh Castle lists 'ane pair of greit bellies with pyppis of bras for the melting of the pecis auld and must be preparit of new to serve' (*Wardrobe Inventories*: 248–61). These were then in the melting house and, since we argue below that the later furnace was of the reverberatory type, must have been for use with the 1515 furnace. They may have been those bellows that had to be mended in 1542 after the first unsuccessful attempt at casting a double culverin (*TA* 8: 126). The *Treasurer's Accounts* make in abundantly clear that coal and charcoal were the materials normally used to fire the furnace (*ibid*. 4: 508: 9: 127, 199, 348; 10: 101, 115, 151, etc.), but it is known that the reverberatory furnaces used in guncasting were fired with wood (Smith and Gnudi 1959: 280; Jackson and de Beer 1973: 151; Tylecote 1976: 96). The Potter of Dumfries was got to make a 'taist' (French *tasse* = crucible?) for melting the metal in Stirling in 1508 (*TA* 4: 134), and this may refer to the basin in the furnace in which the molten metal collected – or else the crucible containing the metal to be melted placed in the furnace.

A great cannon called the Necar (= knicker, Old Scots for cracker) was cast in 1511 and theoretically could have had a weight of as much as 5,400 pounds. Otherwise, the *Treasurer's Accounts* suggest that no more than one double or gros culverin, or two double moyens or several double hagbuts of found were melted at one time. This would have meant a furnace with a capacity to produce, at most, 3,000 pounds (1,364kg) of metal. This may be compared with the reverberatory furnace erected at Woolwich by the Verbruggens in the early 1770s, which could melt about 38,000 pounds (17,273kg) of metal at one time, a volume of almost 2 cubic metres (Jackson and de Beer 1973: 151).

The furnace of 1515 remained in service until 1558, when it was decided that a new one had to be built. This was undoubtedly because the old furnace had proved incapable of being brought to the right temperature and worked to melt the bronze thoroughly. It can be deduced that an attempt at founding had gone disastrously wrong at this time since there is a payment in the *Treasurer's Accounts* for ten loads of coals for breaking up the metal taken from the furnace (*TA* 10: 441). Three of the melters (founders), David and Thomas Rowan, along with Claus Heliot, went to Tranent in the autumn of 1558 to contract with John Crawfurd, indweller there, for 4,000 tiles 'to be ane pend and ane sole to ane furnes', and Tranent grey clay, mixed with hair, was also used. The old furnace was knocked down and the work of building the new at least partially accomplished by the melters themselves (*ibid*.: 440–2).

A furnace with a pend (vault) was probably a very different thing from the furnace built in 1515, in fact a reverberatory furnace that did not require the forced draught provided by bellows. In reverberatory furnaces, the fuel is burnt in a separate chamber or fire-box, and the hot products of combustion pass into the hearth in which the material to be melted is placed, and thence out through a chimney. The vaulting of the whole furnace tends to deflect or reverberate the heat downwards to the metal and the chimney is necessary to create a draught and lead the smoke into the open. This type of furnace was normally used for casting bronze

ordnance into the 18th and 19th centuries, and the furnaces in the Royal Brass Foundry at Woolwich in England illustrated in Verbruggen's drawings of about the 1770s may have differed little except in scale from that in Edinburgh Castle (Jackson and de Beer 1973: nos. 30, 33, 36, 37, 39, etc.). All accounts relating to the actual manufacture of guns cease after the last item of expense on the new furnace, and so nothing is known of its capacity or capabilities.

Much of the metal used in the gunfounding had to be imported from the Continent, especially the Low Countries (*TA* 4: 278, 302; 6: 151, 158), the source for most of it ultimately being the mines of Hungary and the Tyrol (Tylecote 1976: 75). Scrap metal was assiduously re-used, old bells being collected from the abbeys of Kilwinning and Kelso in 1541 and a broken falcon from Denmark in 1542 (*TA* 7: 498–9; 8: 152–3). Scrap and ingots were weighed and mixed together in the furnace and some tin was added separately 'to dulce the mettell', as well as brass in small quantities (*TA* 4: 133; 10: 438). The molten metal was poured from the furnace into clay moulds that were positioned upright in the fosse or sink (pit) immediately in front of it. This must have been of great depth in order to take the moulds of double culverins being made in 1540, 1541 and 1558 which might be as long as 16 feet (4.877m) (*TA* 7: 360; 8: 124–7; 10: 437–42), and was probably stone-lined since a load of lime was needed to mend it in 1542 (*TA* 8: 126). The moulds were held upright in the pit by being tightly packed with slightly moist earth.

Gun moulds were made up complete with cores at this time, the making of solid castings being first developed by Maritz in Switzerland in 1715 and not being introduced to Britain until 1770 (ffoulkes 1937: 65). Drawings of guns were apparently made on Lombard paper and, thereafter, the first step was to make a model of the outer surface of the gun, this being done entirely in wood for the smaller guns. In the larger, rope was wound round a well-greased wooden spindle and coated in clay beaten into a smooth paste and mixed with wool clippings and hair. In 1558, the source of the clay is given as Pilrig, between Edinburgh and Leith.

Ships' masts made convenient spindles, or where a big enough piece of wood of suitable quality could not be got 'spilis' were glued together. The projecting mouldings at muzzle and breech may have been carved in wood and slipped on to the wooden spindle in the case of the smaller guns. Otherwise they were modelled in clay. Where the chase was cylindrical, a wooden strickle-board could be held against the clay of the model while the latter was being slowly revolved, in order to achieve a regular finish. The mould of timber for a double culverin listed in the 1578 inventory may have been such a strickle-board, since the model for a gun of this size would almost certainly not have been made entirely of wood (*Wardrobe Inventories*: 258). At the muzzle end, the model was made with a large 'gunhead'. In the casting process, the space occupied by this was filled with bronze and by its weight ensured that the metal in the rest of the gun was well distributed and free from air bubbles. The clay of the model was carefully dried out in the meantime by making fires fuelled by peat or turf under it as it was slowly turned. Finally, it was thoroughly greased with wax or tallow and the wooden models of the trunnions or hook nailed on.

Decoration was either applied in wax to the model or was engraved on the finished gun. In 1539 Andrew Masterton, carver, was paid 'for making and carving of vj patronis to the gunnies, witht lyoun heidis and flour de lices of tre', which can be interpreted as meaning wooden moulds for wax lions' heads and fleurs-de-lis to be applied to the gun models (*TA* 7: 344). In 1541/2, on the other hand, Andrew Mansion, carver, was paid for engraving the royal arms with unicorns, thistles and fleurs-de-lis on a double culverin, and the date on its muzzle, and James Cokke, goldsmith, was paid in 1558 for sinking and engraving the queen's arms and an inscription on a double falcon (*TA* 8: 127; 10: 438).

The arms and initials of King James V on a small falcon in Glasgow Museum

Over the completed model, the clay mould was built up, hair and wool clippings being added to bind the clay, and hemp and wire for strength in the outer layers. The mould was carefully dried as work progressed, at first only by exposure to the air, but in the later stages by the action of fire. It was finished off by being bound with strips of wrought iron, which enabled it to stand up to the strains of being moved and filled with molten metal. The six gun moulds being worked on in 1539 each required eight 'gaddis of irne' (*TA* 7: 223).

Once the gun mould was complete, the inner spindle of the model was knocked out and its clay and rope elements removed. The interior of the mould could then be thoroughly dried out, too, and the model of the gun's bore carefully lined up inside it. For this, an iron spindle was used, coated with clay – and possibly reinforced with wire, as described by Biringuccio (Smith and Gnudi 1959: 241). The mould for the cascabel had to be made separately and the gun mould fitted on it carefully in the pit prior to casting. It is an intriguing possibility that the large iron spindle later used in the Edinburgh Tolbooth for shackling prisoners was originally for creating gun bores in Edinburgh Castle. It is now displayed in the National Museum of Scotland.

The melting of the metal and casting of the gun(s) was the culmination of several weeks' work. In 1541, five men under Peris Rowan were paid for working on a double culverin from 19 September to 30 October, which was the day the gun was cast (*TA* 8: 125). The melting itself could take several hours, owing to the sheer quantity of the metal and, if necessary, the furnace was attended overnight, as in March 1512/13 (*TA* 4: 508). The work was fraught with great hazards and difficulties. The double culverin cast by Peris Rowan in 1541 failed since the mould of the gun was not properly secured to that of the cascabel. A second attempt after much more laborious work was equally disastrous when the spindle (i.e. for the gun's bore) rose out of place as the metal was being poured. It was only at the third attempt that the casting was successful (*TA* 8: 124–7).

The gun, having been cast, was by no means finished. It had to have its gun-head sawn off and the bore reamed to the correct diameter. The boring was done horizontally, the bit being turned by a wheel and probably worked by manpower. Six men under the command of Hans Cochrane were paid four weeks' wages for boring newly cast guns in 1540 (*TA* 7: 350–1). The exterior surfaces of the gun also had to be hand-tooled to an attractive finish, mounted and proofed before they were deemed fit for service.

From the *Treasurer's Accounts* and the inventories of the castle, it can be established that the foundry produced the following types of guns in descending order of size: cannons, double/gros culverins, moyens, battards, double falcons, quarter falcons, great/double hagbuts of found. We unfortunately cannot tell how complete a record of types this is or guess at the quantity being produced, but in terms relative to the country's overall requirements it must have been a modest output. The small size of the furnace, the lack of horse- or water-operated machinery and the part-time nature of much of the work indicate that the gun founding was never really conceived of as a big operation.

Although this gun foundry may have been a relatively small operation, it clearly was able to produce ordnance that remained serviceable for long periods of time. It no doubt gave a certain amount of prestige to the Scottish monarchy. It is interesting to compare its establishment as a royal enterprise on royal property with the situation in England. The manufacture there of bronze guns apparently started later, perhaps only about 1520, and was carried out by contractors operating their own foundries, especially the one at Houndsditch, London, from about 1531 (Kennard 1986: 34, 39, 122). The Scottish gun foundry deserves more recognition as a significant early step in the development of artillery.

Q. *Where were the guns founded and stored?*

A. Though some places associated with the gun house and arsenal still survive, especially the cellars under the Queen Anne Building, all trace of the munition house in the former St Mary's Chapel has gone, and we can only tentatively locate the gun foundry in the area later transformed into Dury's Battery.

We need first of all to remind ourselves of what is known about the appearance of the castle by the early 16th century. To the east, the castle rock was separated from the town by a curtain wall running north-west to south-east, flanked by the massive David's Tower, the stub of which is now incorporated into the Half Moon Battery, and the Constable's Tower, sited near the present Argyll Tower (Morton's Gate). The main building developments on the castle rock were concentrated on the highest part behind this wall where there was the 12th-century chapel of St Margaret, and, further to the south, the Palace Yard or Crown Square. The rock at this point was made level by the construction of vaulted cellars to the south, east and west, and the great square formed which survives today, bounded on the north by David II's Chapel of St Mary, the site of which is now occupied by the National War Memorial, on the south by the Great Hall of James IV and on the east by the King's Lodging or Palace Block, some of which dates back to the 14th century.

The castle inventories of March 1566/7 and 1578 (*Wardrobe Inventories*: 165–77, 248–61) both list eight different 'houses' or premises associated with the gunnery establishment as follows:

1566/7	1578
workhous	workhous
munitioun hous above the smidye	munition hous above
smidday	smiddy
overhous	litle hous
midhous	midhous

laich munitioun hous	nedderhous
gunhous	melting hous
poulder wout	poulder hous

It will be noted that the second of these inventories was made after the castle suffered considerable damage and alterations in the bombardment of 1573, thus leading to the probable displacement or relocation of munitions and activities. We can suggest, however, that these premises may be identified as follows:

The Workhouse

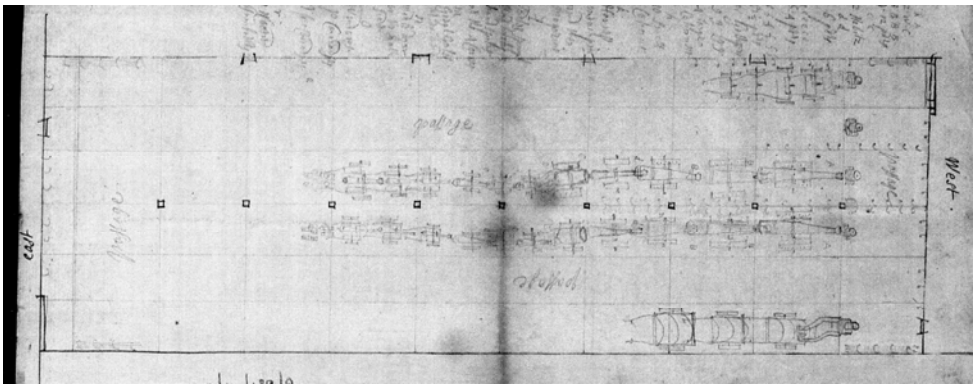
James I had a 'Great Chamber' built between 1433 and 1438, which the Royal Commission suggested may have been at the south-east corner of Crown Square (*Edinburgh Inventory*: 18). I am, however, indebted to Iain MacIvor, a former inspector of ancient monuments with responsibility for the castle, for the suggestion that this great chamber was a hall, presumably that got ready for the meeting of parliament in 1458 (*ER* 6: 385), which bounded the west side of the square. In 1496, there were various amounts of expenditure in preparing the workhouse for housing the artillery. In 1583, the great hall called the workhouse was re-roofed with slate (*TA* 1: 289, 302; *AMW* 1: 312). All this suggests that James I's hall was turned into an artillery workhouse in the reign of James IV. It had already disappeared when Gordon of Rothiemay's bird's-eye view of Edinburgh was produced in 1647 and was replaced in the 18th century by the Queen Anne Building.

The Munition House

In 1538, 'the chapel' was altered into a munition house for storing artillery, gun stocks and wheels. The old windows and doors were filled in and a new large pair of doors made. The rock floor was quarried smooth and cobbled, and work done on the roof and lofting. When the work was completed, it took eight men three days to get the munitions inside (*TA* 7: 214–26, 489–

90). This chapel was evidently not the little one of St Margaret that survives today, but the much larger church of St Mary with a floor area of about 1,000 square metres. St Mary's survived as a munition house until its demolition in 1755. Plans made by Charles Tarrant in 1754 show that it was divided into two storeys, the bottom one housing the artillery train and the upper one small arms (Ewart and Gallagher 2014: illus. 4.24, 4.25). This arrangement may well go back in time a long way.

I am grateful to Dennis Gallagher for drawing to my attention a sketch plan of 1723 (below) showing the artillery train stored in the ground floor of this munition house (NRS RH15/14/189). It is not detailed enough for individual guns to be identified, but it does show six small mortars and 22 guns on field carriages. Of these, six appear as large, presumably battery pieces, and two are apparently howitzers. There are also other small pieces and seven carts.



The Smiddy

Tarrant's 1754 plan (Ewart and Gallagher 2014: illus. 4.24) shows that there was then a smith's shop against the north wall of the Munition House/St Mary's. Supposing that it dated back to the 16th century would explain descriptions of the Munition House as being above the Smiddy. Possibly, however, there was more than one smiddy, the other being located in the same building as the Gun Foundry (see below).

The Over or Little House

There are no solid clues for identifying this structure. Might it have been St Margaret's Chapel, or else the upper storey of the Gun House (see below)?

The Mid House

By the late 16th century, it is clear that some of the gun store rooms were in the capacious cellars beneath the Queen Anne Building, now bounding the west side of Crown Square. The rock-cut roadway into the castle winds round the highest point of the rock to the west side of the Palace Yard where the entrance to these cellars lies. There are three large cellars, about 1,200 square metres in extent, now subdivided, later known as the 'French Prisons' thanks to the use they were put to during the Napoleonic Wars. They are entered by means of a passageway wide and high enough to get carriages and carts through. This is clearly a secondary arrangement, but one very probably introduced at an early date. The westernmost of these cellars is well lit by windows to the west and south, but its two neighbours only have windows to the south. There is another smaller cellar off the north side of the passage and two flights of steps, one apparently leading up to St Mary's Church and the other to the former Work House. 'Mid House' is an appropriate description for these cellars, given their location sandwiched between the Work House and other cellars below, identifiable as:

The Laich Munition or Nedder House

Three sub-vaults, poorly lit by windows to the south, are reached separately by long straight flights of stairs slapped through the thickness of the wall off the main entrance passageway of the supposed Mid House.

The Gun House or Melting House

After a visit to the castle in March 1573 in order to discuss its surrender, the Englishman, Nicholas Errington, reported that the Marian party had made a rampart to cross over from one side to the other at the melting-house

called ‘the smythes forge’, and by that means had cut off all the backside of the castle that hung towards the north-west (*CSP* 4: no. 598). In an account of the estimated expenses on the royal palaces drawn up in 1583, it was noted that the wall beside the Smiddy on the west side of the castle was fallen down for a length of four score feet and that the smiddy house required to be re-roofed, the one side with slates, the other with new ‘spowne’ (shingles) (*AMW* 1: 311–12), this evidently being the result of the bombardment of 1573. A building account of 1615 makes clear that it was two storeys high with two windows in the gables of the upper storey (*AMW* 1: 364). This upper storey might have been the Over or Little House mentioned in 1566/7 and 1578. The whole building might indeed be the Smiddy, which was under construction in 1382 (*ER* 3: 89–90).

Errington’s description would favour locating the Gun House in the area later turned into Dury’s Battery. It is tempting to identify the recent excavation of a large pit there and metalworking debris with the 16th-century gun founding (Ewart and Gallagher 2014: 128–33). We recommend that the results of this excavation are given more detailed review and analysis.

The Powder Vault or House

This may have been located in the cellars under the Queen Anne Building, possibly one of those already identified as the Laich Munition House. Or might it, for safety reasons, have been located well to the west of the Crown Square, like the Powder Magazine erected in the 1740s?

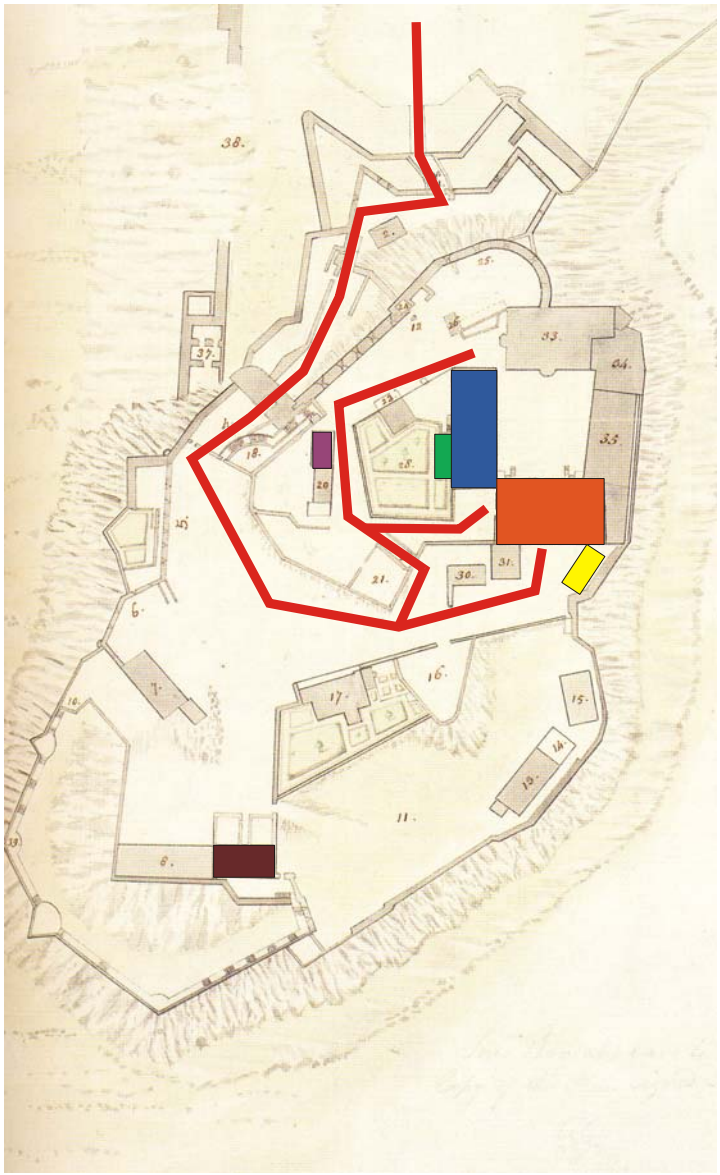
At first sight, the inventories of the workshops and stores of the gunnery establishment suggest complete disorder, like the ‘Tua thousand and four hundredth or thair about of boullettis … of sindry sortis quhilkis culd not be instantly nowmerit or tauld because they be in divers places far sindry and will tak lang tyme with menis panis to pas and try thame throw thair calibres’ (*Wardrobe Inventories*: 260–1). Nevertheless, some order can be discerned among the prevailing chaos, and where particular items seems to be misplaced, for instance carts in the Smiddy, the explanation

may simply be that they were there being worked upon. The inventories, which obviously only list the movables in each house, give just one piece of equipment in the Gun House or Melting House that was specifically connected with founding – a great pair of bellows with brass *tuyères* that were described in 1578 as old and needing to be repaired, if required for use. At this time, moulds and pieces of moulds were to be found in several of the other houses, including the Mid House, the Nedder House, the Work House and the Smiddy, but none at all in the Gun House. The scale for weighing the pieces of metal fed into the furnace were in the Nedder House. There was no tackle or any cranes at hand for manoeuvring the heavy moulds and castings, and the puncheons and barrels for the clay, water, peat and coal had all gone (*TA* 10: 442).

The Smiddy, as could be expected, was provided with various smithing tools, including studies (anvils), tools for making nails, hammers, bellows, 'ane schering vyss' and a weighing device. The Work House was where the wrights worked and contained wood for making stocks, wheels, limbers and so on, and 'sindrie and mony sortis and ingynis of tymmer all serving to the foirsaid artailyearie quhilkis can nocht be declarit speciallie for confusion of the number thairof'.

Neither of the two inventories record much in the Munition House, and, if it was indeed the old St Mary's, it must have been almost empty. The most substantial items in it in 1566/7 were five 'sea stocks', but perhaps the large guns, all in the open air and defending the castle, could be put inside during the worst of the winter when campaigning normally came to an end. The Mid House, on the other hand, contained 23 close carts, some armour and other equipment, the Over House contained pikes and handguns with their equipment and the Laich Munition House 200 ox-yokes. The powder vault had 42 barrels of gunpowder, 15 of culverin powder and nine of priming powder, along with 'ane mann miln for making of poulder with thre mortaris nyne pestellis wanting the kapis of brace'. By 1578, much of this equipment was depleted or in poor condition, like the ox-yokes, reduced to 175, 26 of which were a complete write-off apart from their ironwork, and

most of the rest of which are described as being rotten and of no use. There was less powder and few handguns, and although there were more close carts, 35 in all, mostly in the Smiddy, almost all were lacking their wheels and other fitments.



The premises of the gunnery establishment in the 16th century, superimposed on a plan of 1737 by John Romer. Blue: The Munition House. Green: The Smiddy (possibly). Orange: The Workhouse with the Mid and Laich Houses below. Yellow: probable location of the Gun House. Purple: possible location of the Over or Little House. Brown: possible position of the Powder House (if not under the Workhouse)

Q. *How or why did gun founding in the castle cease?*

A. The gun foundry in the castle remained in operation until 1558. Changing political requirements, the great expenses involved and, perhaps, a failure to adapt new technological processes successfully brought production to an end.

The motivation behind the setting up of the royal gun foundry may have been a desire to gain prestige in keeping with national pride rather than solely to provide a much-needed commodity. On a purely economic level, production costs might have been so great as to minimise the attractiveness of investment in home-produced guns. The metal itself was very expensive – in 1542, a large load of copper was bought in Denmark consisting of 27 'ship pounds' (each 300 or 400lb) and 8 'lesche pounds' (a unit of weight used in the Baltic trade) at a cost of £390 exclusive of handling, customs, freight and carriage costs (*TA* 8: 152). Other costs included fuel, materials for making the moulds, iron and wood for stocks and carriages, and the workers' fees. The employment of several craftsmen of foreign origin indicates the difficulty in obtaining native expertise, and some of the accounts and inventories hint at technical difficulties, like the double culverin cast twice unsuccessfully in 1541 (*TA* 8: 124–7). With the regency of Mary of Guise from 1554, the government's reliance on French military power, including their artillery, became almost total.

The fact is, however, that the royal foundry remained in operation for a period of more than 80 years. The furnace built in the castle in 1515 remained in service until 1558, when it was decided that a new one had to be built. This was undoubtedly because the old one had proved incapable of being brought to the right temperature and worked to melt the bronze thoroughly. It can be deduced that an attempt at founding had gone disastrously wrong at this time, since there is a payment in the *Treasurer's*

Accounts for ten loads of coals for breaking up the metal taken from the furnace (*TA* 10: 441).

It appears that a new, technologically more advanced reverberatory furnace was then built, but there is no evidence it was ever put into use. Nothing is known of its capacity or capabilities. Changes in government and policy consequent on the civil wars of the late 1550s and the ejection of the French may have been the main cause for gun casting coming to an end.

Q. *Can any guns manufactured in the castle still be recognised?*

A. Twelve small pieces of bronze artillery can be attributed to the Edinburgh Castle foundry on the basis of their appearance and markings on them:

1. Small falcon or falconet with the royal arms, crowned, and IR 5 for King James V; found in Castle Semple Loch, Renfrewshire, possibly having been lost at the siege of the peel there in 1560. L 1.78m; bore 1.8in. (46mm). Glasgow Museums.
2. Small falcon, the breech end blown off, formerly in the collection of the Earl of Seafield. L 1.33m; bore 1.6in. (40.6mm). National Museums Scotland: H.LNA 68.
3. Small falcon, crudely engraved with a cross potent and inset in the 18th or 19th century with the arms of the Bannatynes of Kaimes, Bute; formerly in the collection of MacGregor of MacGregor. L 1.19m; bore 1.45in. (37mm). National Museums Scotland: H.LH 429.
4. Hagbut of crok, the muzzle blown off and restored, with a P cast into it; formerly in the collection of the Earl of Seafield. L 0.998m; bore 1.2in. (30.5mm). National Museums Scotland: H.LNA 66.
5. Hagbut of crok dated 1553 formerly in the collection of the Earl of Seafield. L 1.075m; bore 1.1in. (28mm). National Museums Scotland: H.LNA 67.
6. Hagbut of crok with a shield marked with an R, and inset in the 18th or 19th century with the arms of the Bannatynes of Kaimes, Bute; formerly in the collection of MacGregor of MacGregor. L 0.966mm; bore 1.05in. (27mm). Glasgow Museums: A7713a.

There are a further six hagbuts of crok in private collections, four dated 1553 and five with the arms and initials of James Hamilton, Earl of Arran.

Hagbut of crok with Hamilton arms, the initials IH and 1553

See Appendix 1 for more information on gun sizes. See also Caldwell (1983) for other surviving pieces – bells, weights and measure – by melters on the gunnery establishment and based in Edinburgh Castle: Robert Borthwick, David Rowan and Hans Cochran.

Q. *What was the role and status of the castle's gunners?*

A. The gunners maintained the royal artillery train and associated equipment and supplies. They were paid professionals, many craftsmen with considerable skills that were greatly valued. They also acted as gun crews in time of war.

James I and II employed specialists to look after their guns, although an actual core of gunners, or gunnery establishment, based in Edinburgh Castle, may only have become a full-time reality in the reign of James IV, or perhaps his father, James III (1460–88). There were only ever a handful of ordinary (permanent) royal gunners based in the castles of Stirling, Dumbarton or elsewhere. Unfortunately, records listing fees and appointments of personnel and detailing their expenditure do not survive in any quantity until the 16th century.

The gunners were under the command of a master of the artillery, normally a nobleman, landowner or supporter of a powerful political

faction. For much of the time the appointment may have been largely ceremonial or a sinecure, with the main administrative tasks being performed by a comptroller. For a list of Masters of the Artillery and other officers, see Appendix 2.

In the course of the 16th century, the number of gunners based in Edinburgh Castle rose to about 26. They are listed as ordinary gunners, that is as established, to distinguish them from the extraordinary gunners who were taken on from time to time. They were grouped into four divisions under master gunners: gunners, melters (founders), wrights and smiths. Sometimes some personnel are noted as having more particular skills, like making firearms, powder and wheels. Some letters of appointment survive in the Register of the Privy Seal, such as the following of 14 February 1547/8 to James Hector, which gives a succinct outline of his duties. He was appointed wright and gunner ordinary at £3 15*s* monthly for life, provided he work daily 'bayth of wrycht craft, gunnar, melting and casting of gunnis and all utheris laubouris he can do, and als that he salbe reddy to pas to the feildis as an cannoner or to sege or to remane in any part quhair he salbe commandit' (*RSS* 3: no. 2640). Clearly, he had an impressive range of skills, perhaps not surprising since he appears to be the son of Robert Hector, a melter and master gunner, probably that son who King James V paid to go and serve an apprenticeship in Flanders in 1541 (*TA* 7: 428).

The fees paid to gunners compare favourably with those given to other royal employees, and a few of the more notable gunners, like the masters Robert Borthwick and John Drummond, were shown such favour by James IV and James V that they acquired lands and joined the ranks of the minor nobility as lairds (*RMS* 2: no. 3546; 3: nos. 31, 453; *ADCP*: 354; *APS* 3: 619; *RSS* 1: no. 1574; 2: nos. 1304, 4551). The masters also received livery clothing, apparently normally black. In 1541, it is described as consisting of a cloak of French black, hose and a doublet of black velvet (*TA* 8: 24). Other perks, which could even be accorded to ordinary gunners, included having guns fired as a salute at their funeral. This was certainly the

case when Alexander Lowrie died in 1606 (NRS E21/78, fol. 58r). On 23 November 1614, when the cannon and culverin bastard used by the Earl of Caithness to capture Kirkwall Castle were returned to Edinburgh, there was a triumphal procession through the streets of the town, no doubt with the five gunners walking proudly alongside their charges. The keys of Kirkwall Castle were hung over their muzzles and there were gun salutes from Edinburgh Castle along with soundings of trumpets and drums (*Melros Papers* 1: 143ff; Calderwood 1842–9, 7: 191–2).

An inventory of the possessions of one master gunner, Michael Gardiner, who died in 1584 and was actually based in Stirling Castle, lists several items involved with his profession:

> Ane kist for keeping of pulder with ballands and wechtis seis and rangis
> Ane hatt spurs knapiscull [helmet]
> Ane belt qhynyer [knife or dagger] and suord and bag
> Ane horne for poulder
> Ane stand of harness [suit of armour]
> Ane halbert
> Ane lokkit bonnet cais with instruments contenit therin for my craft
> Ane lunt staf garnesit with ane rennet of bras [linstock]
> Ane reull of irne with ane uther of trie with certain writtis of parchment pertaining to his craft. (Whitelaw 1977: 299)

Clearly, many of the gunnery establishment were already experienced when taken on. A considerable number of them were of foreign origin – French, German and Dutch, and perhaps many more than is immediately apparent from their names. Peris from Rouen in France, who is first recorded as working with Robert Borthwick in 1515, founded a dynasty of founders and merchants (and later lawyers) who adopted the name Rowan. Many craftsmen when taken on may have continued to run workshops or businesses in Edinburgh or elsewhere, like the master melters Robert Borthwick and David Rowan. Cast-bronze items by them survive that were presumably non-royal commissions (Caldwell 1983). Some, like the wright, Andrew Mansion, who carved decoration for the guns in 1540–1, may have been appointed gunners in recognition for their work, more generally, in

royal service, in his case as a skilled wood carver (*TA* 7: 488–9; 8: 127; Caldwell 1994: 182). At least two masters, William Hill in 1554 and David Rowan in 1550, were awarded the privilege of trading in wine, wax, silk and all other merchandise (*RSS* 4: nos. 596, 2428).

Q. *How were the weapons taken out for battle?*

A. A broad, reasonably gentle passage way from the outer entrance to the castle to the Munition House and other premises occupied by the gunnery establishment probably dates from the 15th century. It meant that even the largest siege guns could readily be taken in and out of the castle. When, however, whole siege trains had to be manoeuvred with hundreds of horses and oxen, it was found easier to manhandle the guns out of the castle. This was certainly the case for the raid against the Homes in March 1517/18 (*ADCP*: 111), and more notably for the Flodden campaign in 1513. In the latter case, we have full documentation surviving for the guns and how and when they were moved.

The *Treasurer's Accounts* refer to the artillery being drawn by men from Edinburgh Castle to the Netherbow Port at the foot of the High Street and then into St Mary's Wynd (*TA* 4: 515–17). What this indicates is two things. First, the guns were only hitched up to their oxen once they were outside the town. Second, this did not take place on the Burghmuir where some of the contingents of men were assembling, or else the guns would surely have been drawn to the Grassmarket.

There is then a reference in the *Treasurer's Accounts* to an ox being purchased in Dalkeith to replace one that had been run over by a cannon, and payments to a smith there to mend the yoke and so on that harnessed it to its gun (*TA* 4: 519). This little tragedy tells us that the artillery train was heading on the road over Soutra to Lauder. And that is it. The next we hear of the guns, they are battering Norham Castle and the army has crossed the Tweed.

The guns themselves, 17 in all (for an explanation of their specifications, see Appendix 1), pulled mostly by oxen, needed a considerable number of drivers and workmen, assigned to each gun as follows:

First cannon: with oxen belonging to the captain of Edinburgh Castle, eight drivers
and 20 workmen with pikes, shovels and spades.

Second cannon: with 36 oxen belonging to the king and the laird of Duns, nine drivers
and 20 workmen.

Third cannon: with 36 oxen belonging to the prior of Whithorn and two West Country
lairds, nine drivers and 20 workmen.

Fourth cannon: with 36 oxen belonging to the king, nine drivers and 20 workmen.

Fifth cannon: with 36 oxen belonging to the king and the provost of Coldstream, nine
drivers and 20 workmen.

First grose culverin: with 36 oxen belonging to the king, nine drivers and 20
workmen.

Second grose culverin: with oxen belonging to the laird of Dalhousie, eight drivers
and 20 workmen.

First culverin pikmoyen: with 16 oxen belonging to the king and a horse, four drivers
and ten workmen.

Second culverin pikmoyen: with 15 oxen belonging to the king and the laird of
Lochleven and a horse, four drivers and ten workmen.

Third culverin pikmoyen: with 16 oxen belonging to the king and a horse, four drivers
and ten workmen.

Fourth culverin pikmoyen; with 16 oxen belonging to the prioress of Haddington and
a horse, four drivers and ten workmen.

First culverin moyen: with eight oxen belonging to the laird of Restalrig and a horse,
two drivers with a man for the horse and six workmen.

Second culverin moyen: with eight oxen belonging to Andrew Aitoun and Robert
Arnot and a horse, two drivers with a man for the horse and six workmen.

Third culverin moyen: with eight oxen belonging to the laird of Kelly and a horse,
two drivers with a man for the horse and six workmen.

Fourth culverin moyen: with eight oxen belonging to the laird of Balgonie and a
horse, two drivers with a man for the horse and six workmen.

Fifth culverin moyen: with eight oxen belonging to the prior of New Abbey and a
horse, two drivers with a man for the horse and six workmen.

Sixth culverin moyen: with eight oxen belonging to the king and a horse, two drivers
with a man for the horse and six workmen.

There was also a crane for mounting and dismounting the guns, drawn by eight oxen and a horse with three drivers. There were a further 28 horses with creels loaded with gun stones (cannon balls), 15 hired carts with powder, shot and other equipment, and two close carts. A pool of 80 oxen looked after by four men may have been intended as replacements or extras for the guns.

Q. *Did the gun house provide for royal ships?*

A. One of the main reasons for the housing of the royal arsenal in Edinburgh Castle was its proximity to the Port of Leith and nearby Newhaven, where royal ships were built and fitted out in the 16th century.

The published *Treasurer's Accounts* contain many references to the supply of guns and other equipment from the castle to ships, particularly in relation to the fleet that sailed to France in 1513. Unfortunately, in a detailed study of the expenses in relation to this fleet, the author failed to provide enough evidence for exactly which guns, or even how many, were on the 11 ships in question (Caldwell 2013: 50–60, 75).

A significant development in the use of artillery – firing large guns from the decks or gun-ports of ships – appears to be recorded by the siege of Cairnburgh Castle in the Treshnish Islands off Mull in 1504. The castle is actually two adjacent fortifications occupying two small rocky islands in the Treshnish islands, off Mull. They were besieged by a royal expeditionary force for several weeks, the ships having been supplied with guns and the additional expertise of Hans, one of the royal gunners (Macdougall 1997: 185–6). It is not known what part the guns played in Cairnburgh's capture or surrender, but they must have been fired from the ships as there was no place to land them in the face of enemy opposition.

It is probable that the great bombard taken on James V's naval expedition round Scotland in 1540 was Mons Meg, and, if so, this was probably the last time she was taken from her home in the castle until her departure for London in 1754. She may not have had much practical value mounted on board ship, but her appearance there no doubt had immense symbolical value, demonstrating to the Islemen the king's military reach and power.

The representation of Mons on the early carving in the gateway of Edinburgh Castle has been used as the basis for constructing the carriage designed for her in 1935. It has massive wooden cheeks and rests on four spoked and studded wheels solidly bound with iron. Behind is a coign for elevating and depressing the gun, and lying in the muzzle is a gunner's quadrant. This cart is obviously intended for firing the gun from – hence the coign and gunner's quadrant. Apart from its large wheels, it is a suitably enlarged version of the carriages on which guns for service in fortifications and ships were mounted as recently as last century. There are no obvious

means of how it might have been drawn by a team of oxen or horses, and in our opinion it was not designed for that. If Mons was indeed taken with the fleet in 1540, this carving may represent the carriage for which payments are recorded in the *Treasurer's Accounts* at that time (*TA* 7: 354).

Q. *In what circumstances were the castle's guns used to fire salutes?*

A. The firing of salutes from guns probably goes back to earliest times. The occasions ranged from great national rejoicings to, on occasion, the death of a gunner, such as Alexander Lowrie who died in 1606 (NRS E21/78, fol. 58r). An Edinburgh burgess, Robert Birrell, noted in his dairy for 4 May 1597 that guns were shot on the departure from court in Edinburgh of James MacSorley (of the Clan Donald based in Ireland), who had evidently made a great impression on King James VI (Dalyell 1798: [Birrell's Diary] 430.

Mons was kept in Edinburgh Castle, being used, at least occasionally, for the firing of salutes, in 1558, 1660 and 1680. On this last occasion, in honour of the arrival of the Duke of Albany and York (later James VII and II), Mons burst. Sir John Lauder of Fountainhall reported that she was charged by the advice of an English cannoneer and the Scots resented it greatly, thinking that the Englishman might have overloaded the gun on purpose, since there was no gun in all England as big (Urquhart and Laing 1840).

Q. *What do we know about Mons' part in the siege of Norham Castle in 1497?*

A. The preparation and movement of the siege train, including Mons, for the Raid of Norham in July–August 1497 is relatively well documented in the *Treasurer's Accounts*; the use and effectiveness of the guns less so.

This invasion aimed at the reduction of Norham Castle, a major Border fortress belonging to the Bishop of Durham. Precise details of the force and

the guns are lacking, but the presence of Mons and the greater number of specialists and amount of equipment referred to in the *Treasurer's Accounts* would indicate that King James IV fielded a more substantial artillery train than in the Raid of Ellem in September 1496 (*TA* 1: 346ff.). Experience in moving the artillery on this occasion may explain why a different route was taken, at least for the guns. They were accompanied by 13 gunners, 221 men with shovels, spades and picks, 12 wrights, a cooper and four smiths. There were also 61 quarriers and masons who may have combined their abilities in mining and demolition work with helping to clear a passage for the guns. Over and above these were the three wrights, two smiths and 100 men detailed to accompany Mons. This time horses rather than oxen were largely relied upon for hauling the guns. Beast for beast, horses were considered more powerful than oxen.

The men and horses for the artillery were engaged on 19 July and at least some of the guns were then taken from Edinburgh Castle and put on the road, reaching 'Corriwale Hewch' on the 27th. The identification of this place is problematic, but eight or nine days should have been more than ample time for them to reach their final destination opposite Norham Castle, whatever route they took, and so we may assume that that is where Corriwale Hewch was.

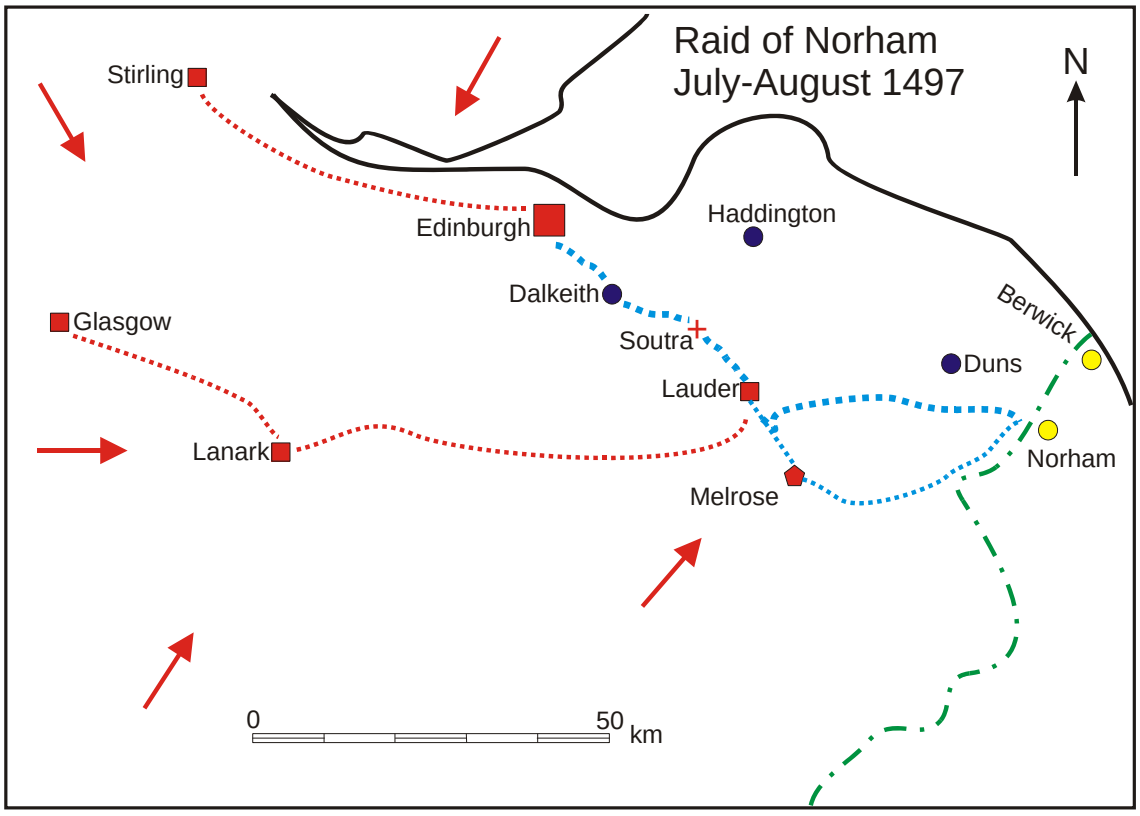
On the 20th, the king set off for Melrose, probably where the army was due to muster. On the 21st, Mons was drawn from the castle, but only got as far as St Leonard's on the outskirts of town, on the Dalkeith Road, before her cradle broke and a new one had to be made. This cradle was presumably a large type of wagon only for transporting Mons, not a carriage from which she could be fired. She and other guns then lay at Holyrood Abbey from 24 to 29 July. James himself, with the main army, was at Norham by 4 August. Mons and the other guns could hardly have got there any before that, and the siege was abandoned either on 7 or 8 August.

From the brief notices of this raid it can be deduced that the route taken from Edinburgh was essentially the medieval predecessor of the A68

to Dalkeith and then on to Lauder, much of it on or near the Roman road known in the medieval period as Dere Street. From Lauder southwards to Melrose there were choices, perhaps continuing on Dere Street or taking either 'Malcolm's Road' or the Girthgate (RCAHMS 1956, 2: 322, 470). From Melrose a route stretched eastwards to the Tweed, opposite Norham, by way of Kelso. This way looks rather longer than that traversed in the previous year, about 58 miles (93km) as against 45 miles (72km), but the advantages may have included an easier way over the Lothian Edge at Soutra and fewer difficult river crossings.

The historian Buchanan (1827–9, 2: 287) describes how, in 1523, a wooden bridge had to be crossed beyond Melrose, presumably across the Tweed. If it were not in place in 1497, nor sufficiently strong for transporting a gun as large and heavy as Mons, then an alternative, more direct road eastwards, now represented by the A697 to Coldstream, could have been used for the artillery. The only major river crossing on this route would have been across the Leader Water just beyond Lauder, perhaps by the bridge that figures in the events of 1482 when leading nobles mounted a coup against King James III and stopped his expedition against an invading English army.

The bombardment of Norham in 1497 was apparently mounted from the Scottish side of the Tweed (Hunter Blair and Honeyman 1966: 12), and so no time was wasted in ferrying equipment across the river. It is a not unreasonable assumption that there was no coble on the Tweed large enough to ship Mons herself. It might be hoped that a more detailed study of the upstanding remains of the castle and new archaeological excavations will throw some light on the effectiveness of Mons in this siege.



The possible routes taken by the artillery are represented in blue, other elements of the army in red

Q. *What is the nature and significance of the artillery carvings in the entrance passage of the gatehouse?*

A. They are a unique pictorial record of the early Scottish artillery.

According to Sir Daniel Wilson (1891, 1: 160–1):

> Immediately within the drawbridge (of Edinburgh Castle) there formerly stood an ancient and highly ornamented gateway, near the barrier guard-room. It was adorned with pilasters, and very rich mouldings carried over the arch, and surmounted with a curious piece of sculpture, in basso relief, set in an oblong panel, containing a representation of the famous cannon, Mons Meg, with groups of other ancient artillery and military weapons. This fine old port was only demolished in the beginning of the present century [ie the 19th], owing to its being found too narrow to give admission to modern carriages and wagons, when the present plain and inelegant gateway was erected on its site.

Wilson indicates in a footnote that his source for this information was R. McKerlie, Esq., of the Ordnance Office, who was an officer in the garrison in 1800. Furthermore, McKerlie was responsible for preserving the two parts of the carving.

Apart from Mons Meg, the two carvings show in considerable detail a selection of the rest of the equipment in the royal gun house. Most prominent are five large cast (bronze) guns mounted on field carriages, including one with the forepart of its barrel decoratively writhened or twisted. This might well be a representation of a gun listed in a 1578 inventory of the castle's guns as a cannon of font (i.e. of cast metal) called 'thrawin mowth', marked with a porcupine (the emblem of Louis XII of France) (*Wardrobe Inventories*: 250). There are also chambers for breech-loading guns, small unmounted field guns and hagbuts of crok, and a mortar or small bombard with trunnions, mounted on a stand. An assortment of ladles, sponges and rammers for loading the guns, a powder horn for priming them and a linstock for firing them are clearly visible behind the guns, while in the foreground are piled up barrels of powder and gun stones. There is a bucket and perhaps either trestles or a set of scales beside the gun nearest to Mons Meg. Behind Mons is a grappling iron for throwing over walls and above the two large guns, placed back-to-back, two fire arrows and a bow(?).

The date of these carvings has not previously been ascertained with any certainty. While all the guns and equipment shown could quite happily be dated to the 16th century or earlier, the best evidence of date is provided by the clothing of the gunner shown loading one of the guns. He appears to be wearing Venetians (knee-length breeches) and, although they became high fashion in France and England during the 1570s, the whole outline is much more typical of the early 17th century, or even later. The gateway from which they came appears to have been the principal entrance identified in a plan of the castle of 1737, probably by John Romer (Ewart and Gallagher 2014: illus. 2.11, 7.3). It is shown (in the distance) with

a triangular pediment in a view of the castle made by John Slezer in the late 17th century (*ibid*.: illus. 6.5). It was thus part of the hornwork ordered by Cromwell in 1650, though it is probable that the carvings were repositioned here from an earlier structure.

Q. *Why 'Mons Meg'?*

A. She was called Mons after her place of manufacture and had been christened Meg by 1650.

The true origin and date of this great bombard were only guessed at prior to 1967, and the publication by M. Claude Gaier of some extracts from the Burgundian *Chambre de Comptes* left no room for doubt that it was named for Mons in Belgium (Gaier 1965), then an important centre of metalworking. The gun, which is referred to all along in the Burgundian documents as Mons, was commissioned by Duke Philip the Good of Burgundy from the important artillery and ammunition supplier Jehan Cambier, and was completed in June 1449. She was taken outside the city walls of Mons and successfully tested, and according to contemporary accounts weighed 15,366 pounds, had an overall length of 15 feet and a calibre of 18 inches. She was charged to the duke at a price 2*s* per finished pound of metal – that is, including the cost of raw materials and manpower – making a total sum of £1,536 2*s*. Cambier was also got to supply 61 stone balls, each 18 inches in diameter, to be gun stones for her, and they cost a further £1 12*s* each. The duke only took delivery of the gun in May 1453, intending to use her on the burgesses of Ghent who were then in rebellion against him. When he sent her to Scotland four years later with another smaller gun, it was no doubt intended that the Scots should employ her against the English, with whom he was then at war.

Mons appears by name only a few times in Scottish documents of the 15th and 16th centuries. The first mention is in 1489 when she was taken from Edinburgh Castle to the siege of Dumbarton Castle, and she was

certainly also at the siege of Norham Castle in 1497 (*TA* 1: 115, 348). On the way there she only got as far as St Leonards just outside Edinburgh when she had to have a new 'cradle' made (*ibid*.: 347). This cradle was probably only a cart or wagon for transporting the gun and not for firing it from. By 1501, she was lying neglected in Edinburgh Castle, but that year the earth was cleared away from her and she was turned over so that her touch-hole lay uppermost. She was then lifted and laid on trestles, painted with red lead and a shelter made for her and another two guns, with 49 rafters (*TA* 2: 24–5).

The earliest evidence for the name Meg is in a news report of the capture of Edinburgh Castle by Cromwell in December 1650, when she is referred to as 'the great Mag' (*The Faithfull Scout*: 163). Possibly there was no significance in the coining of this name, merely an interest in, or affection for, an old warrior that was probably regarded with pride as a Scottish gun. By the 19th century, however, there was a legend that explained both this name and her origins, here given in the words of Daniel Wilson:

> The Earl of Douglas having seized Sir Patrick McLellan, Tutor of Bomby, the Sheriff of Galloway and chief of a powerful clan, carried him prisoner to Threave Castle, where he caused him to be hanged on 'The Gallows Knob', a granite block which still remains, projecting over the main gateway of the Castle. The act of forfeiture, passed by Parliament in 1455, at length furnished an opportunity, under the protection of government, of throwing off that iron yoke of the Douglases under which Galloway had groaned for upwards of eighty years. When James the Second arrived with an army at Carlingwark, to besiege the Castle of Threave, the McLellans presented him with the piece of ordnance now called 'Mons Meg'. The first discharge of this great gun is said to have consisted of a peck powder and a granite ball nearly as heavy as a Galloway cow. This ball is believed, in its course through the Castle of Threave, to have carried away the hand of Margaret de Douglas, commonly called the Fair Maid of Galloway, as she sat at table with her lord, and was in the act of raising the wine-cup to her lips. Old people still maintain that the vengeance of God was thereby evidently manifested, in destroying the hand which had been given in wedlock to two brothers, and that even while the lawful spouse of the first was alive. As a recompense for

> the present of the gun, and of the loyalty of the McLellans, the king, before leaving Galloway, raised the town of Kirkcudbright into a Royal Burgh and granted to *Brawny Kim*, the smith, the lands of *Mollance* in the neighbourhood of Threave Castle. Hence the smith was called Mollance, and his wife's name being Meg, the cannon in honour of her, received the appellative of 'Mollance Meg'. There is no smithy now at the 'Three Thorns of the Carlinwark'; but a few years ago, when making the great military road to Portpatrick, which passes that way, the workmen had to cut through a deep bed of cinders and ashes, which plainly showed that there had been an extensive forge on that spot at some former period. (Wilson 1848, 1: 130)

In the later edition of his book, Wilson drops this version of the legend in favour of a briefer account related by a local antiquary, Joseph Train, to Sir Walter Scott. This merely indicates that Mons was gifted by the McLellans to King James II when he arrived with his army at Carlingwark in 1455 to besiege William, Earl of Douglas, at Threave Castle (Wilson 1891, 1: 170).

Q. *What were the Seven Sisters?*

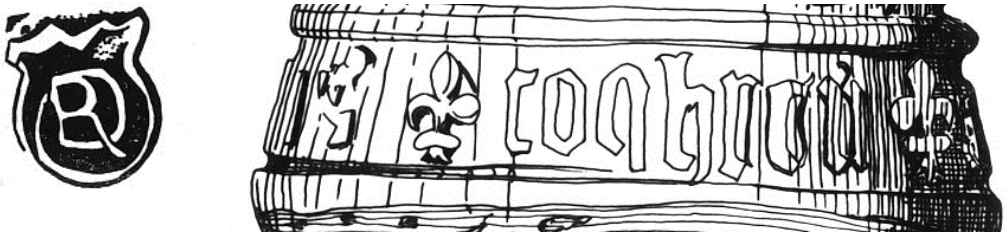
A. Allegedly, the large bronze guns cast by Robert Borthwick and lost at Flodden in 1513. They were later identified with the large brass guns mounted on the Half Moon Battery.

We owe it to the late-16th-century historian, Robert Lindsay of Pitscottie, for the information that Robert Borthwick (James IV's master gun maker, based in Edinburgh Castle) cast seven large guns, lost to the English at Flodden (Pitscottie, *History* 1: 259–60). Certainly, the artillery train lost at that battle included seven large guns, described in contemporary accounts as five cannon and two grose culverins (Caldwell 2013: 60–1), and at least some of them are likely to have been Borthwick's

work. One of them, described as ‘ane Scottis peice les nor ane cannoun, quhilk wes tane be the Inglismen at the feild of Flodane; sho wes callit ane of the sevin sistaris’, was amongst the guns brought by the English to besiege Edinburgh Castle in 1573 (*Diurnal*: 330).

By the beginning of the 18th century, the large brass guns mounted on the Half Moon Battery were being identified as the seven sisters. Some of these may then have been of some age, though they were not the actual guns referred to by Pitscottie. In 1716, their removal was ordered by the government as part of a general calling-in of obsolete arms resulting from the Jacobite uprisings, and they were shipped south to the Tower of London. There they were either fed to the furnaces in order to make new guns or were destroyed in the disastrous fire at the Tower in 1841. A contemporary account of the taking away of the guns suggests that even then the Scots had some pride in the achievements of their forebears in the art of gun casting:

> … and the seven great brass guns as insufficient ar caryed of to be new cast at London. The taking away the 7 sister, so were cald the great bres guns, on the half moon was like to breck all the old women’s hearts in town: the reasoning was that was the effects of the Union and that ther were no such cannons in England and that the castle was plundered and unless yow could supposed ther wrongside turnd out at the Cros like a stocking for evry body’s conviction ther was no persweading they were useless. But I had my hand in them and fownd they were all hunycombed within such hols as to put in a musket bullet and they were the farder in the worse. Ther ar guns fitter for the purpose mounted in ther place bress guns of 14 12 10 pounders. All the ball for the great cannon are removd and all the useless bomb shells &c. and ther is as much of evry kind and more in ther place but this does satisfie the minds of ill tempered people and they impose upon well meaning wake folks, and this perhaps was inducement to mobing, for next to the Crown the 7 sisters were a dear thing and they had indeed been good guns in ther time. They were of 40 pownders and upward. They went away March 23. 24. 26. 27. 1716 … (Steuart 1910: 148–50)



The DR in a shield mark used by David Rowan, and Hans Cochran's name on a bronze weight. Both were royal gunners and melters

Appendix 1

A Table of Gun Sizes

This table was constructed by the author on the basis of guns referred to in Scottish documents prior to about 1625. Note that the sizes and other specifications reflect French rather than English tables.

Gun	Method of construction	Method of loading	Weight lb (kg)	Calibre in. (mm)	Type of shot	Weight of shot lb (kg)	No. of horses/oxen	Maximum range yd (m)
Bombard	wrought/cast	M/B			stone			
Serpentine	wrought	M/B			stone			
Double cannon	cast	M	5400 (2454.55)	8 (203)	iron	66 (30)	21 / 36	1500 (1371.60)
Cannon	cast	M	3800 (1727.27)	6¼ (159)	iron	33 (15)	17 / 36	1700 (1554.48)
Grose culverin	cast	M		4⅔ (118)	iron	16 (7.28)		2000 (1828.80)
Demy culverin	cast	M		4½ (114)	iron	12½ (5.68)		1800 (1645.92)
Culverin bastard	cast	M	1970 (895.45)	3⅝ (97)	iron	8 (3.64)	– / 11	1600 (1463.04)
Double culverin moyen Culverin pikmoyen ? Saker	cast	M		3½ (89)	iron	6 (2.73)	1 + 16	1500 (1371.60)
Pasvolent	cast				iron			
Culverin moyen	cast	M	870 (395.45)	2¾ (70)	iron	3 (1.36)	7, or 1 + 8	1300 (1188.72)
Double falcon	cast	M		3$\frac{1}{10}$ (79)	iron	4 (1.82)		
Falcon	cast	M	750 (340.91)	2⅓ (59)	lead	2 (0.91)	4	1100 (1005.84)
Small falcon Falconet	cast	M	450 (204.55)	1⅝ (46)	lead	1 (0.45)	2	
Quarter falcon	cast	M			lead	½ (0.23)		
Double hagbut of crok	cast	M	56* (25.5)	1$\frac{1}{10}$ (28)	lead			

Hagbut of crok	cast/wrought	M/B	38¼* (17.04)	1 (25)	lead/iron			
Heidsteik	wrought	B			stone			
Double slang	wrought	B			stone			
Slang	wrought	B		2½ (64)	stone			
Bers	wrought	B	161 (73.18)	1¾ (44)	stone			
Cutthroat	wrought	B		1¾ (44)	stone/lead			
Mortar	cast	M			stone/iron			

* Based on weight of surviving gun
M Muzzle loading
B Breech loading

Appendix 2

A List of Masters of the Artillery, Comptrollers, Master Gunners, etc.

Masters of the Artillery

William Bonar of Rossy 1457–8
Allan Lord Cathcart 1482/3
Sir Robert Ker April 1497
Henry Lord Sinclair 1510–13
Jehannot de Lavall 1516
François Brosses 1521
Master John Campbell 1523
John Melville of Raith 1526
Alexander Jardine of Applegirth (1) 1526
Robert Barton of Over Barton 1528
Henry Lord Methven 1528
Robert Hamilton of the Briggs 1555/6
Alexander Jardine of Applegirth (2) 1573
Robert Colville of Cleish 1578
Andrew Lord Ochiltree 1598

Comptrollers of the Artillery

John Chisholm 1561
James Gardner *c* 1614
Mr Robert Lindsay 1614--15
James Murray (2) 1616

Commissioner of the Artillery

Captain John Bukat 1515

Master Gunners
Robert Borthwick 1510–31
Hans Cochran 1538/9
John Drummond 1541
Robert Hector 1547
James Hector 1561 (Dunbar Castle)
Harry Balfour 1561 (Dunbar Castle)
Michael Gardiner 1571 (Stirling Castle)
James Murray (1) 1599–1616
James Murray (2) 1616–

Master Melters
Robert Borthwick 1510–31
Peris Rowan 1532
John Drummond 1532–50
David Rowan 1548

Master Wrights and Gunners
John Drummond 1526–50
John Crawfurd (1) 1550/1
Andrew Mansion 1561
James Hector 1579
James Roquenow 1583/4–7
James Murray (1) 1587–1601
James Murray (2) 1601–16
Arthur Hamilton 1616

Master Smiths and Gunners
William Hill 1550/1
John Bonston 1561 (Dunbar Castle)
John Bickerton 1565
Quentin Bickerton 1580
Abraham Hamilton 1597–1600

Abbreviations
HMSO	Her Majesty's Stationery Office
NRS	National Records of Scotland
RCAHMS	Royal Commission on the Ancient and Historical Monuments of Scotland

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Dr David Caldwell studied archaeology at Edinburgh University and spent 38 years working as a curator for National Museums Scotland. He has published extensively on Scottish archaeology and history. He is president of the Society of Antiquaries of Scotland, vice-president of the Society for Post-Medieval Archaeology and vice-chairman of Fife Cultural Trust.

Any enquiries regarding this document should be sent to us at:
Historic Environment Scotland
Longmore House
Salisbury Place
Edinburgh
EH9 1SH
+44 (0) 131 668 8600
www.historicenvironment.scot

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