

Leather guns and other light artillery in mid-17th-century Scotland

by David Stevenson and David H Caldwell

I History and manufacture

by David Stevenson

The so-called 'leather guns' of the 17th century originated in the 1620s, and first became famous through the efforts made by King Gustavus Adolphus of Sweden to provide his army with light, mobile artillery. Until this time most guns had been so unwieldy that, once placed in position on the battlefield, they had to be left in the same position throughout the battle; thus they often proved virtually useless except in the opening stages of battles. Gustavus Adolphus therefore initiated a series of experiments aimed at producing a gun which was effective in giving protection against enemy infantry and cavalry and which could be moved quickly enough to keep up with the fortunes of battle, advancing or retreating with the infantry. Of the many experimental guns produced, 'the too famous, but quite ephemeral "leather gun"' was the best remembered' (Roberts 1967, 69–70).

A large gun wound with rope and cased in leather is recorded as early as 1375 (Carman 1955, 26), but it is not known whether the 17th-century leather guns owed anything to such early experiments. They first appear in 1622, in Zurich, their construction being attributed to Philipp Eberhard, and for a time these guns proved quite popular in their native Switzerland. News of the invention was brought to Sweden by an Austrian officer who enlisted in the Swedish service, Melchior Wurmbrandt or Wurmbrandt; by 1627 (and probably earlier) he was building leather guns for Gustavus Adolphus (Wijn 1970, 218; Roberts 1958, II, 232; Hime 1898, 595–7; Carman 1955, 62, 63; Blackmore 1976, 233). Several of these Swedish leather guns survive, and are described in part II; their construction varies in detail, but basically they consist of a relatively thin metal barrel tightly wound with rope, wire or cord, with a tough leather casing shrunk on top (for details of an X-ray examination of one of these guns see Wijn 1970, 218).

Wurmbrandt's guns were used by Swedish armies for several years; their use is sometimes said to have been discontinued by 1629 (e.g. Roberts 1958, II, 232), but some were still in use at the battle of Breitenfeld in 1631 (Hime 1898, 597n). Nonetheless, the career of the Swedish leather gun was short, for it had 'sacrificed everything' to lightness and mobility; 'for fear of splitting the barrel it had to be provided with special powder and a much reduced charge, with resulting loss of muzzle-velocity and range; but even so it was much too fragile' (Roberts 1958, II, 232–3). Additional disadvantages were that the complexity of the gun's construction led to manufacturing difficulties, and the fact that the rope and leather covering of the metal barrel provided good insulation meant that after firing a few rounds the barrels became too hot to load safely (Wijn 1970, 218; Carman 1955, 63; Roberts 1958, II, 233).

Such faults led to leather guns being replaced by all-metal light guns of more conventional design, which were adopted as the standard Swedish regimental gun, and experiments with leather guns were abandoned. Thus they were of no great military significance except as a stage in the development of the regimental gun (Roberts 1958, II, 232, 233; Roberts 1967, 69–70).

It was Scottish officers who had served under Gustavus Adolphus who brought knowledge of leather guns to Britain. One such officer, Sir James Turner, later noted that ‘These guns which are called Leather-Cannon, have Copper under the Leather, and are made with great art, and are light to carry, which is the greatest advantage they have’ (Turner 1683, 189).

The names of three Scots have been associated with the manufacture of leather guns; Robert Scott, James Wemyss, and Alexander Hamilton – the first two correctly, the last almost certainly wrongly.

According to Colonel Robert Scott’s epitaph in Lambeth Church, ‘amongst many other things he invented the Leather Ordnance and carried to the King of Sweden 200 men’; after 2 years’ service he was promoted to the rank of quarter-master-general, which he then held for 3 years. As Scott left the Swedish service in 1628 this suggests that he had entered it in 1623; but it would probably be wrong to assume that the epitaph implies that Scott invented his leather guns before entering the Swedish service – his invention is mentioned first as it is regarded as his main claim to fame, not because it is his earliest claim. The earliest dated references to Scott’s guns occur in 1627 and 1628, when they were tested in Sweden. Scott kept the details of their construction secret, and asked Gustavus Adolphus for £1,500 in return for this information; but, though some held Scott’s guns to be superior to Wurmprandt’s (being much lighter yet taking a larger charge of powder), the king refused to pay for Scott’s secrets. Scott therefore abandoned the Swedish service and moved to Denmark, where trials of his guns were held in Copenhagen in late 1628 and 1629. However, King Christian IV also refused to buy the secret of the leather guns; Scott was ‘advised to tender his service to his own Prince’ (Hime 1898, 597–9). The version of Scott’s epitaph in ffoulkes (1937, 34) erroneously omits part of the inscription. Scott followed this advice, and in 1629 King Charles I authorised the purchase of a house and land in Lambeth for ‘Col. Robert Scott for His Majesty’s Service’, evidently for experiments with artillery. In February 1630 Scott was granted a pension and he, his wife and children and, his nephew James Wemyss (another veteran of the Swedish service) were granted naturalisation as English citizens (*CSPD 1629–31*, 193,194; Hime 1898, 597–8; Dalton 1897, 121; Fraser 1888, III, 267).

What are we to make of the claim that Scott ‘invented the Leather Ordnance’? It has been argued that the epitaph only refers to leather guns used in the English service (Hime 1898, 596–8), but this seems highly dubious; there is no evidence that Scott constructed any such guns in England in the short period between his arrival in 1629 and his death 1631. Moreover the facts that the first definite references to both Wurmprandt and Scott constructing leather guns occur in the same year (1627) and that the performances of their guns were compared suggest that they were rivals, each claiming to be the true inventors of leather guns (a title that really, it seems, belongs to the Swiss). However, Scott’s importance in the present context is that he was certainly the first to bring the idea of leather guns to Britain, and that he evidently passed on the results of his experiments with them to his nephew, James Wemyss.

On Scott’s death in 1631 Wemyss continued his work of experimenting with artillery under royal patronage. But he did not inherit his uncle’s pension, and by 1637 he was deeply in debt and petitioned the king for help. Charles ordered payment of whatever Wemyss could justly claim, and the following year appointed him master gunner of England (Hime 1898, 599; Dalton

1897, 121-2; Fraser 1888, I, 299-300). The revolt of the Scottish covenanters against Charles I had begun, and Wemyss was now responsible for preparing an artillery train for use against his native country.

At about the same time Colonel Alexander Hamilton (a brother of the first earl of Haddington) undertook to organise the artillery of the covenanters, being appointed general of the artillery of Scotland. Hamilton was another veteran of the Swedish service. In 1630 Robert Monro, a fellow Scots officer, had visited him 'at his Worke-houses in Vrbowe, being then employed in making Cannon and fire-workes, for his Majesty of Sweden' (Monro 1637, part 2, p 1; Caldwell, D H, pers. comm.). 'Vrbowe' was Arboga, which since the mid-16th century had been one of the most important centres of the Swedish arms industry (Roberts 1958, II, 31, 37, 113). In 1634 Hamilton was constructing light guns in Germany for the duke of Saxe-Weimar, who was acting in alliance with the Swedes, and late that year he returned to Britain (Fraser 1889, II, xxxi-xxxv, 103-5, 109-12; Fischer 1902, 110; Caldwell, D H, pers. comm.), where Charles I granted him a pension (*APS*, V, 699).

It has often been asserted that 'Sandy' Hamilton constructed leather guns which were used during the Bishops' Wars of 1639-40 (e.g., Paul 1904-14, IV, 309; Roberts 1958, II, 233; Firth 1962, 148; Fraser 1889, I, 30) but, as we shall see, there is no contemporary evidence whatever for this.

Probably all the covenanters' heavier cannon were either guns already in Scotland or were imported, but many of their light guns were cast by Hamilton in Edinburgh. The first evidence of Hamilton's activities in Scotland is contained in a letter he wrote to his kinsman, the marquis of Hamilton, on 14 August 1638. The marquis was in Scotland negotiating with the covenanters on behalf of Charles I, but rumour said that he was in fact secretly encouraging the covenanters in their rebellion. One story claimed that Alexander Hamilton was preparing arms for the covenanters on the marquis's orders. Alexander therefore wrote to help the marquis prove his innocence on this point. He had not, at the marquis's direction 'aduse or consent' been making new cannon, nor repairing 'your auld frames which I had formerly made'. Alexander had done these things, but 'I take God to witness that your Lordship could not so much as know of it lett be to give direction or consent to it'. According to Alexander what had happened had been that during visits to the marquis's houses at Ness (Bo'ness) and Kinneil he had 'had so much curiositie as once or twice to looke upon my owne auld worke to sie in what estate they were after so long absence and if they might yet be made any way serviceable and likewise have caused to make a small piece of brasse weighing about 200 lbs to trie ane experiment which hath bene my custome and practise both at home and abroad for the most pairte of my liffe' (Hamilton 1932, 49).

With men fearing, and beginning to prepare for, civil war, Alexander Hamilton's protestations that his interest in his old guns and his experiments with new ones arose solely from innocent curiosity were not very convincing. The 'frames' he mentions as being in the marquis's possession were light multi-barrelled guns (see below), and he had probably constructed them for the marquis at the time for the latter's expedition to Germany in 1632; Alexander Hamilton had served in the expedition, having previously helped to negotiate an agreement between the marquis and Gustavus Adolphus in 1629-30 (Burnet 1677, 6-8, 21; Hamilton 1932, 21-5, 182, 185-7). Shortly after Alexander had written stressing the innocence of his curiosity, Charles I summoned him to England, but he refused to obey. The explanation for this emerges from a letter the marquis of Hamilton wrote to the king on 27 September. He informed Charles that it was rumoured that Alexander had been sent for so he could construct 'ingyns' (engines) for use against the covenanters. The marquis warned that Alexander would not obey if he thought that this was true, for

though he protested his loyalty to the king and the marquis had always found him honest, 'terrabill zealous he is' for the covenanting cause (Gardiner 1880, 35). Soon Alexander began making guns for the covenanters. An Irish army officer who visited Scotland late in 1638 reported the 'there is one Hamilton, who hath of late cast a great number of Brass Pieces, which one Horse may easily draw; he saw some of them on their Carriages, being more than two Foot long, and better than Saker Bore' (Knolwer 1740, II, 271). News also reached Ulster by February 1639 that Alexander Hamilton was casting guns in Edinburgh (Knowler 1740, II, 277). A 1639 reference to the fact that Alexander Leslie, the covenanters' commander in chief, 'devysis cannon to be cassin [cast] in the Potterraw by one Capitane Hammiltoun' (Spalding 1850-1, I, 130) fixes the site of Hamilton's activities; the Potterrow was just outside one of the southern gates of Edinburgh, the Potterrow Port.

Some of these guns were with the earl of Montrose (then a covenanter) at Inverurie in April 1639; 'some short feeld peeces, of three foot longe or therby, which for all that, were of ane indifferent wydnesse, and did shoote ane indifferent great ball. These peeces (commonly nicknamed Deer Sandyes stoups, as being the inventione, or so thought, of Collonel Alexander Hamiltoune, master of ther artillerye, who himself was nicknamed Deer Sandy) wer the ordnar feeld peeces that afterwards for some tyme wer mad use of, for the most pairt, by the Covenanters' (Gordon 1841, II, 228).

When the covenanters invaded England in 1640 their lighter guns consisted, by one account, of six drakes and nearly 30 of 'Sandy Hamilton's little guns'; by another, of 54 field pieces, little drakes, and 80 'frams', 'alias Sandy Hamilton's guns' (*CSPD 1640*, 615, 629; Terry 1899, 121 n). In August 1641 Charles I reviewed the covenanters' army at Newcastle, the infantry being 'here and there intermix't with those dangerous short gunnes inuented by that their famous engineer Sandy Hamilton, and were for the sudden execution of horse in case they should assaile them' (Terry 1899, 154). A final reference to his guns occurs in an English ballad on the Bishops' Wars – a mention of 'Sandy's screw'd Cannon' (Firth 1906, 257).

Clearly Hamilton's light guns aroused considerable interest among contemporaries; yet none of the references to them mention leather coverings which, had they existed, would have been the most obvious and novel feature of the guns. The story that Hamilton constructed leather guns seems to have arisen entirely from a reference by Gilbert Burnet, who stated that in 1640 when the Scots invaded England they had with them 'an invention of guns of white iron, tinned and done with leather, and corded: so that they could serve for two or three discharges. These were light, and were carried on horses, and saw service at the battle of Newburn (Burnet 1900, I, 45; Blackmore 1976, 233). But Burnet was writing many years after the events he describes – he was not even born until 1643 – and in the face of the overwhelming silence of truly contemporary reports it seems that he must have been mistaken, dating the leather guns which were soon to be made in Scotland a few years too early. Burnet makes no mention of Hamilton, but later writers have jumped to the conclusion that he must be referring to Hamilton's guns; and so the latter's fame as a maker of leather guns has been established.

None of Hamilton's guns are known to survive. Probably he produced several different types of cannon. But something can be deduced from the evidence cited above about the nature of the most common of his guns; they were short (squat enough for them to be called 'stoups'), between 2 or 3 ft long, with roughly the calibre of a saker (3½ inches). Perhaps they were not unlike the one surviving Scots cannon of this period which is not leather covered – the gun cast by James Monteith, pewterer, in Edinburgh in 1642, which is described below by Mr Caldwell. It is interesting that the chamber of this gun is conical, a feature the Swedes had experimented with. The marquis of Hamilton (who served under Gustavus Adolphus for a time)

is said to have taken part in these experiments; this seems highly unlikely – it is almost certainly Alexander Hamilton who is meant (Gohlke 1908, 393-4; Caldwell, D H, pers comm).

But what were the 80 ‘frames’ mentioned among the Scots cannon in England in 1640? The large number of them, and their position at the bottom of the graduated list of guns, suggests that they were very small guns, and the name given to them may indicate that they were mounted on wooden frames rather than on wheeled carriages. Evidence supporting this comes from the list of artillery of the Scots army which entered England in 1644. The lighter guns consisted of 48 brass field pieces, three iron field pieces, and 88 ‘Case of frames’ or ‘Cases of frames’. Equipment for these ‘frames’ included three pounds of wax and 60 ‘knaphald’ (clapboards), the latter perhaps indicating that the frames incorporated some sort of shield to shelter the gunners (Terry 1917, II, xc, 25, 34, 35, 143). More specific information is contained in references to the same frames after they had been returned to the magazine at Leith in 1647. ‘Item, nyne caises of frames conteyning forscore eight.’ Four of the cases of frames were later sent to Edinburgh Castle (PA.15/3). The picture which seems to emerge from this evidence is of several guns mounted together, nine or ten barrels to each ‘case’, probably carried on horseback on a wooden frame which was set on the ground for firing. Experiments with multi-barrelled guns had a long history, and it seems that while in the Swedish service Hamilton had designed (though perhaps not actually constructed) such guns (Meyerson 1938, 22; Caldwell, D H, pers. comm.). A report of 1644 states that among Hamilton’s guns in England there was a type ‘never before discovered, which were made purposely for this designe, above three-quarters of a yard long, or some a yard, that will carry a twelve pound bullet, to doe great execution at a distance, and yet so framed that a horse may carry one of them’ (Terry 1899, 180; Firth 1962, 157n). This is clearly a much larger gun than the ‘frames’, but the reference does prove that Hamilton was experimenting with light guns to be carried by, rather than pulled by, horses. Moreover, it is significant that the word ‘frames’ is here used to describe the method devised for mounting a gun to be carried on horseback. That the ‘frames’ were smaller versions of this gun, small enough for several to be carried by one horse, seems highly probable. In Tower of London inventories of the late 17th century there appear light guns, ‘falconets’ (two foot long) mounted on ‘frames’, evidently with several guns in each frame (Blackmore 1976, 311, 335, 355). These sound remarkably like Hamilton’s ‘frames’.

Hamilton’s inventiveness extended to new types of ‘bend and halfe bend sadill pistols’, for which he was granted a monopoly in 1644 (PA.11/3, f.77); this implies that he was working on the development of the ‘dog locks’ which replaced the earlier snaphances, and he may even have been making flintlocks (Caldwell, D H, pers comm).

Hamilton’s experiments with ‘frames’ and other cannon are obviously developments of the attempts he had witnessed – and indeed taken part in – in Sweden to devise guns which combined lightness and mobility as far as possible with strength, range and weight of shot. In England his fellow countryman James Wemyss was simultaneously working on the same problems.

In some ways his approach was similar to Hamilton’s, in that he favoured mounting several small guns together. But Wemyss retained the faith in leather guns he had inherited from his uncle, refusing to accept (as Hamilton had evidently done) that the Swedes had been wise to abandon them. When Wemyss first constructed leather guns in England is unknown; he may have been experimenting with them throughout the 1630s (though he does not seem to have supplied any to English forces in the Bishops’ Wars), or he may have newly revived them when they are first recorded in 1643.

This being the case, the earliest recorded use of a leather gun in the British Isles comes

from Ireland. When the Irish Catholic rebels (some of whom may have come across leather guns when fighting as mercenaries against the Swedes in the Thirty Years War) besieged Ballynally Castle, County Clare, in 1642 they constructed a 'lethern great peece of ordnance' about 5 ft long and 5 in in diameter (calibre?), 'not bult upon caredge, but fastened in a stocke of timber . . . the lethar thaie made har withall was leetell bettar then halfe tand'. 'The next morning thaie made triell of there lethern gun at us, but shee only gaue a great report, having 3^{li} of powthar in har, but lett fly backwarde the bullet remaining within' (Croker 1841, 17–19). It sounds very much as if the Irish, taken in by talk of 'leather guns', had omitted to place a metal barrel inside the leather casing!

Wemyss' experiments were somewhat more sophisticated. When the English civil war broke out in 1642 he served parliament rather than the King. He was appointed lieutenant general of ordnance to Sir William Waller, and in December 1643 he set out from London to join Waller's army 'with waggons laden with leather pieces of ordinance . . . These leather pieces are of very great use, and very easie and light of carriage. One horse may draw a peece, which will carry a bullet of a pound and halfe weight, and doe execution very farre. This is the said Colonel's particular invention' (Firth 1962, 156 and n).

These guns soon saw action – but not success. Waller's army was defeated by the royalists at Cropredy Bridge in June 1644, and Wemyss and all his guns were captured – a total of 11 guns including 'two Barricades of wood drawn with Wheels, in each seven small brass and lethern Guns, charged with case Shot' (Walker 1705, 32, quoted in Firth 1962, 156n. The account in Hyde 1888, III, 367, quoted in Dalton 1897, 123–4, is very similar in wording). Another account describes Wemyss' captured guns as '14 Peeces of Ordnance, whereof 11 Brasse; viz. 5 sakers, 1 Twelve pound Peece, 1 Demiculverin, 2 Mynions, 2 Three Pound Peeces etc. etc. besides Two Blinders for Muskets and Leather Guns invented by Col. Weems a Scot, who lately made them at Lambeth . . . and received 2000^l for them as appears by writings found in his pocket'. It is said that Wemyss was brought before Charles I and charged with ingratitude (in serving the enemies of the king who had made him master gunner of England), to which Wemyss replied 'Gud feith his heart was always with His Majestie' (*MA* 1644, 1056, partly quoted Firth 1962, 156n; Hime 1898, 596; Carman 1955, 61, 63) The captured leather guns 'proved very serviceable to the King' (Gwynne 1822, 42), but Wemyss himself, whose services parliament were anxious to regain, was soon freed in an exchange of prisoners, and continued his work of providing guns for both the army and the navy of parliament (Dalton 1897, 124–5; *CSPD* 1645–7, 491–2).

After the English civil war ended (1646) Wemyss returned to Scotland. Though he had not visited his native land since his youth (Fraser 1888, III, 267) he had probably retained links with it: it seems likely that the Thomas Wemyss who was in charge of the covenanters' artillery in the campaigns against Montrose and Huntly in 1644 (*PA*.7/3/117) was a kinsman trained by him. In March 1648 the Scottish parliament passed an act in response to a petition from Wemyss. He had related that he had come to Scotland 'to put divers inventiounes in practise some of which he hath elsquhair brought to perfection. The particulars are light ordnance vtherwayis called Leather ordinance of all sortis shooting frome a quarter of a pound bullet vnto a demi cannoun with divers vtheris ingynges of warr as mortar peices pettardis and the lyk of Leather'. Wemyss therefore asked that for 57 years no one else in Scotland should be allowed to make or sell such weapons, and that he be authorised to take oaths from all to whom he divulged his secrets that they would not reveal them or leave Scotland. This parliament agreed to (*APS*, VI.ii.18–19, 482–3).

Wemyss had, however, chosen a troubled time to return to Scotland. The parliament which passed the act in his favour went on to organise a new invasion of England to aid Charles I in accordance with the treaty known as the Engagement. Alexander Hamilton remained general

of artillery of Scotland, but 'Deare Sandie being groune old and doated, had given no fitting orders for these things' so that the Engagers had invaded England without artillery (Turner 1829, 59)! Their army was promptly defeated by Cromwell, and anti-Scots feeling in England led to Wemyss being deprived of the office of master gunner of England (Dalton 1897, 125). There is no evidence that he had supported the Engagers or been employed in their army. Certainly he cannot have been closely involved with the Engager regime, for when in July 1649 the new Scots 'kirk party' regime deprived Hamilton of office for having aided the Engagers, Wemyss was immediately appointed to replace him as general of artillery (*APS*, VI.ii.474, 477; Fraser 1888, II, 319-20).

His services were soon required, for late in July 1650 Cromwell invaded Scotland. Wemyss was already busy experimenting with light guns; on 6 July the committee of estates had delegated four of its members 'to see, and take tryall of som light ordinance made by the Generall Artil. and to report to the Committee, how sufficient and usefull they wil be for the publict service. And that Weddensday [10 July] be the day for their goeing to disert, or the place where they are' (PA.12/5, minute of 6 July 1650). The 'disert' at which the guns were to be tested is presumably Dysart in Fife, just a few miles from Wemyss Castle, the home of the head of James Wemyss' kin, the earl of Wemyss. This may have been the occasion on which, according to Wemyss' later account, he tested 17 pieces of ordnance, 30 small guns and other brass pieces before the king and a council of war (Fraser 1888, II, 244-5): Charles II was staying in Falkland Palace at this time, and dined at Wemyss Castle on 12 July (Fraser 1888, I, 257).

Some of James Wemyss' light guns saw action at a skirmish at Gogar in August 1650 (*APS*, vii.46-7 and appendix 17-18), and Wemyss was present when the Scots were routed at Dunbar on 3 September 1650 and lost their entire artillery train. An English report the following day reported the capture of 'Peices of Ordnance, small and great *Leather Guns*, already brought in, 32' (*MP* 1650, 220). Wemyss himself referred to having lost all the guns which he had tested before the king (Fraser 1888, II, 244-5).

After Dunbar the Scottish regime abandoned Edinburgh and retreated to Stirling, where Wemyss began to assemble a second artillery train. According to his later petitions he found it impossible to get payment either for the first or the second trains; an act of committee of estates of 10 September 1650 ordered payment to him of £1,200 for the train lost at Dunbar, and parliament in March 1651 ordered further payments to him, but little money ever reached him (GD.50/180; *APS*, VI.ii. 649, 662). Wemyss therefore made a secret agreement with Charles II to provide, at his own expense, 20 guns firing at least three pound. In the event Wemyss brought to a rendezvous at Stirling 29 guns of at least three pound shot and 42 guns firing half-pound balls, which were handled like muskets (Dalton 1909, part 2, 171-2; Fraser 1888, II, 244-7). Other guns were provided by James Monteith. In June 1650 Charles II had appointed him his commissary of artillery and ordnance great and small, and for casting musket and pistol ball, and his master pewterer (PS.1/116, ff.167v-168 - the entry at first refers to *Samuel* Monteith, but then reverts to his correct christian name), and in April 1651 he was reported to have cast two brass cannon at Stirling (PA.11/11, f.4). Thus by mid-1651 'The artillery was in very good order under the command of Wemmes', 'a confessed good officer' (Hyde 1888, V, 173). From these references it seems that Wemyss made field guns of all sizes, and that some, if not all, were leather cased. His light guns were again in action at Larbert Bridge in July 1651 (*APS*, vii. 46-7, appendix 17-18), and Wemyss accompanied his artillery train in the disastrous invasion of England which was defeated by Cromwell at Worcester on 3 September 1651. By the time of the battle Stirling Castle had already surrendered, among the arms captured in it being 11 leather guns (Dalton 1897, 129), and the English conquest of Scotland was soon complete.

At Worcester Wemyss lost not only his second artillery train but his own liberty. He spent some time as a prisoner in Windsor Castle, but was free by 1654, when he offered his services to the king of Sweden (Fraser 1888, I, 300–1, III, 97). The offer was not accepted, and in 1658 Wemyss petitioned Cromwell for protection in England and Ireland for his inventions, similar to that he had been granted in Scotland in 1648. His list of inventions makes no specific mention of leather guns, but prominent place is given to various types of carriage each mounting several guns (of the same or differing calibres) which could be fired by gunners sheltered behind wooden screens, in some cases evidently while the carriages were in motion. These sound logical (if not always practical) developments of his ‘barricades’ which had been captured at Cropreddy Bridge in 1644 (*CSPD*, 1658–9, 35–7; Dalton 1897, 126–7).

Nothing came of the petition to Cromwell, but with the restoration of the monarchy in 1660 Wemyss’ fortunes improved. In 1661 he was re-appointed master gunner of England and general of artillery of Scotland. In the same year the Scots parliament renewed the 1648 act giving protection to his inventions, and in 1662 he was granted a patent for manufacture of light guns in England (*APS*, vii. 46–7; Dalton 1897, 127–8; ffoulkes 1937, 114). But there is no evidence that Wemyss constructed any more guns. In 1666 he resigned his English office, and he died in Scotland the following year (Dalton 1897, 128).

Many of the leather guns he had constructed in 1650–1 survived him. His son James was created Lord Burntisland in 1672 and the same year married his kinswoman Margaret, daughter of the earl of Wemyss. Three years later, in July 1675, the earl of Argyll wrote to the earl for ‘some of your leather guns. I think they will be proper for our barlines’. The ‘barlines’ are clearly birlins (small galleys). As Argyll was at this time preparing a fleet for the ‘invasion’ of Mull in pursuance of his claims to possession of that island it seems that he had decided that leather guns would be suitable light artillery for his ships. The fleet sailed to Mull later in 1675, but there is no evidence for the actual use of leather guns by the expedition (Willcock 1907, 198). Argyll requested Lord Burntisland’s advice as to what size of gun to buy from the earl and how to fire them; how they had come to be the earl’s property rather than Bruntisland’s is not explained. A few days later a servant of Argyll gave the earl of Wemyss at Burntisland’s Castle a receipt for ‘sewein peaceises of lyght ordnance, comenly calld leather gwnes’. Of the seven guns, three shot four-pound balls and four shot two-pound balls (Fraser 1888, III, 121).

On the death of the earl of Wemyss in 1679, Lord Burntisland’s wife became countess of Wemyss in her own right. Burntisland himself died in 1682, and the following year his widow the countess obtained permission from Charles II to sell the guns abroad – provided she first sold 20 to the king himself at reasonable prices. However, the countess evidently failed to find buyers, for in 1685 the guns were taken to Edinburgh Castle at her request. The earl of Argyll was leading an abortive rebellion against James VII, and the countess may have feared the guns would fall into rebel hands. In March 1688 the privy council gave permission for restoring the guns to her, to be exported or sold (Reid 1896, 365–6; Dalton 1897, 129; *RPCS* 1683–4, 327–8, 334; Paul 1914, II, 282–3, VIII, 503–5). Later in the same year James VII fled to France, being replaced as king by William of Orange, and on 15 July 1689 the privy council of the new regime asked the countess to lend some of her leather guns to Major General Hugh Mackay for use against the Highland Jacobites who had risen in arms under the earl of Dundee (*RPCS*, 1686–9, 516; Dalton 1897, 129). Two weeks later the council ordered the countess to send all her leather guns from Burntisland Castle to Edinburgh Castle ‘dureing the present exegencie of affairs’ (*RPCS* 1686–9, 569): as in 1685 it was feared that this odd little private artillery train would fall into the hands of rebels.

The leather guns employed in the 1689 campaign proved of little use. Hugh Mackay

reverted to Alexander Hamilton's idea of carrying light guns on horseback, but the frames on carriages designed for this purpose were inadequate. At Killicrankie on 27 July 1689 Mackay tried to provoke the Jacobites into attacking by 'the firing of three little leather field-pieces, which he caused carry on horse-back with their carriages, which proved of little use, because the carriages being made too high to be more conveniently carried, broke with the third firing' (Mackay 1833, 55).

This was probably the last time that Wemyss' leather guns saw action – though the leather cannon said to have been fired three times in Edinburgh in 1788 may have been one of his guns (Carman 1955, 63). But, remarkably (considering that only one other Scots cannon of the period is known to exist), no fewer than 23 of his cannon survive, and the main group of these, 19 guns (with a total of 42 barrels), probably constitute the closest approximation to a complete light artillery train of the 17th century to survive anywhere in Britain. In Britain as on the Continent use of leather guns proved ephemeral. But Wemyss' construction of such guns, together with the casting of guns by Alexander Hamilton and James Monteith, throw much light on the efforts of the covenanters to provide light artillery for their armies. The work of Wemyss and Hamilton also illustrates one aspect of the way in which Scottish military thinking in the mid-17th century was largely determined by the experiences of Scots mercenary officers who had fought in the Thirty Years War, especially of those who had served in the Swedish armies.

II Note on surviving examples

by David H Caldwell

Twenty-three leather guns, mostly double or four barrelled, are known to exist in Scotland. With the exception of one, all show marked similarities of construction, and the exception is not so dissimilar that it might not have been made in the same workshop as the others, or at least in the same tradition. There is no reason to doubt that any of them have been in this country since their manufacture and use in the 17th century. All of them unfortunately lack their carriages, the four museum examples being mounted on little wooden stands of recent date, and all of them are in a poor state of preservation, the iron corroded and the leather and cord dried and powdery.

Nineteen of the guns form a remarkable private collection that has just recently been rediscovered, and they do not seem to have been generally known about by arms and armour students or historians of the period (pl 22a). They are undoubtedly the guns which were at Burntisland Castle and which were removed to Wemyss Castle sometime after 1689, and they were at a later date mounted on the bowling green at Wemyss Castle (Fraser 1888, I, xxxii; cf *Stat Acct*, 16, 530). They are entirely lacking in all traces of their outer coverings of cord and leather and their ironwork is considerably corroded. A rather better preserved double-barrelled gun in the National Museum of Antiquities (LH 207) is known to have come from the same source, having been gifted by W B Johnstone in 1850 (fig 1A, p. 23a). It still has some cord and leather binding. Similar in size to this is a gun in the West Highland Museum, Fort William, whose provenance is unfortunately unknown (fig 1B). The other two guns are in the National Museum – a set of four of small size, the most completely surviving, gifted by Robert Bryson in 1850 (LH 206) (pl 22b, c); and a single gun completely lacking any vestiges of cord or leather, bought as part of a collection of antiquities in 1849 (LH 208) (fig 2). According to Lord Archibald Campbell (1899, 21) there were two small cannon covered with leather at Old Inverawe, Argyll, but the writer has been unable to discover if these still exist anywhere – unless 'they' are the

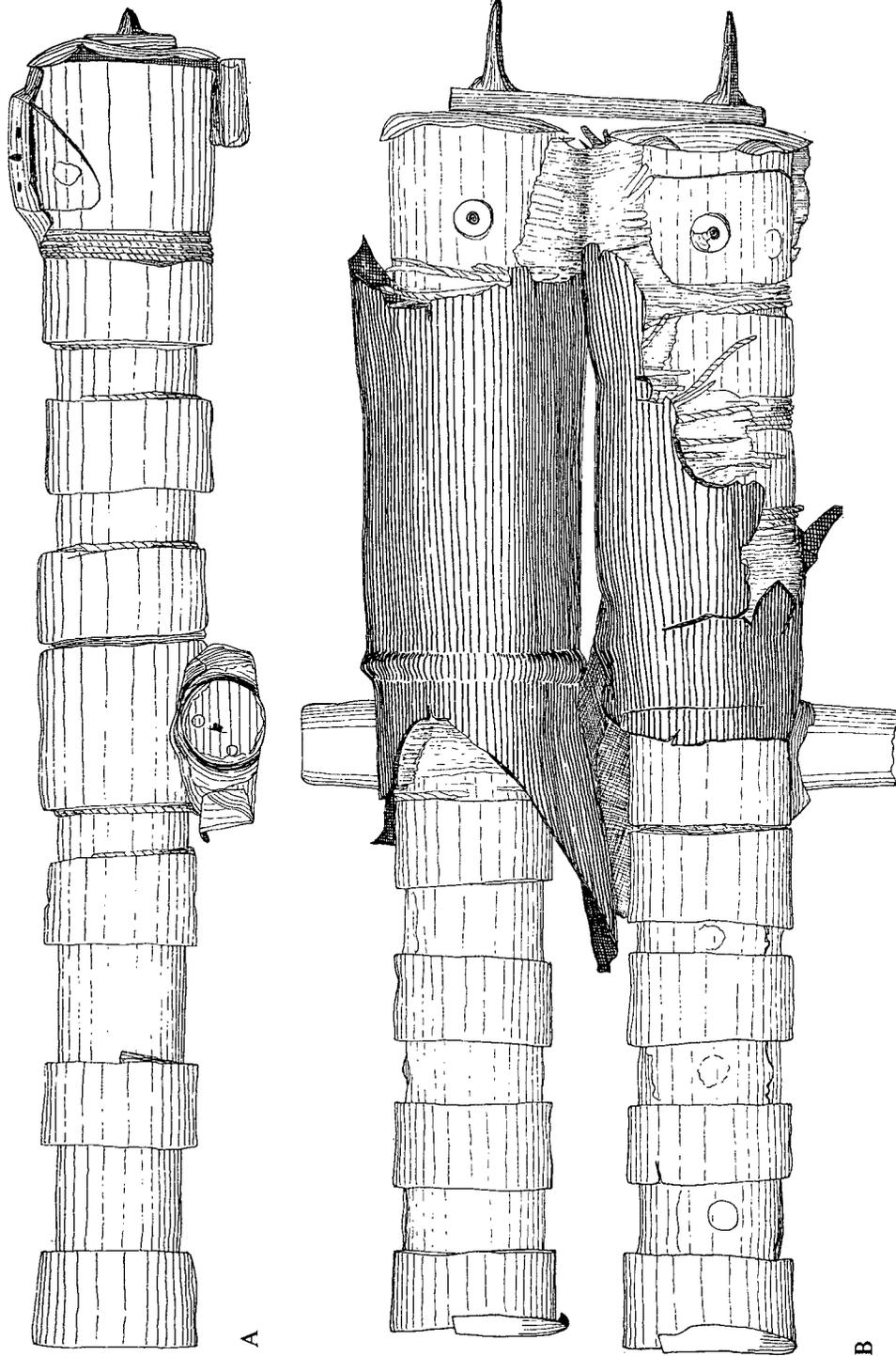


FIG 1 Type III leather guns: A, National Museum of Antiquities of Scotland; B, West Highland Museum, Fort William (scale 1:4)

double-barrelled gun now in Fort William. They could well have been some of the guns supplied by Lord Burntisland to the Earl of Argyll.

The following table briefly lists the surviving guns which can be divided into six main types on the basis of their size and number of barrels. There is a surprising amount of variation in calibre and barrel length, not altogether caused by the effects of corrosion but due to imprecision in manufacture. Possibly the guns were produced in great haste to deal with one of the emergencies of the period.

	No. of barrels	Barrel length	Calibres
I	1* NMAS	0.75 m	61 mm
	1*	0.875	63
II	1	1.07+	80
	1*	1.53	80
	1	1.19	86
III	2	0.705	60 75
	2* Fort William	0.69	66 70
	2	0.90	68 65
	2* NMAS	0.72	60 63
	2	0.995	65 70
	2	0.69	59 62
	2	0.87	65 66
	2	0.865	65 65
IV	2*	0.855	65 64
	2	0.91	81 82
	2	1.04	82 91
	2	1.06	86 86
V	2*	1.02	90 85
	4* NMAS	0.56	44 44 44 44
VI	4*	0.695	60 57 63 62
	4	0.72	65 63 61 62
	4	0.86	65 62 64 65
	4	0.89	73 74 72 69

* Illustrated.

From the above table it can also be seen that the guns fall into three main sizes of calibre-range. Thus types II and IV with an average bore of about 84 mm (3.7 in) were probably four pounders (i.e. were of a size to shoot iron shot of four pounds weight), types I, II and VI with an average bore of about 65 mm (2.55 in) were probably two pounders, and type V with a bore of 44 mm (1.7 in) one pounders; it is worth noting here that the guns bought by Argyll in the 1670s were two and four pounders (see part I above). In fact, they were probably also, or even entirely, intended to fire grape-shot. The apparent variations in calibre size between guns of like size could have been a problem with making solid shot fit, but not so with grape-shot. A cartridge with grape-shot for a leather gun is illustrated by Ulrich von Cranach in a work on artillery published in 1672 (Meyerson 1938, Bild. 39) and an example preserved in Skokloster Castle in Sweden is also illustrated by Meyerson (1938, Bild. 43). Joseph Furtenbach describing leather guns in his *Architectura Universalis* of 1635, says they should only fire stone-shot or grape-shot (quoted by Gessler 1924, 56-7). Stone-shot would, of course, have been considerably lighter than cast iron, approximately a third of the weight, and thus would not have required so large a charge of powder.

A further point of some interest is the shortness of the barrels relative to their bore. A useful measure of this relationship is the number of shot that can be placed end to end within the barrel – the number of calibres – and for types III-VI this can be estimated to be on average

between 11 and 12. The averages for types I–III are a bit higher, but with the exception of one gun of type II are not above 14. The exception has a barrel of between 18 and 19 calibres.

A fair amount can be learned about the methods of construction of these guns by studying the surviving examples. The first step was to make the iron core by beating a thin sheet of metal, approximately 3 mm thick, round a mandril thus forming an open-ended cylinder. The iron was lap-welded along the length of this core and where the joint was not very secure it was patched with pieces of iron or copper either before or after the reinforcing iron rings were added (pl 23c). These iron rings vary in number from eight to nineteen on each barrel, including the rings at the muzzle and breech and the broad central ring to which the trunnions are attached. In some cases these rings were riveted on to the core for greater security. This can clearly be seen on the double-barrelled gun in the National Museum (pl 23c). In the single-barrelled guns, types I and II, the trunnions are attached low down on the body to a broad iron ring going round the barrel (fig 2, pls 23b, 24b). They are sheathed in copper, the leather covering of the guns being gathered beneath this sheeting and held down by nails. In the multi-barrelled guns, types III–VI, the barrels are held together by an axle bar, ending in either side in trunnions similar to those on types I–II (pl 22c). The trunnions are thus entirely beneath the level of the gun barrels and this arrangement must have been a source of great strain to the guns when being fired. The axle-bars are formed of a stout piece of wrought iron. Iron tangs formed on the bottom of the broad rings encircling the barrels are fed through holes in the axle-bars and held in place together by pins fixed transversely through the tangs (pl 24a). The bars were then made thicker by the addition of a piece of wood and the whole encased in copper sheeting. The multi-barrelled guns were further fixed together by an iron bar covered in copper on their underside at the breech end, and by similar bars fixed over the spikes in the breeches, holding the barrels in groups of two. Guns of types I and II have iron brackets attached to the underside of their base rings (pl 24b).

The breech of each gun is closed by an iron plug from which projects an iron spike which may have formed the core for a cascabel. It is not clear how these breech plugs are held in position but possibly they are screwed in as an illustration of leather gun construction by J S Buchner, published in 1682, shows (illustrated by Meyersen 1938, Bild. 40). The touch-holes are contrived through the hindmost reinforcing rings and rise as collets to bring them flush with the leather casing. Like the breech plugs these may well have been screwed into place. Exceptions are the touch-holes on the double barrelled gun in the National Museum which are not raised in the form of collets but bored through reinforcing crescentic iron plates (fig 1A, pl 23a) and one of the barrels on the four-barrelled gun in the same collection has its touch-hole similarly formed through an applied iron strip (pl 22b).

The iron-reinforced barrels were tightly bound with hemp cord. On the gun in Fort William Museum there is evidence that two different thickness of cord were used, and also layers of hemp matting on the rear portions of the barrels to make up the greater thickness required. On the two other guns with surviving cord and leather in the National Museum there is only evidence of the use of cord of one thickness. The cord was then covered with a coat of leather which was sewn up the length of the barrels on the underside and held in under the copper sheeting on the trunnions and also by copper dishes placed over the spikes on the breeches. The muzzles and touch-holes were also protected from burning by pieces of copper (fig 1B, pl 23a). The finished barrels were thicker at the breech end and had bell-shaped muzzles and a decorative ring raised behind the trunnions (pl 22b).

The above description applies to all the guns apart from the small single-barrelled piece in the National Museum (LH 208). Its reinforcing rings are notably thicker and less broad than those on the other guns and its spiked breech plug has had four iron nails arranged around it,

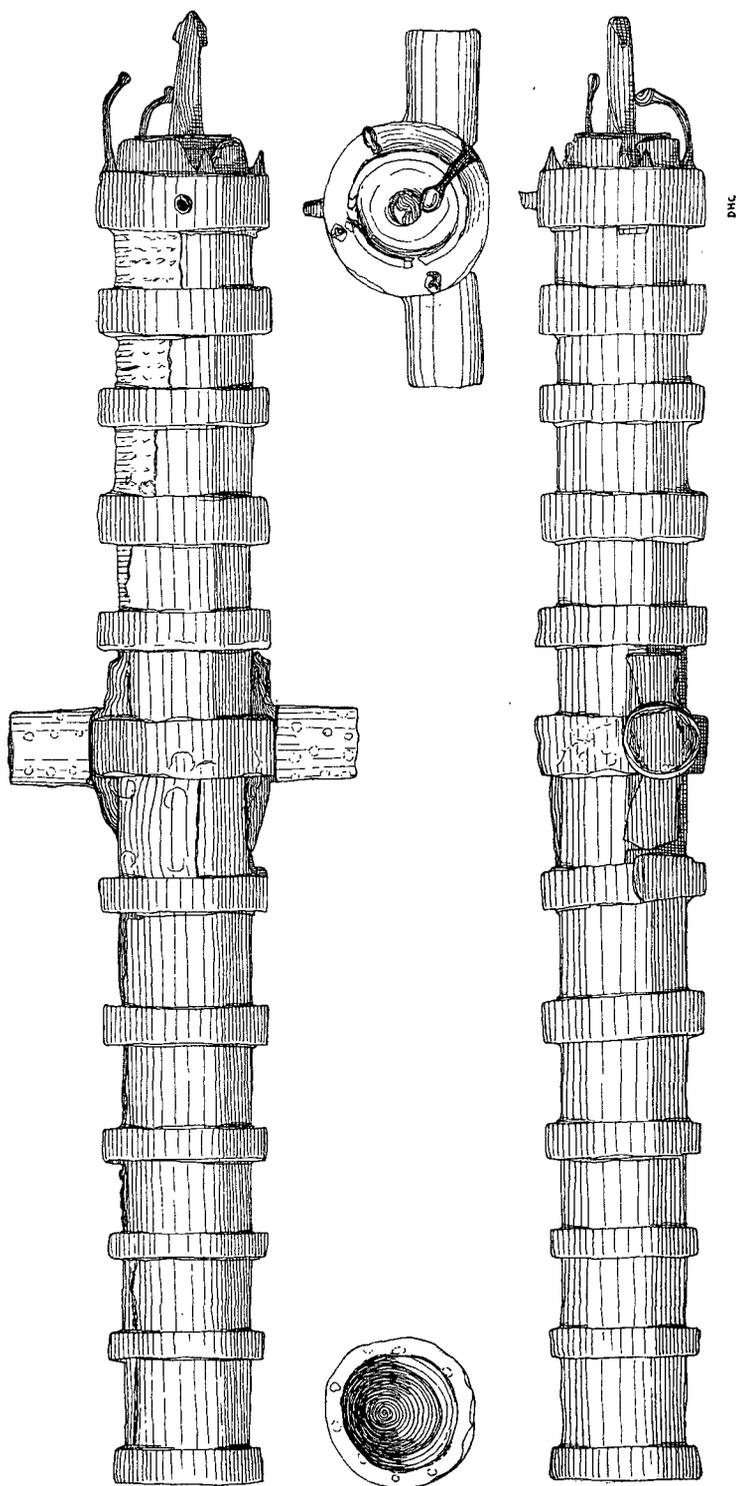


FIG 2 Type I leather gun, National Museum of Antiquities of Scotland (scale 1:4)

presumably for securing the leather and/or a cascabel. The iron ring on which its trunnions are formed has strengthening flanges on either side (fig 2).

All these guns – including the last mentioned – have a lot in common including their method of construction with an iron hooped core, their arrangement in double or four-barrelled units and their shortness, all of which features distinguish them as a group from leather guns manufactured elsewhere in Europe in the 17th century.

Five leather guns are preserved in the Schweizerischen Landesmuseum in Zürich, including two exceptional pieces, a breech-loader and a mortar, and all five can be dated to the years 1623–7 (Gessler 1924). A well documented gun in the Livrustkammaren in Stockholm by Ludvig Ripp can be dated to *c* 1628 (Meyerson 1938) and there is a group of four of which two are in the Musée de l'Armée, Paris (Robert 1893, III, 61, N. 270), one in the Museum of Artillery at Woolwich (Kaestlin 1970, 25, no. II. 173), and one in the Zeughaus, Berlin (Gohlke 1908, Abb. 3, Nr. 127; Meyerson 1938, Bild. 34), which are convincingly thought to have belonged to Gustavus Adolphus. The two in Paris are said to have been captured at Lützen in 1632 and all of them have dolphins in the form of a letter G, for Gustavus. Furthermore, a gun of this type was illustrated by Georg Schreiber in a work published in 1656 and described as being of the form first used by the Swedes in Prussia in 1627 (Gohlke 1908, 389, Abb. 2; Meyerson 1938, 44, Bild. 33). There are a further four guns described as being in the Berlin Zeughaus, and others in Vienna, Copenhagen, Munich and Nürnberg. Many of these guns have calibres similar to or smaller than the Scottish guns of types I, III and VI. The group of guns with G-shaped dolphins, two of the Zürich guns and the gun in Stockholm have calibres of between 50–56 mm which would have meant, in theory, that they would have been three-pounders.

The continental guns are bound with hemp, cord and leather in a similar fashion to the Scottish guns but also with materials such as wood, lime, tow, linen strips, paper and canvas. Wood was used in some, for example, the gun in Stockholm, to give greater thickness to the muzzle and form the raised rings on the outer surface of the barrel. In this case also wooden slats were incorporated lengthwise underneath the cord and leather covering (Meyerson 1938, Bild. 18). Many of the continental guns have copper cores rather than wrought iron ones and in either case sometimes do not have reinforcing metal rings shrunk on. Apparently only one of the guns in Zürich has an iron core reinforced with iron rings, described as like a 'Ringgeschützrohre' of the 15th century (Gessler 1924, 63). The guns with G-shaped dolphins apparently have iron rings reinforcing their copper cores at the breech end as described by Schreiber in 1656, but not the gun in Stockholm by Ludvig Ripp.

The two most important differences, however, between the continental guns and the Scottish ones are that the continental guns are all single barrelled and are relative to their bores much longer pieces, thus giving them a rather different, long and slender appearance. The Scottish guns have barrels which are mostly 11 to 12 calibres long inside. The Stockholm gun's barrel is almost 24 long, the gun with the G dolphins in Berlin Zeughaus (Nr. 127) is 33 and several of the others are over 30 calibres. The shortness of the Scottish guns made for greater lightness and helped to compensate for the weight of their more massive wrought iron cores. It also meant that more than one barrel could be handled together with ease. The shortness did mean a great sacrifice in range and accuracy but these disadvantages may have been amply compensated for by their mobility and greater destructive effect at close range.

There is good reason to think that most or all of the Scottish leather guns were the work of James Wemyss. The long survival of so many of them at Wemyss Castle favours this interpretation. In effect we have represented in these guns a unique 17th-century train of field artillery. Unfortunately we cannot give an exact date for their manufacture but it was probably before

the battle of Worcester in 1651 and they could have come from Weymss' first or second artillery train of 1650 and 1651. The guns captured by the English at Dunbar may simply have been dumped in Edinburgh Castle or elsewhere and reclaimed by Wemyss after the Restoration in 1660 – similarly with the guns taken at Worcester. Wemyss' official positions as Master Gunner of England and General of Artillery of Scotland would have facilitated the transfer of the guns from his custody in his official capacity to himself in his private capacity. There is no evidence that Wemyss constructed leather guns after Worcester and it is most unlikely he could have done this during the occupation of Scotland by the English army in the 1650s.

The place where the guns were made is unknown, but it was quite probably in the Burnt-island – Wemyss area of Fife, as in 1650 members of the committee of estates were sent to Dysart to see them demonstrated (see p 306 above). It is unlikely that they would have been tested far from their place of manufacture. Wemyss could evidently continue manufacturing his guns after the English had occupied Scotland south of the Forth in September 1650.

One other Scottish gun of the Civil War period known to have survived is a small cast bronze gun by the pewterer, James Monteith of Edinburgh (fig 3, pl 24c), now in the National Museum of Antiquities (LH 204). It was presented to the museum by Captain L Carmichael of His Majesty's 59th Foot in 1829. The gun was discovered as part of the defences of the fortress of Bhurtapore (Bharatpur) in northern India when it was captured by the British in 1826, and it was given to Captain Carmichael by order of the Governor General in Council in recognition of his meritorious part in the siege (*Soc Ant Scot Minute Book*, 1827-40, 139; *Communications*, VI, 1829-32).

The overall length of the gun is 0.768 m from muzzle to cascabel, and it has a bore of 81 mm (3.2 in). The interior of the barrel has a cone-shaped chamber for the powder charge. The gun itself is rather fussy in appearance owing to the provision of several rings modelled on its short body. On top of the barrel it has a thistle and the following inscription:

JACOBUS MONTEITH ME
FECIT EDINBURGH AN
NO DOM 1642

The thistle has been formed on the model for the gun mould by means of an irregular-shaped stamp. The lettering has been roughly cut and formed in the mould in the same way. Round the muzzle and on the breech and cascabel are considerable traces of thick red lead paint, presumably added as a decoration, and on the barrel a serial number – '1 3 15' – is repeated twice, once in paint and once stamped. This is of a later date than the gun's manufacture but the founder has cast the number 'XLIX' into the cascabel. The gun seems generally to be quite a good casting though there are signs of wear and some pitting inside the barrel.

There is a strong possibility that Monteith's gun, at least in its proportions and in having a conical chamber, copies the guns of Alexander Hamilton. Dr Stevenson has noted above how Alexander Hamilton and/or the Marquess of Hamilton were concerned with developing a light cast-bronze field gun which had such a conical chamber while they were in the service of the Swedes. It is not altogether clear what the advantages of a conical chamber were especially since it made for a shorter space in the barrel for the shot, unless it strengthened the gun at the breech in that there was a greater thickness of metal round the chamber, and perhaps made the loading with powder cartridges easier. Certainly cartridges would have been a necessity as with loose powder there would have been a grave danger of leaving space between the powder charge and the shot and thus causing the gun to explode. Meyerson (1938, Bild. 42) illustrates a cartridge from Skokloster Castle with grape-shot and a long tapering powder bag which he says

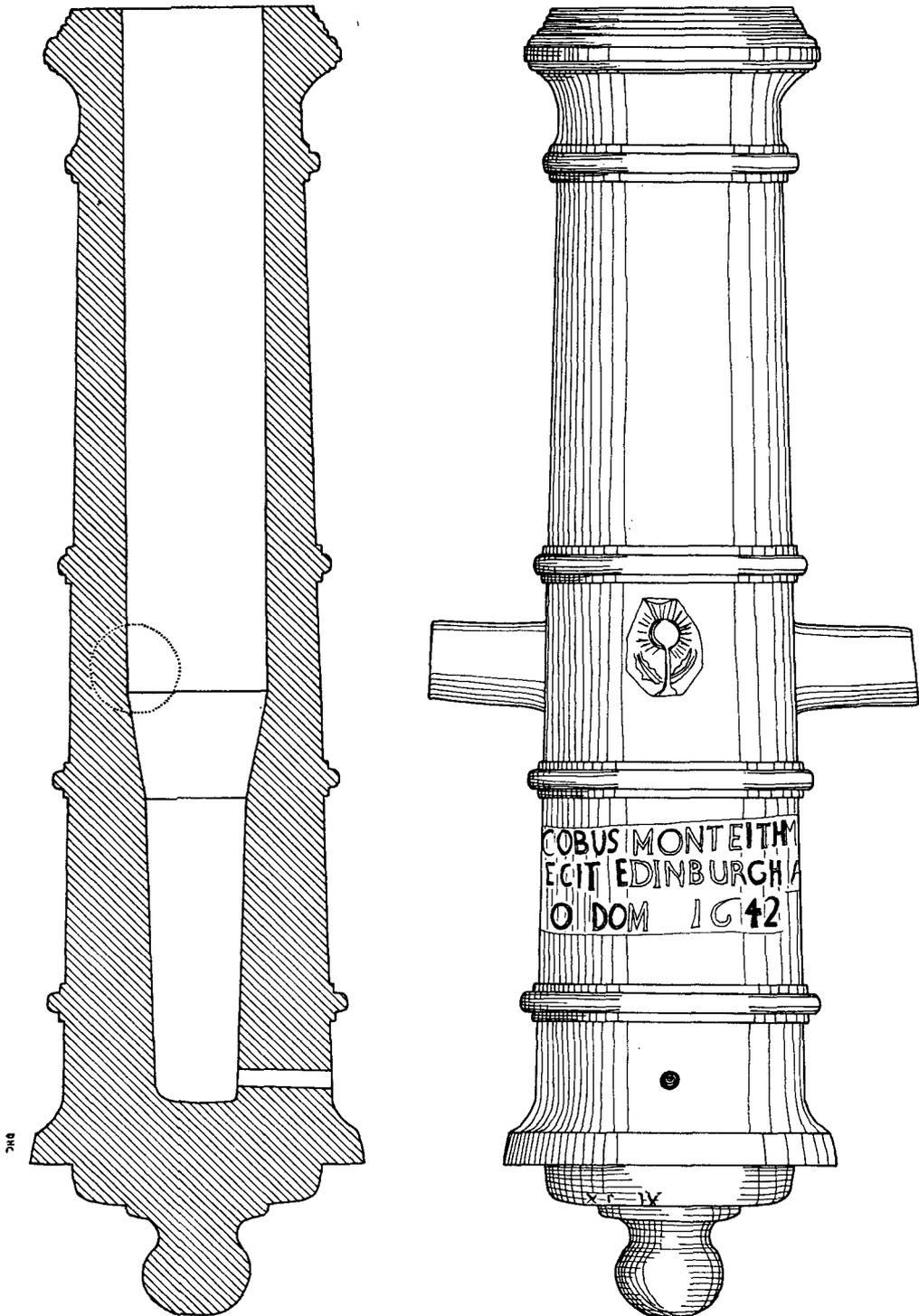


FIG 3 Bronze field gun by James Monteith 1642, NMAS (1 : 4)

was of the type used in leather guns, but this example may rather be intended for a bronze gun with a conical chamber. No other guns are known by Monteith, but at least five of his bells survive, ranging in date from 1641 to 1657 (Clouston 1964).

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GLOSSARY OF TECHNICAL TERMS

- Cascabel* The part of a gun behind the breech of the barrel.
Chamber The part of the inner end of a gun barrel which contains the powder charge.
Trunnions The stumps on either side of a gun for mounting it on a carriage.

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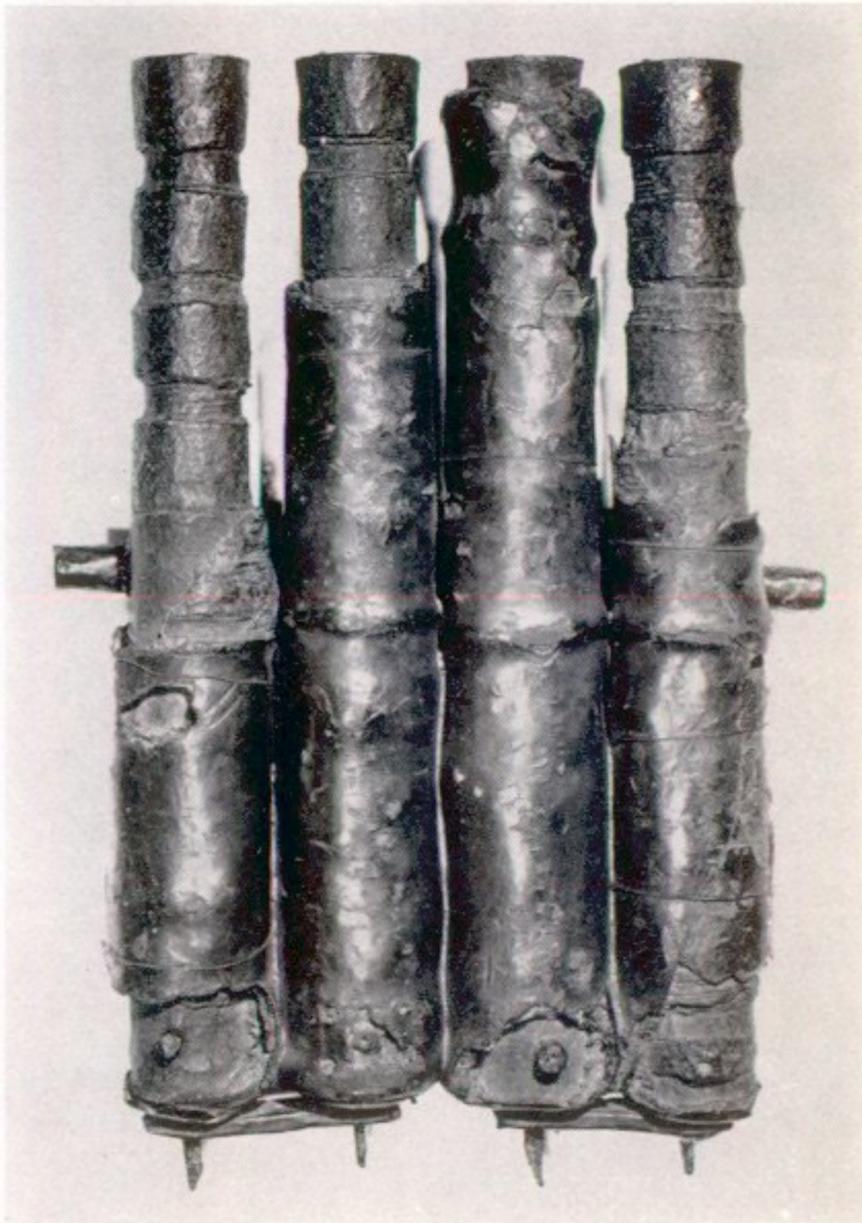
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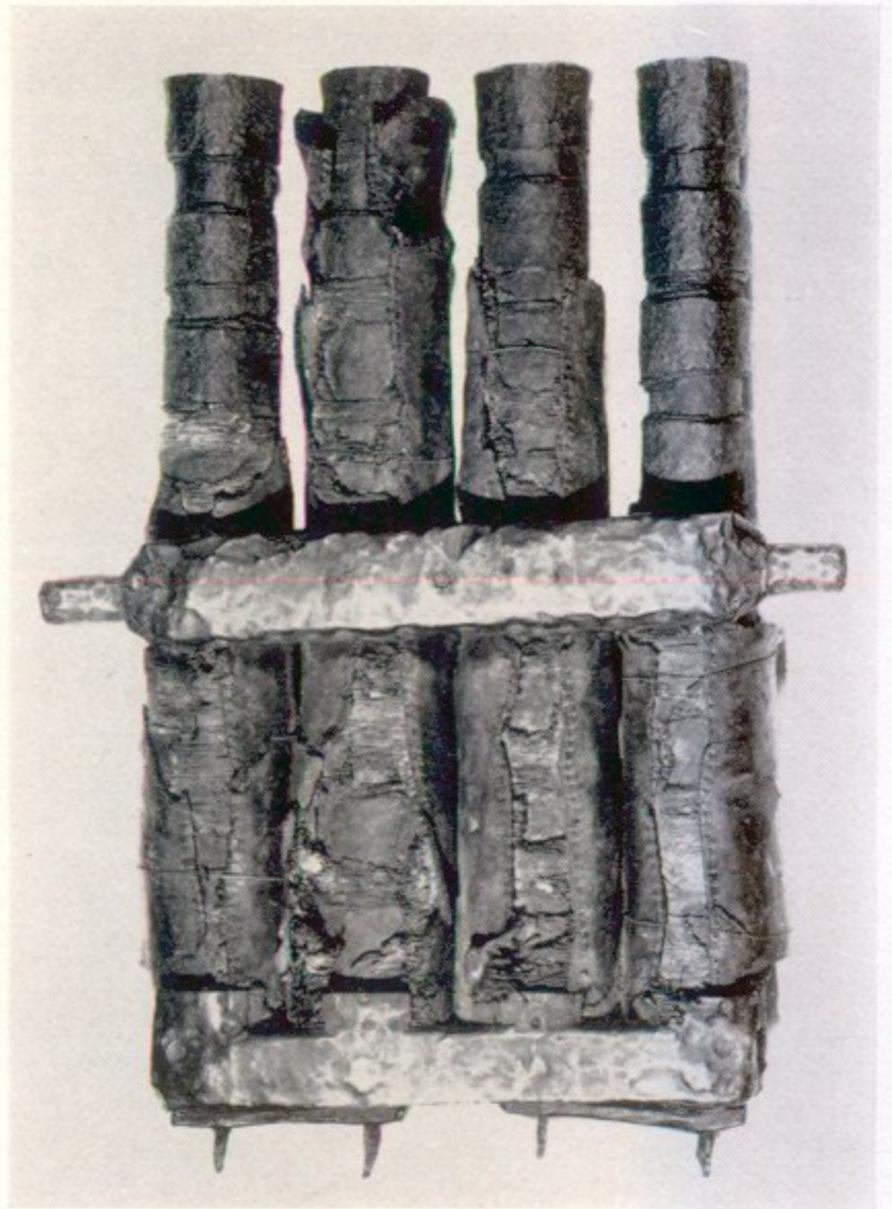
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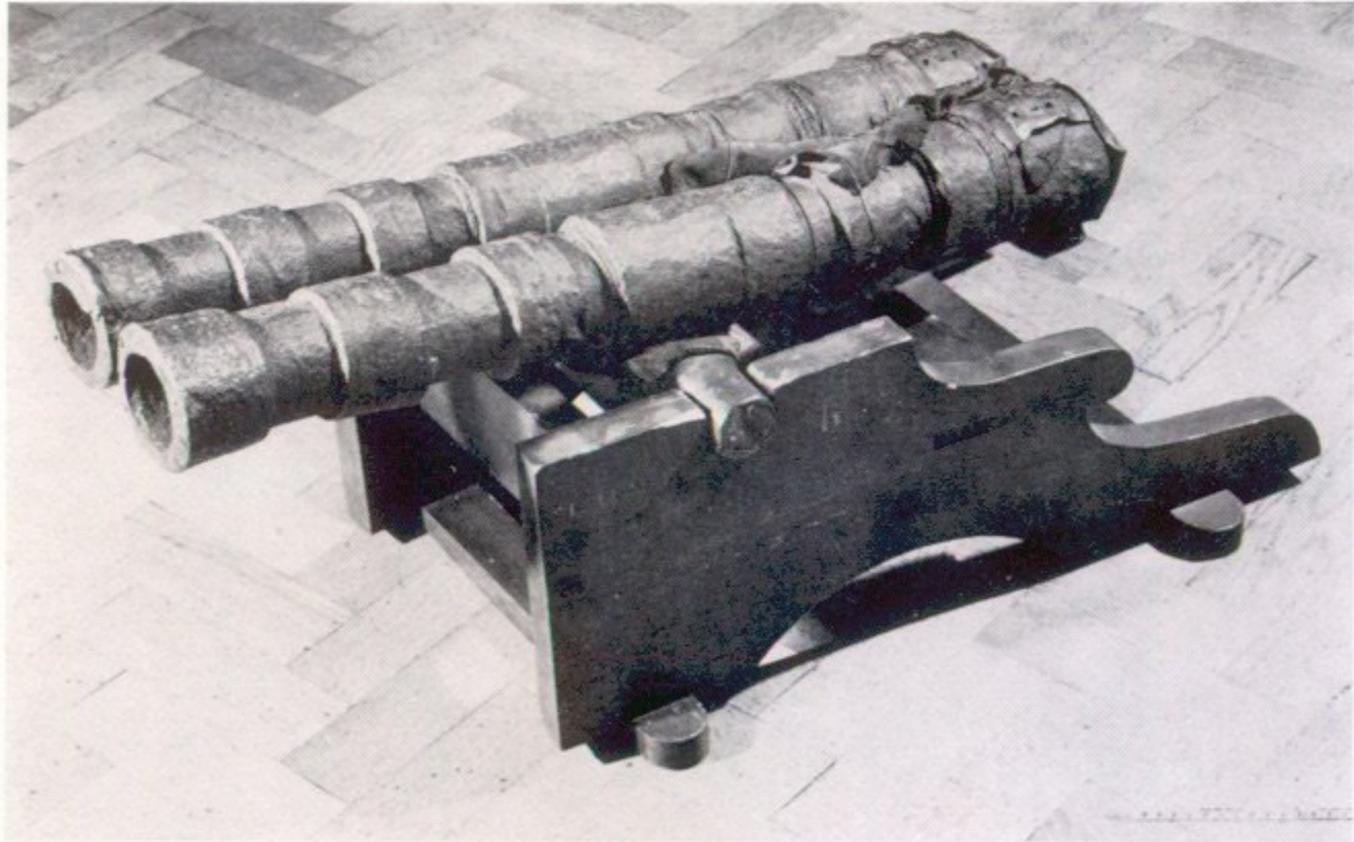
a Leather guns, Types VI, IV-I, from left to right



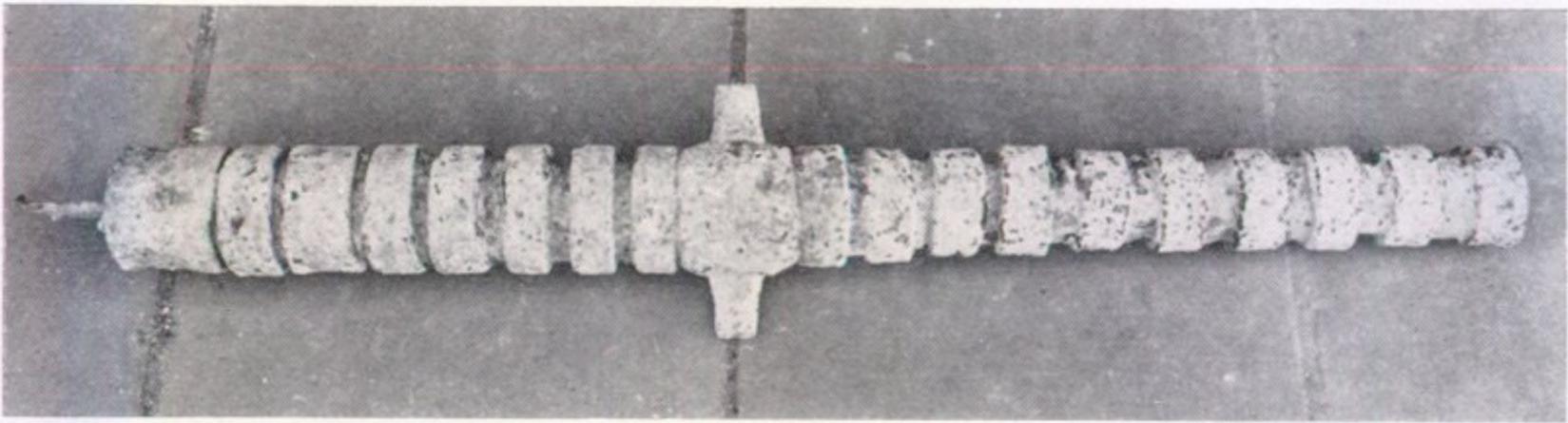
b Type V, leather gun, National Museum of Antiquities of Scotland



c Type V leather gun, underside



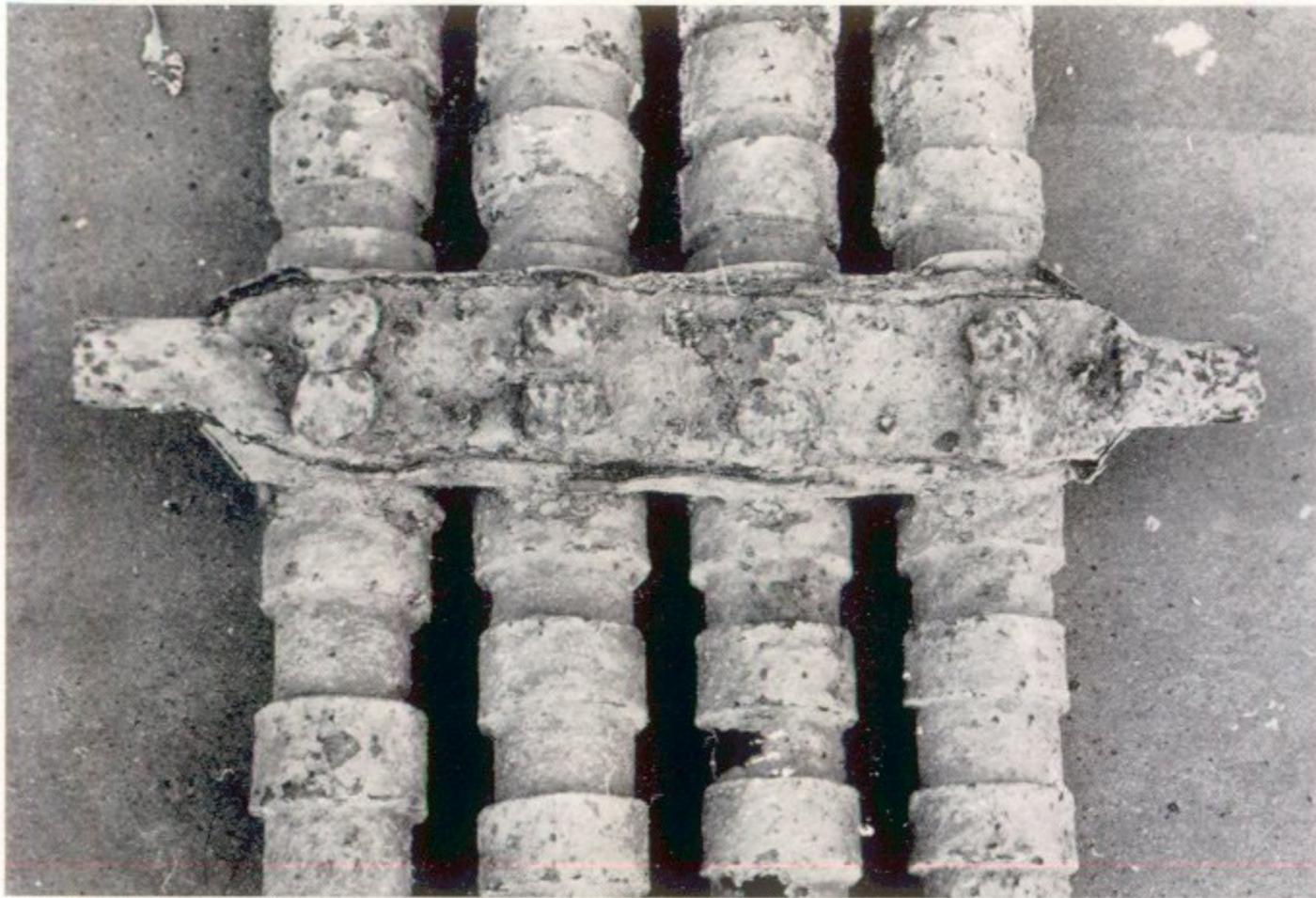
a Type III
leather gun,
National
Museum of
Antiquities of
Scotland



b Type II leather gun



c Detail of barrel construction showing rivets and copper plate covering barrel seam



a Trunnion axle-bar without its copper sheathing



b Underside of Type II leather gun



c Bronze field gun by James Monteith, 1642