

## THE MILITARY HANDGUN OF THE SIXTEENTH CENTURY.

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The closing years of the fifteenth, and right through the century following, were times of war and preparations for war in most of the countries in Europe. Great changes were in progress in the constitution of the large European armies brought into the field, as well as in tactics, for uncertain feudal levies were being rapidly replaced by regular troops, and infantry battalions had become "the strength of the battle," though in the second half of the sixteenth century the cavalry arm, using the arquebus, the carabin and the pistol, again came into great prominence.

My paper on gunpowder and the handgun, printed in the *Journal*<sup>1</sup>, brings their history up to the end of the fifteenth century: by this time Maximilian I had sat on the throne of Germany for several years. The emperor took, until his death in 1519, a keen personal interest in the making and development of arms and armour, in all their details, and he watched and assimilated each improvement in other countries as it arose. Henry VIII of England also took a lively interest in firearms, and he too devoted some study to the theory and practice of gunnery. Such a condition of things naturally made for new departures and developments, both in armour and weapons of war, and work was carried on under conditions of improved mechanical processes, on more scientific lines than those prevailing in the fifteenth century.

The most striking features of the sixteenth century in the history of handguns are: the application to war purposes of the matchlock, if not its invention; the invention of the wheel-lock, and the snaphaunce; rifling barrels in spiral curves; the fixing of a standard calibre; the evolution of the pistol; its adoption as a cavalry weapon, and general improvements in small-arms.

<sup>1</sup> *An outline of the History of Gunpowder and that of the Handgun, from the Epoch of the Earliest Records to the End of the*

*Fifteenth Century; Archaeological Journal*, lxvi, 145.

The information obtainable from English records of the sixteenth century concerning the development of handguns is extremely scanty, and, as in the century preceding, it is more especially to the inventories and to the remnants of the contemporary military history of Germany, together with the collections of ancient handguns preserved in the museums of that country, that we must turn for working out the subject. A great deal of information concerning the history of firearms has been collected together by Herr Essenwein, and published in *Quellen zur Geschichte der Feuerwaffen*,<sup>1</sup> and to this invaluable work I have been greatly indebted in the preparation of these notes.

By the end of the fifteenth century, the handgun may be said to have attained, though roughly, the form we are familiar with. It was then discharged generally from against the shoulder, with or without a rest; but there were still many light and nearly straight weapons, fired from against the cheek. The last-named practice died hard in warfare, though it continued long in the chase, for sportsmen found that they could aim so much better, holding their guns in that position. In 1519 the town of Nuremberg sent 150 men against Ulrich of Würtemberg, and those were selected for the expedition "die mit gutem geschütz versehen sein und am wang abschiessen können."<sup>2</sup> Two years earlier this same duke gave orders that each of his harquebusiers should be provided, as far as possible, with a weapon fitted with a gunlock, a needle for clearing out the touchhole, and other necessary fittings, and be able to shoot from the cheek, "so that the scandal of inaccurate shooting should be avoided."<sup>3</sup> It must not be supposed, however, that gunlocks were in general use so early, for that is far from being the case: indeed, a painting of the year 1533, in the Pinakothek at Munich, shows that even by that time a considerable proportion of the handguns there represented were still without gunlocks. Preuss, writing in 1530, mentions "doppelhaken, haken, halbhaken; und handgeschütz, als ziel- pirsch- feuer- und feierbüchsen"; while the inventory of Pleissenburg, of 1532, only schedules "haken- und handbüchsen," as being

<sup>1</sup> Leipzig, 1872.

<sup>2</sup> Those provided with good weapons, and who can shoot from against the cheek.

<sup>3</sup> *Quellen*, 117.

in store.<sup>1</sup> *Feuerbüchsen* and *handgeschütz* are words used to imply handguns in general; and *feierbüchsen* were probably weapons used at target practice. The others mentioned will be described later. The following entry occurs in the survey of arms and armour, made at Westminster, the Tower and Greenwich, in 1547: "one chamber-pece in a stocke of woode lyned in the cheke with vellet." This weapon is still in the Tower, catalogue no. 4; and the arrangement for closing the breech is said to be similar to that of the Snider rifle, an Enfield rifle converted into a breech-loader. It bears the date 1537: the barrel is 1 ft. 11 in. long; the bore of the chamber .55; and of the barrel .535.<sup>2</sup> Breech-loading handguns were in use so far back as the middle of the fifteenth century, if not before, and that they were not uncommon in the first half of the century following is vouched for by entries in the inventory just mentioned: "Old harquebusses with chambers; chamber-peces; short chamber peces," etc. In the same inventory is an item "vij litle purses for chambers of vellet"; which were probably for extra chambers.

The practice of using the cheek as a buffer soon became impossible by reason of the sharper recoil produced by the more powerful weapons and the stronger powder employed towards the middle of the century, and the further bending of the stock in weapons for the infantry would indicate that by that time the practice had been abandoned by that arm. The custom, however, prevailed much longer with cavalry and among sportsmen using light handguns: it was still being practised by the French horse, as stated by Montgomery,<sup>3</sup> during the reign of Henry IV, and even as late as that of Louis XIII.

The military handgun of the beginning of the sixteenth century, though still a rough weapon from our point of view, had made great strides towards comparative efficiency, and the various stages reached throughout the century preceding are set forth in my first paper. It had no fixed sights, and was fitted with a "serpentine," which, by the direct action of a finger, brought the burning match held in its jaws into contact with the priming in the pan. The

<sup>1</sup> *Quellen*, 120.

<sup>2</sup> *Archaeologia*, li, 229.

<sup>3</sup> Montgomery Courbouson. *La milice franc*, 133.

serpentine was sometimes placed between the pan and the muzzle, and at others was worked from behind the pan. A handgun in the possession of Mr. W. J. Andrew, F.S.A. which is stated to have been in the Tower of London but dispersed with other things after the fire, is fitted with an outside spring for holding up the serpentine,

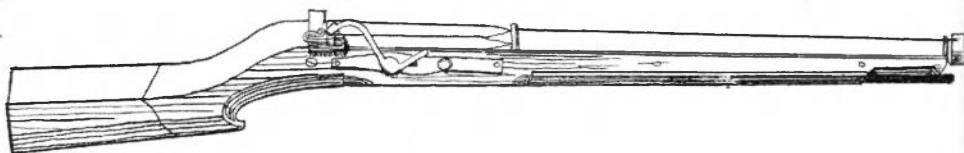
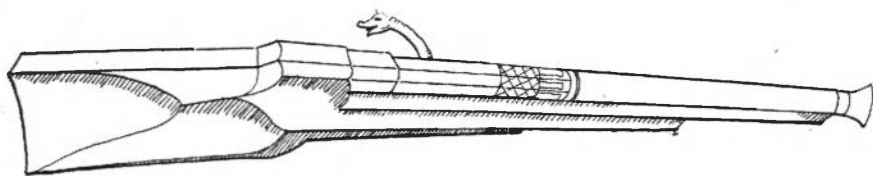


FIG. 1. A HANDGUN OF 1501 USED AT SHOOTING COMPETITIONS ( $\frac{1}{12}$ ).

FIG. 2. A HANDGUN OF C. 1510 ( $\frac{1}{12}$ ).

FIG. 3. A LANGEROHR ( $\frac{1}{12}$ ).

with the match in its jaws. There is a lockplate merely to prevent the action of the spring and serpentine from wearing into the wood. The stock of the interesting weapon to which this movement is attached is sharply bent, a circumstance which might imply a date in the second half of the sixteenth century, while on the other hand, the "Gothic" mounts of the gun would suggest about the

end of the previous century. The barrel is four feet long, and the weight of the piece twelve pounds two ounces. Other appliances of the fifteenth century for achieving the same purpose, based on the principle of leverage, are fully described in my previous notes in the *Journal*. The improvements in forms of release, sighting, etc. foreshadowed in some illustrated manuscripts of the fifteenth century, some of which had been embodied in weapons made especially for target practice, and probably also in a few cases to those for sporting purposes, began to be adapted to weapons of war at the commencement of the sixteenth century, if not before. Fig. 1 is the drawing of a handgun reproduced in *Quellen*, from a *schutzen-brief* of Cologne, dated 1501, which furnishes an illustration of a *scheibenbüchse* used at target shooting competitions at the beginning of the century under review. It has the appearance of being a most serviceable weapon: the barrel is fairly long, the stock trimmed conveniently for handling and for resting against the shoulder: the mode of igniting the priming is by the serpentine, and there are no fixed sights. The artist in this case has drawn the weapon on the woodcut as he saw it, so that on the impression it is reversed. Sights placed on the barrel would have been but of little use before the introduction of gunlocks, for until then the marksman's eye was mainly occupied with the manipulation of his match, and he could only judge his distance roughly, but as soon as he had only the trigger to deal with at the moment of firing, sights were placed on the barrel: this enabled him to take a surer aim, in a more accurate determination of the elevation and direction. Sights were first placed near the breech, later at the muzzle, later still we have both; and sometimes a small tube was placed on the barrel, as is the case with the Penhurst Place calivers and muskets, hereinafter referred to. Various methods of sighting are illustrated in Codex 1390, a manuscript at Erlangen, dated in the year 1500; and for the rest we have those shown on the weapons preserved to us. The use of iron bullets soon rendered gun-barrels unserviceable; and the substitution of leaden bullets was found to be a great improvement in this respect. Early in the century small iron bullets cased in lead, a custom revived by Arm-

strong for ordnance, were used. The gun-stocks of this period are in two varieties: bent, as shown on fig. 2, and straight, or nearly so. There are several handguns with barrels of iron and of bronze in the museum at Nuremberg, dating from about the first ten years of the sixteenth century, the great majority of which are still fitted with the serpentine, a form of release which lingered long, by reason of its simplicity: indeed, wood-engravings of the second half of the century still frequently portray soldiers carrying handguns fitted with this appliance. Several of the weapons of the early years of the century exhibit movable pan-covers and breech and muzzle sights. A handgun, dating about 1510, illustrated on fig. 2, is typical of its period; it is fitted with an early form of matchlock, the button-lock, hereinafter described: the total length of the piece is 1.69 metres, that of the bronze barrel, 0.80 metres, and the weight is 5.1 kilogrammes. There is a pan-cover, breech and muzzle sights, and a ramrod, fitting into a socket: the breech-sight has a long, narrow, quadrangular slit for sighting.

A *schutzenbrief* of Augsburg, of the year 1508, gives the range at the target as being 700 *werkschuhe*, meaning working-shoes,<sup>1</sup> equal to about 226 yards. In warfare, however, the use of handguns during the early centuries of their history was mainly confined to short, often very short, ranges, or they failed to produce any decisive effect: it was not until the advent of the musket that a range of 300 paces was attempted. There is very little change in the general form of handguns during the first half of the century, as evidenced by examples inscribed with the year of their make in the collection at Nuremberg and other places: this is confirmed by wood-engravings of the period, and especially by those of the first quarter, in the *zeugbücher*<sup>2</sup> of Maximilian, which types practically ran through the quarter of the century following. In 1511 Lewis and Alexander de Fava received payment from the English government for "500 hakebusshes," at eight shillings apiece, and in the following year Peter Corsy had a shilling apiece more for 420 handguns, with bottles

<sup>1</sup> *Quellen*, 116.

<sup>2</sup> Arsenal Books.

(i.e. flasks) and moulds for each, while in 1530 Cornelius Johnson received five shillings apiece for 100 handguns, i.e. without flasks, etc. Viscount Dillon<sup>1</sup> quotes Pepwell, as writing to Henry VIII, about 1534, from St. Lucas, that "arquebuses are now made here which give double the stroke of a handgun, many of them and of Morris-pikes are come hither from Biscay." A German inventory of 1533 schedules *doppel-haken*, and *handgeschütz*. There would seem to have been but little difference, if any, between demi-hakes and handgonnes, for they are often classed together in German inventories as *halbehaken* and *handbüchsen*; just as in the English survey of 1547, in "the thirde house" at Westminster, we find "demyehackes or handgonnes lxxj." Among the handguns entered in the same inventory of 1547, in the Tower, are "6700 demi-hakes or handgonnes"; also "275 shortegonnes, for horsemen, w<sup>t</sup> cases of lether, furnyshed w<sup>t</sup> hornes and purses," the "hornes," being powder-horns, and the purses, bullet-bags. The "shortegonnes for horsemen" were doubtless much improved weapons to those in use for the purpose in the middle of the fifteenth century, which are fully described in my previous paper, and their presence in such a number in the Tower goes to show that the use of handguns by cavalry had been continuous, in spite of the difficulties which must have been experienced in using weapons with a lighted match on horseback. At the commencement of the reign of Francis I when a fourth of the *landsknechts*, and the Swiss mercenaries carried the *harquebus*, the French infantry was still armed with the crossbow. Montluc<sup>2</sup> tried in 1523 to open the eyes of the French to the short-

<sup>1</sup> *Archæologia*, li, 230.

<sup>2</sup> It is sometimes stated that Montluc disdained the use of the handgun, but this is far from being the case, as the following extract from his *Commentaries* shows: "Il faut noter que la troupe que j'avais n'estoit qu'arbalestiers, car encore en ce temps-la (1523) il n'y avoit point d'arquebuziers parmy nostre nation. Seulement trois ou quatre jours auparavant six arquebuziers Gascons s'estoient venus rendre du camp des ennemis de nostre coste, les quels je retins, par ce que par bonne fortune j'estoies jour là de garde à la porte de

la ville et l'un de ses six estoit de la terre de Montluc que plust à Dieu, que ce mal-heureux instrument n'eust jamais invente, je n'enporterois les marques, les quelles encores aujourd'hui me rendent languissant: et tout de braves et vaillans hommes ne fussent morts de la main le plus sauvent de plus poltrons, et plus lasches, qui n'oseroient regarder au visage celuy que de loing ils renversent de leurs malheureuses balles parterre. Mais ce sont des artifices du diable pour nous faire entretenir." 1, 31.

comings of the crossbow as against the now greatly improved handgun,<sup>1</sup> and the conspicuous success of the Spanish arquebusiers at the battle of Pavia in 1525 helped to bring about a great change: indeed by 1534 in a force of 42,000 French infantry there were 12,000 arquebusiers.<sup>2</sup> The following extract from *La discipline militaire* gives some information at first hand regarding the size of the harquebus in use by the French cavalry towards the middle of the century, the equipment of the harquebusier, his wages in times of peace, etc:

"Les harquebusiers seront bien montez et leur harnois sera pareil a celuy des estradiots, reserve la salade, car ceux-cy auront seulement un cabasset afin de viser mieux, et avoir la teste plus delivre, l'espée au costé, la masse a l'arçon d'un part, et l'harquebuze de l'autre, dedans un fourreau de cuir bouille, lequel tienne ferme sans bransler. Ladite harquebuze pourra estre de deux pieds et demi de long ou de trois au plus, et qu'elle soit legere. Les gages des harquebusiers pourroient estre de trois escus en temps de paix pour chacun mois."

I take the cavalry harquebus of this period to have been an early form of petronel, the name by no means derived from *poitrine*, the chest, as often stated, for the weapon was discharged from against the cheek. The petronel or petrinal is described by Claude Fauchet (d. 1601),<sup>3</sup> who wrote towards the end of the sixteenth century as follows:

"Depuis vingt ou trente ans, lon appelle Petrinals de pareils instrumets, moyens entre les Harquebuzes et Pistolles; ayans aussi un roüet plus fort et soudain. Et lon croit que ceste arme, soit invention de bandvuiller des monts Pirenees."<sup>4</sup>

Thus, a handgun, a medium in size between the harquebus and pistol, fitted with a wheel-lock, and probably introduced from Spain. The petronel is mentioned as forming part of the armament of the army besieging Rouen in 1592. In the Hengrave inventory, 1603, it is called *pethernel*, and Nicot in his dictionary, in 1606, defines the weapon as a kind of harquebus, shorter than

<sup>1</sup> The crossbow, however, had its passionate admirers in France, as the longbow had in England, even much later than this, and Guill de Bellay, seigneur de Langey, writes in *Discipline militaire*: "L'on trouvera, plus de gens blessez et tues par le traict que par le double d'arquebusiers."

<sup>2</sup> *Du Passé et l'Avenir de L'Artillerie*, 186.

<sup>3</sup> *Origines des Chevaliers, Armories et Heraux*, 58.

<sup>4</sup> Armed bands of thieves that infested battlefields, said to have had their origin in the Pyrenees.



the musket, but heavier and of a greater calibre. There are two matchlock *petrinals*, as they are named in the catalogue at the Musée d'Artillerie, Paris: one of them, dating about the middle of the sixteenth century, the other towards the end: the calibre of each is  $\cdot 016$  metres. The petronel would thus seem to have been, like the other handguns of the period used by the heavier cavalry, of the nature of a carbine, and it is stated to have shot bullets, sixteen to the pound.

The disadvantages of the dilatory working of early firearms were such that efforts were being made at an early period of their history towards achieving a more rapid succession of fire, and double and multi-barrelled pieces begin to appear in the fifteenth century, the one, a *zwillinggewehr*, and the other, a *bockgewehr*. The barrels of these weapons are placed either side by side or in rows one over the other, and the priming for each barrel was exploded directly by hand: later each barrel had its own lock. Many early repeating guns are scheduled in the zeugbücher of Maximilian, and others are shown in Codex icon. 222, at Munich, in the Hof- und staatsbibliothek there. A three-barrelled harquebus, the barrels placed pyramidically, appears on page 127, of Codex 10,824, in the Hofbibliothek at Vienna, and another, illustrated in the same record, exhibits a landsknecht, holding such a weapon under his right armpit, his left hand grasping a forked rest, on which the harquebus lies: the *haken* or spur is placed against it, so as to break the force of the recoil. There is another form of repeating handgun wherein two or even more charges, lodged in the same barrel, were fired one after the other, in such a manner that each charge had its own flashpan, communicating by a channel along the barrel. The charges were separated by strong wads, that nearest the muzzle being first exploded and so on. The arrangement failed to work well in practice for the uncertainty in sealing often brought about a common discharge; and such weapons soon came to be regarded as the playthings of the gunsmiths of the period and indeed were little more than experimental and soon discontinued. All these repeating handguns were used greatly in hunting. Actual examples may be seen at Nuremberg and in several other large

collections. In a manuscript in the British Museum, entitled *Thinges Nedefull for this Present State*, by John Mountgomere, addressed to the earl of Bedford, and dated in 1562, two statutes are adduced. The first, 6 Henry VIII, enacts that "Whosoever shall shoot in, or keep in his house, any handgun or crossbow, without the king's licence, shall forfeit the same and ten pounds for every shoot, unless he hath to the value of 300 marks." The second, 14-15 Henry VIII runs "any person that hath lands to the yearly value of one hundred pounds may shoot in crossbows or handguns, notwithstanding the statute of Henry VIII, and former placards,<sup>1</sup> granted by the King for shooting in either of them, shall be void." Another statute, 33 Henry VIII, is important as showing the revolution that was being steadily worked by firearms. The act declares that "murders, robberies, felonies, riots and routs with crossbows, little short handguns and little harquebuts have become rife to the great peril of the king's loving subjects, and also that divers keepers of forests, chases and parks, and others, have laid aside the good and laudable exercises of the longbow; and now of late evilly disposed persons ride and go on the highways and elsewhere, having with them crossbows and little handguns, readily furnished with quarrels, gunpowder, fire and touche." To reform such abuses, therefore, the qualification of £100 per annum is repeated, for the use of the crossbow, handgun, harquebut and demi-sake; "and the handgun, stock and barrel, must be one yard in length; and the harquebut and demi-sake three-quarters of a yard." The act not to extend to shooting at butts, etc.<sup>2</sup> The last clause is probably a misreading of the act, for both the handgun and demi-sake were shorter than the harquebus. There are scheduled in the inventory of 1547, taken at Westminster, "380 Italian peces, guilte, without chambers, furnished with touche-boxes, etc; and 116 with chambers"; while at Greenwich were 100 Italian matchlock pieces. Italy made excellent small-arms in the sixteenth century, though not, perhaps, so conspicuously so as in the fourteenth and fifteenth, for Spain was now a competitor; and it

<sup>1</sup> Licences.

<sup>2</sup> *Archæologia*, xlvii, 210.

would seem that most of the great improvements in small-arms in the sixteenth century, after Germany, are due to Spain. Good work of this kind was also done in England, for it is stated in the Tower inventory of 1559 "that the pieces made within the realm were double as good as any other." In 1544 Henry VIII purchased 1,500 harquebuses from Brescia.<sup>1</sup> The great centres for the manufacture of small-arms, besides Germany, Spain and the Netherlands, were Milan, Brescia, Pignerol (Pinerola) and Lucca, and in France, Metz and Abbeville. Brantôme<sup>2</sup> gives the preference to those made at Milan above all others. The nomenclature of many of our small-arms is derived from Germany and Flanders, and these countries being so much nearer our own than Italy and Spain, it is but natural that we should have drawn the bulk of our foreign requirements of firearms from thence.

It was not before the middle of the century under review that handguns were being made strong enough to discharge a projectile capable of penetrating a harness of proof, but when the combination of stronger and more accurately made weapons, together with an adequate and more uniform quality of powder had been attained, plate armour fell steadily into disuse in campaigning. The influence of firearms on this decline has been much exaggerated, for there were other important contributory causes, into which I must not enter here. In 1566 the proportion of German infantry carrying firearms was about one eighth, and in that year it is stated that doppelhaken of copper or iron shot four-ounce balls: the weapons were four feet long, and no heavier "than a sentinel could comfortably carry during the length of a watch." The hakenbüchse was rather shorter, and shot one and a half- to two-ounce balls, both weapons being used with rests. Halbe-haken and handbüchsen (handgonnes), were lighter weapons of smaller calibre, shooting bullets varying from three-quarters of an ounce to an ounce or thereabouts. A German regimental order-book of 1564 gives the weights of the bullets for doppelhaken at one-eighth of a pound; those for hakenbüchsen at one-twelfth of a pound, and handrohre and halbe-haken

<sup>1</sup> *Archæologia*, li, 230.

<sup>2</sup> Under *Courounils*. Colonels General.

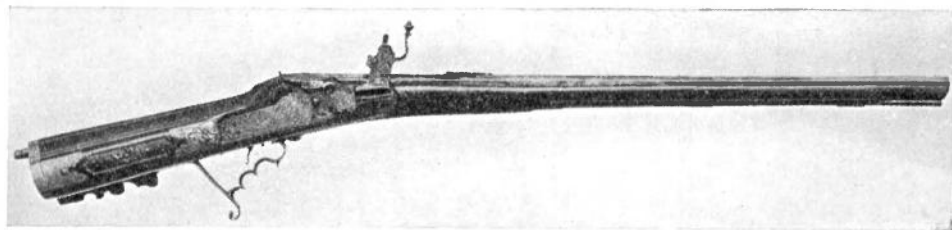
at one-twentieth of a pound. The bullets of the arquebuse in France at that time are stated to have weighed eleven grammes or forty-eight to the *livre*; these, of course, being for cavalry weapons. There were also "short strong handguns," the name of which is not given, about a "shoe and a half" long, roughly a foot and a half, for they were "working shoes"; the bore, that of "a little hen's eye"; the barrels were charged with several bullets, up to twelve or even fifteen, and the weapons used with portable rests. The following handguns are scheduled in German inventories of about the middle of the century: *zielbüchsen* and *standbüchsen*, which were *scheibenbüchsen*, i.e. guns for target-practice; and they were usually rifled and were discharged from a stand: *pirsch-*, *birsch-* or *pürschbüchsen*,<sup>1</sup> also rifled, were weapons for big game; but to judge from the numbers entered in arsenal inventories, they were probably used for military purposes as well. Such records usually contain a number of entries of sporting guns, right through the century, weapons doubtless stored there for the use of hunting parties at the various courts. A *pirschbüchse* in the possession of the writer is illustrated in plate 1, no. 1. It is fitted with a wheel-lock, handsomely engraved, and is rifled in eight spiral grooves: it has an octagonal barrel, 33 inches long; total length of piece, 48 inches; calibre  $\frac{5}{8}$  inch, breech and muzzle sight; weight 15 $\frac{1}{4}$  lbs; enriched brass mounts. *Soldnerbüchsen*<sup>2</sup> are the infantry handguns of about the middle of the century; and they were stored in large numbers in arsenals. The weapon is an improved harquebus, like the caliver, and in the second half of the century the barrel was lengthened, and the gun called a *langerohr*, literally a long-barrel. The longer barrels at first gave better results; but, as in ordnance, the thing got overdone. The *faustrohr* (fist-gun), freely mentioned in inventories of the second half of the century, is the reiter's pistol: and the *faustling* or *fusterling*, its diminutive,<sup>3</sup> is a smaller pistol. These weapons, discharged at arm's length, are further commented on under the heading of pistols.

Gunpowder began to be granulated during the first

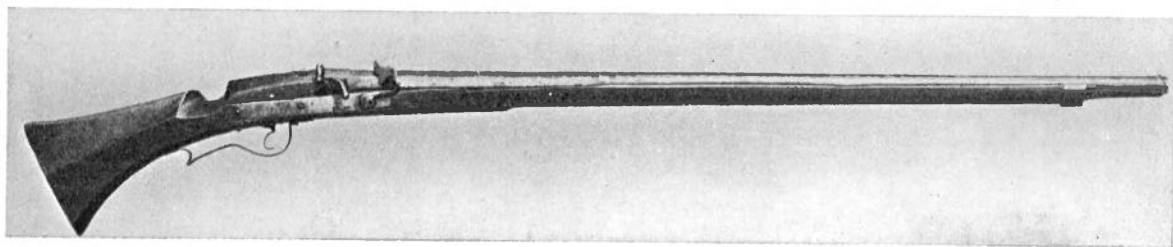
<sup>1</sup> The name derived from *birsch*, a stag.

<sup>2</sup> *Soldner*, an infantry soldier.

<sup>3</sup> *Feuerrohre* and *faustlinge* are mentioned in the Giesen inventory of 1568.



NO. 1. A PIRSCHBUECHSE IN THE POSSESSION OF THE WRITER.



NO. 2. A CALIVER IN THE POSSESSION OF THE WRITER.

quarter of the fifteenth century,<sup>1</sup> but it would seem to have been but sparingly used in that condition until early in the sixteenth, when "fyne corne" was employed for priming, and "grosse corne" for the charge. This involved the carrying of a "touche-box," sometimes combined with a "spanner" for the wheel-lock. Gunpowder was being made in three grades in 1521; "serpentyne," "grosse corne" and "fyne corne." The process of granulation was quite simple, namely, that of pressing the powder through sieves, reticulated to different sizes, the largest grain being used for ordnance, the second for the larger handpieces, the third for the smaller, and the meal-grain for priming. The cost per pound in 1512 was as low as threepence halfpenny; a parcel having been bought at that price by the English government from Francis di Errona, a Spaniard, and purchases were made in 1514 at fourpence.<sup>2</sup> In the Tower inventory of 1559, the following entry occurs, "800 lbs. serpentyne powder at eightpence the lb; and 475 lbs. corne powder at tenpence." Up to well into the second half of the reign of Elizabeth, gunpowder had been chiefly imported from Spain, but when that country had assumed a threatening attitude towards England, the crown began to grant licences for its manufacture. The first powder-mills of importance were established by George Evelyn, at Long Ditton, near Kingston, Surrey; at Leigh Place, near Godstone, and others at Faversham, in Kent. George Evelyn, John Evelyn and Robert Hills were granted a licence for making powder in 1589, the year after the Armada. This licence was revoked in 1596, but renewed, by letters patent, in 1599, to John Evelyn and others.<sup>3</sup>

In the inventory of 1559, are scheduled "harquebutts à croche, 80; double-harquebutts,<sup>4</sup> 80; guilt harquebutts, 397; to be new bought within the realm, 400; . . . . . curriens, 400; daggs, 3,500; to be provided in Flanders, 300; matches, 19,337." The striking feature of this list is the number of daggs in store, so soon after the commencement of the second half of the century; a circumstance, perhaps, tending to show that these weapons

<sup>1</sup> *Archaeological Journal*, lxvi, 151.

<sup>2</sup> *Archaeologia*, li, 227.

<sup>3</sup> *Proc. Soc. Antiq.* 2nd series, i, 172.

<sup>4</sup> Double-hakes.

were then short handguns for cavalry, like the early faustrohr, a weapon discharged at arm's length, like the pistol; the prototype, in fact, of that weapon:<sup>1</sup> and possibly the name "dagg" or "tacke" had descended to a variety of the pistol a couple of decades later. The "handgonne" or demi-hake merges into the pistol, and it is impossible to draw any very decided line between the two. The mention of currions in the inventory will be observed. Considerable quantities of match-cord were kept in store; for the consumption was great and it is stated that a man's match, when near the enemy, burnt at the rate of nine inches in an hour.

Towns and even villages were requisitioned to supply men and arms: thus, in the year 1569, the parish of Yoxhall, in Staffordshire, is called upon to furnish "pikemen 3, bilmen 5, harquebuses 9."<sup>2</sup>

#### GUNLOCKS.

The very important item in the history of handguns, that of gunlocks, has been ably dealt with by Viscount Dillon, in the *Journal*, 1893,<sup>3</sup> and I have been greatly indebted to the treatise, which contains many illustrations of locks in the Tower, and the mechanism of each is clearly described. This branch of the subject is somewhat complex, and can only be treated generally in these notes; for the varieties and combinations in gunlocks are simply endless. It is impossible to trace with any absolute certainty the country of origin of any of the main locks; for during the first half of the century under review, and even earlier, Spain, Flanders, Italy, Germany, and Switzerland were each eagerly on the look out for new departures in weapons of war, and any improvements in gunlocks were rapidly assimilated by the others; still most of these countries were greatly dominated by types, which each strove to render more efficient. At length the flintlock became generally adopted by all.

<sup>1</sup> The name *faustrohr* or *fustrohr* descended to the reiter's pistol.

<sup>2</sup> Grose's *English Army*, i, 124.

<sup>3</sup> *On the Development of Gunlocks, from examples in the Tower*, l, 115.

In my previous paper reference is made to an experimental weapon, believed to have been designed by Martin Merz, a celebrated director of firearms of his day. It is illustrated in Codex Germ. 599, a record bearing the year of date 1475. The handgun is fitted with a lock, the inner mechanism of which is protected by a lockplate, hiding it from view, so that we do not know on what system it was worked. The same weapon shows other important improvements, usually ascribed to the sixteenth century. The pan is provided with a lid, moving on a pivot; there are breech and muzzle sights; a needle for clearing out the touchhole is attached to the stock by a chain, while a ramrod fits into a socket, running along the underside of the piece: all which improvements were put in practice, more or less, about the end of the fifteenth or early in the sixteenth century.

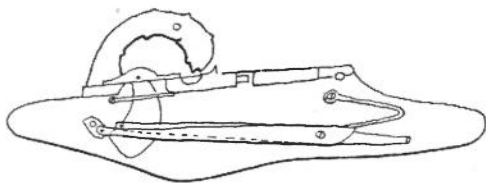


FIG. 4. THE MATCHLOCK ( $\frac{1}{3}$ ).

Gunlocks for ordnance were being made at the Tower by Cornelius Johnson in 1521.<sup>1</sup> The gunlocks of this century will now be described in their probable chronological sequence. As far as is known the earliest form of matchlock, worked on a system of springs and levers, which came into actual service in campaigning, was one in which the cock was released by a pressure on a button, placed on the outside surface of the lockplate: this brought a spring into action, and caused a small projecting bar or catch, holding back the trigger when the lock is set, to recede through a hole in the plate into the lock: this set the sear free, and the cock fell on the pan, in the direction of the butt. The button-lock is fitted to the

<sup>1</sup> *Archaeologia*, li, 227.



weapon shown on fig. 2; and it would seem that this variety of the matchlock prevailed in Germany from, say, 1505 to 1520, perhaps longer. The matchlock with which we are familiar had a long career, fitted to weapons for the infantry; for it continued in use, in the English army, until the reign of William III, in spite of the invention of other locks wherein the priming was exploded in a self-acting manner. The mechanism of the lock, as shown on fig. 4, is quite simple and inexpensive in character; it did not easily get out of order, and varied but little from start to finish. It consists of a cock, a tumbler, a sear, and two springs; the inner end of the sear works in the tumbler, and when the cock attached to its axle has been pulled back, a pressure on the trigger causes the tumbler to revolve a quarter of a circle, bringing the cock, with its match, to the priming. The sear is kept set by a small spring. In some of the earlier locks the pan-cover is moved to and fro by an arm attached to the sear, but in the case of many later examples the pan-cover is manipulated directly by a finger. The lock had serious drawbacks: it was dilatory in action, the match had to be kept burning, and it was necessary for the marksman to regulate the length of his cord, then knock off the ash and blow the match. The lock too was so influenced by rain as to be practically useless in very wet weather, and the lighted match kept troops constantly in evidence, making anything in the way of a surprise practically impossible. The last-named objection was, however, partly overcome by the use of the matchbox, a tin or copper tube pierced with holes, which masked the light to a great extent, but leaving a glimmer by which troops could be localized by an enemy. There is a variety of the matchlock, exhibiting points of contact with the button-lock, that was much used in Germany in the second half of the sixteenth century: this was the *schwammschloss* or *luntenschnappschloss*, an example of which may be seen in the Tower of London, in no.  $\frac{12}{18}$ <sup>1</sup>. The lock was mostly fitted to the *langerohr*, the improved and lengthened infantry harquebus of the period, often

<sup>1</sup> In Viscount Dillon's paper on gunlocks in the *Journal*, I, he gives a drawing of another example of the lock (fig. vi.) in

the Tower (no. 12), the date of the piece to which it is fitted, 1562, being placed on the barrel.

in combination with an ordinary matchlock or a wheel-lock, and it is freely mentioned in inventories of the second half of the century, notably in those of Giesen of 1568, and of Würzburg of 1589. The schwammschloss (literally tinder-lock), takes its name from the piece of match or tinder usually held in a small tube fixed between the jaws of the cock. A burning match-cord or other means of igniting the tinder in the tube is held in the marksman's hand, for use as required. The schwammschloss was considered in Germany to be surer than the ordinary matchlock. The working and mechanism are as follows: the cock has at its base an oblique claw or crank, and on pulling back the cock the claw catches on a pin or bar inside the lock: it is thus held fast and the spring depressed. A pressure on the sear forces the pin holding

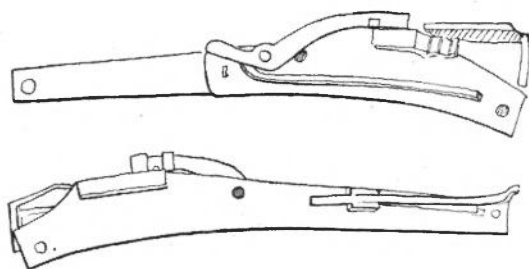


FIG. 5. THE SCHWAMMSCHLOSS ( $\frac{1}{3}$ )

back the cock to a position outside the lock, through a hole in the lockplate, thus releasing the cock, which by the recoil of the mainspring on which it rested, snaps sharply to the pan. Fig. 5<sup>1</sup> illustrates an early lock of this kind, now in the museum at Graz. The example is quite similar to the one in the Tower, no.  $\frac{1}{5}$ <sup>2</sup>. The change from this lock to one evolving sparks by the sharp contact of flint with steel was but slight; for it only needed a piece of flint in the mouth of the cock, instead of the tinder, and an anvil for it to strike on: indeed it seems in every way probable that the idea of the snaphaunce had its inception in the luntenschnappschloss. The lock

<sup>1</sup> Copied from Thierbach's *Über die Entwicklung des Steinschlusses*, *Zeitschrift*, iii, 305.

is in many varieties: a langerohr in the collection at Nuremberg, dating in the last quarter of the century, fitted with a double lock, the main one being a schwamm-schloss, is illustrated in fig. 3. The total length is 1.69 metres; of barrel 1.29 metres; weight 4.76 kilogrammes; it has a long sear, and breech and muzzle sights. As far as is known, the matchlock was never applied to pistols, except in the case of the pistol shields "targetts steilde w' gonnes," examples of which are in the Tower of London; though Captain A. C. Tupper, F.S.A. found in 1870 a model of an Italian pistol fitted with a matchlock when digging coprolites in a field not far from Cambridge.<sup>1</sup>

The long sear, which continued for so long in general use, was much in the way, and apt to catch in the marksman's clothes, and thus to discharge the piece involuntarily. It lingered long, but had to give way to the small trigger, and the long sear, which ceased its connexion with the levers inside the lock, at length became the trigger-guard. German woodcuts of the second half of the century depict the infantry of the period as still mostly carrying guns with long triggers. The weapons all have long barrels.

The short handgun used by horsemen in the second half of the fifteenth century, the priming of which was exploded by a match held in the hand, or brought to the pan by the serpentine, moved to it by a finger, were methods far too cumbersome for working on horseback; and the matchlock was little better; so the great desideratum was to supply a more direct means of discharge. For this purpose the wheel-lock was found to be a very great improvement; and its adoption for the pistol brought the cavalry arm into great prominence and importance, and indeed, may be almost said to have created those companies of reiters and pistoliers which played such a great part in the military operations of their day. The main idea governing the invention of the wheel-lock was that of getting rid of the lighted match altogether, by producing the fire for exploding the priming in a self-acting manner: the sparks for its ignition were obtained by the friction of the grooved edges of a steel wheel, in

<sup>1</sup> *Proc. Soc. Antiq.* 2nd series, iv, 245.

a state of rapid rotation, against a piece of pyrites held in the mouth of the cock.

It is commonly stated that the lock was invented by a certain Johann Kiefuss or Kufuss, in the year 1517, but I am not aware that the statement has any historic warrant: I should say that it has none, for the story would locate Kiefuss variously at Nuremberg and Vienna. We all know how the carrying on of crafts ran in families, from generation to generation, and a Georg Kiefuss of Nuremberg, who died in 1600, is credited with having greatly improved the lock: perhaps he was descended from an earlier locksmith, Kiefuss or Kufuss, the exact spelling does not matter.

Leonardo da Vinci's description of the lock cannot be later than 1517, and was probably some years earlier: he died in 1519. The year 1517 is, however, not far from being correct, though I am inclined to think with Hefner that it is nearer the beginning of the century, and that the invention is German: all the old locks of this kind have been found in Germany, and many of them bear the Nuremberg stamp. German records preserved do not, I think, make any distinct mention of the wheel-lock before 1532, when George the Pious, margrave of Brandenburg, in a letter to the Rath, at Nuremberg, requests that body to prohibit the use by travellers of "*feuerschlagende*,"<sup>1</sup> and other firearms;<sup>2</sup> and it is clear from this that the lock was in general use in Germany in the year mentioned, and surely for some time before. The inventory of Edward VI schedules "one chamber-pece with a fierlock," that is, a breech-loader, with a wheel-lock, the German equivalent for that lock being *feuerschloss*, a term transferred in the seventeenth century to the flintlock. A wheel-lock, which belonged to a Mr. Thurkle, was exhibited in London, with the presumed year of date, 1509, incised; but the presence of a double feed would tend to throw considerable doubt on the inscription. It is now the property of Major V. A. Farquharson, F.S.A. and deposited in the Victoria and Albert Museum. As far as is known, it is the

<sup>1</sup> The term "*feuerschlagende*" (fire-striking) here refers to the wheel-lock; but in the third quarter of the century the

name was transferred to the snap-haunce, to which it is obviously more appropriate.

<sup>2</sup> *Quellen*, 120.

only example so inscribed. Whatever the explanation may be as to the presence of the numerals 1509, such, perhaps, as the rubbing off, by frequent cleaning, of the stroke of a 6 or the tail of a 9, it would seem that the lock is by no means an early one, and Major Farquharson takes this view also. There are wheel-locks in the Tower dating from about the middle of the century, a rifled arquebuse in the Musée d'Artillerie, Paris, bearing the year of date 1542, and an example from the castle of Osterstein, near Gera, now in the museum at Nuremberg, dated 1541; but several undated examples in that and other collections are obviously older than these, some of them going back probably to the first quarter of the century. One of these old locks is fitted to an early

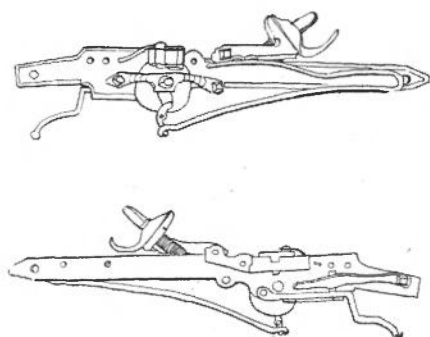
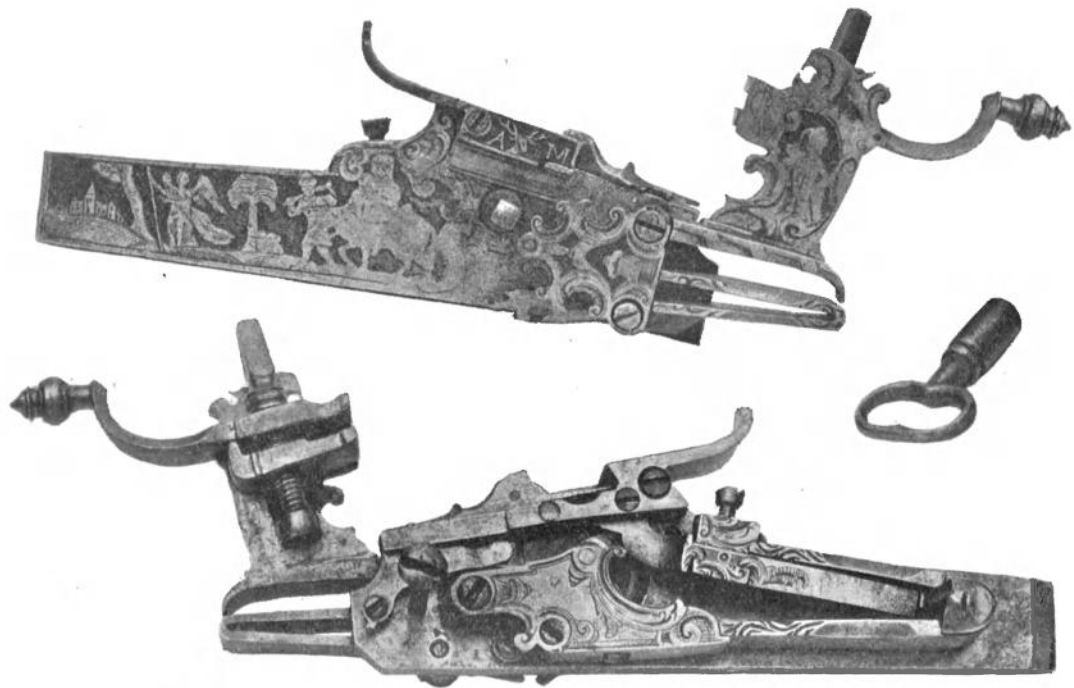


FIG. 6. THE OLDEST KNOWN WHEEL-LOCK ( $\frac{1}{3}$ ).

faustrohr<sup>1</sup> now at Nuremberg, the weapon being illustrated in fig. 8. The late Oberst Thierbach, in a paper entitled *Die älteste Radschlösser deutscher Sammlungen*,<sup>2</sup> gives a drawing of the lock, and his illustration is reproduced on fig. 6, showing the lock in two positions, outside and inner-side. The main distinction between this example and later wheel-locks lies in the fact that most of the mechanism is placed outside the lockplate. The wheel is 3 centimetres in diameter, and 2 $\frac{1}{2}$  mm. thick. This specimen presents some superficial features of transition from the matchlock, and exhibits points of contact

<sup>1</sup> Described under the heading of pistols.

<sup>2</sup> *Zeitschrift*, ii, 138.



WHEEL-LOCK IN THE POSSESSION OF THE WRITER.

with the lock illustrated on fig. xi in Viscount Dillon's notes on gunlocks.<sup>1</sup> The general form of the faustrohr, the primitive pistol to which the lock is attached, would indicate a date in the first quarter of the sixteenth century. Major Farquharson has a lock apparently as old as that shown on fig. 6, bought at Vienna at the sale of the Franz Thill collection. Oberst Thierbach gives an illustration of it in the paper just mentioned, and his estimate as to date is 1520-1530.

A light variety of the lock, similar in character to the foregoing, stated to be of Courland origin, is called a *Teschinka* by Thierbach and others.<sup>2</sup> Plate II exhibits a detached lock in the writer's possession, made for a sporting gun. The lockplate bears the maker's mark, a stag's head between the letters A and M, and the cock is enriched with the figure of a cavalier, cut in low relief, besides other ornamentation, while the lockplate is embellished with a realistic representation of the Flight into Egypt. The inner side of the lock is also ornamented. The wheel-lock works as follows: a chain, for winding on the shaft or axle of a steel wheel lying under the flashpan, is turned by a key or "spanner"; one end of the spanner has a deep squared hole, like that of a watchkey, corresponding with the outer end of the shaft projecting beyond the lockplate: the process of winding brings the mainspring attached to the axle to a state of tension, and it is kept so by the nose of the sear catching in a cavity in the side of the wheel when wound up to the depression, thus holding the lock set. The pan is uncovered on the turning of the wheel by means of a projection on the axle of the tumbler, on which the wheel is set, bearing on a lever; the pan is primed and the cock, with a piece of pyrites adjusted in its mouth, brought over it and held down to it by a spring. To release the lock, a pressure on the trigger withdraws the nose of the sear from the notch in the wheel in which it had reposed, thus freeing the wheel, which then, through the recoil of the spring, spins rapidly round, its outer edge revolving through a hole in the bottom of the pan: the sparks generated by the friction

<sup>1</sup> *Archaeological Journal*, I, 115.

reliable inventory at Dresden, as mentioned

<sup>2</sup> The name appears in a very old and in *Handfeuerwaffen*, 27.

of the pyrites against the grooved periphery of the wheel fall into the pan and explode the priming. When the lock is not required to be used, a small lever, on being moved upwards, fixes it, while a downward movement renders it immediately available, on the trigger being pressed. The spanner is sometimes combined with a "touche-box," to measure the quantity of powder required for the priming, or fitted with a useful tool, such as a prod or a screwdriver. A ram's-horn powder-flask fitted with a spanner was exhibited before our Society in 1852.<sup>1</sup> The wheel-lock does not alter much structurally throughout its career, though there are a large number of varieties. It had, superficially, a transitional stage, recalling some of the features of the matchlock; and there were many modifications and additions of a minor character, in various combination. Among the improvements from the earliest stage we know of, we find the mechanism placed inside the lock; the pan-cover moved mechanically; a flashguard added, to shield the marksman's eyes; and the addition of the double, or hair-trigger, the tricker-lock or *stechschloss*, stated to be a Munich invention of 1543, though there is an arquebus at Paris, dated 1542, supplied with it. The hair-trigger is rendered available by a pressure on the main trigger, after which a very slight pressure on the former sets the mechanism in motion. The lock was sometimes set by the pulling of a string, and there are several processes for self-acting spanning; and safety methods for keeping the lock set, so as to avoid any involuntary discharge. The subject is an endless one. Pyrites (bi-sulphate of iron) was used in the cock in preference to flint, for the reason that it would not wear away the edges of the transverse cuttings of the steel wheel to the same extent, owing to its friable nature, but this brittleness of the mineral was the cause of the lock so often missing fire. All gunlocks invented before the percussion-lock shared in this unreliability, and various combinations were attempted to obviate the disadvantage. Some handguns were supplied with two cocks bearing alternately on the same wheel, while others were fitted with two or even three complete

<sup>1</sup> *Archaeological Journal* ix, 305.



locks set on one plate ; or instead of a second cock, we have a combination of matchlock and wheel-lock, worked by a further pressure on the wheel-lock trigger. There is no case on record, we believe, of the wheel-lock and flintlock having been used in combination.

The costly nature and intricacy of the wheel-lock, made up of as many as eighteen different pieces, including three springs, together with its liability to miss fire, stood in the way of its general employment with infantry weapons ; for it was customary for each soldier to find his own gun, the state supplying the powder, lead and matchcord or pyrites, as the case might be ; moreover the scale of wages paid to each man varied according to the excellence or otherwise of his handgun. In 1547, "hagbutters," who are to have eightpence a day, finding their own weapons and powder.<sup>1</sup> Another objection to the lock lay in the frequent necessity for taking it to pieces to be cleaned, which tended in course of time to make its action less steady and reliable. The edges of the wheel, revolving in the bottom of the pan, would soon clog the lock with the slimy residue of the powder, so as to make frequent cleaning imperative. The wheel-lock was usually fitted to the handguns of the bodyguards of princes, and to those used at target-practice, and by sportsmen and travellers. That locks of this kind were often kept unattached is best shown by the careful ornamentation of the inner sides ; while the lockplate, cock and even spanner were profusely decorated. Locksmiths would seem to have kept considerable numbers in stock for their customers, as well as to exhibit samples of their skill ; and it is probably for these reasons that so many unattached locks have come down to us. The cost of an ordinary wheel-lock at Dresden in 1592, was 4 fl. 12 gr.<sup>2</sup> but some highly ornamented examples were very costly. The wheel-lock continued in use for sporting purposes into the third quarter of the eighteenth century, perhaps even later.

The snaphaunce is a much simpler, cheaper and surer lock than the wheel-lock. It is impossible to draw any very decided line between it and the familiar flintlock,<sup>3</sup>

<sup>1</sup> *Archæologia*, li, 230.

<sup>3</sup> *Steinschloss, batterie, or French lock.*

<sup>2</sup> *Die geschichtliche Entwicklung der Handfeuerwaffen*, 22.

for both are constructed on the same principle, and the difference is superficial in character. The flintlock proper was found to be an improvement on the older method, for Markham, in his *Souldiers Accidence*, written in 1645, observes that if firelocks cannot be procured snaphaunces will do.<sup>1</sup> The Netherlands lock consists of as many as fourteen different pieces, that of Spain numbering nine only. Both these countries claim the honour of the invention of the snaphaunce, and the name itself might be considered a point in favour of the Low Countries: but the lock was known in Germany at an early period of its history as *das Spanische schnappschloss*, though it was never widely used by the Germans. The lock was certainly adopted by Spain very early, if, as is most probable, it had not its origin there: pistols fitted with it were being made in Scotland in the third quarter of the century. The French and Italians were early users of the lock, which had become fully developed before the middle of the seventeenth century. France is mostly credited with the forming of the steel *batterie* in one piece with the pan-cover, and the flintlock was often styled the French lock. As already stated the principle governing the working of the snaphaunce is the sharp snap-action present with and probably inherited from the schwammschloss or luntenschnappschloss, a description of which has been given. All that was needed to convert the one into the other was the substitution of a piece of flint in the jaws of the cock in place of the tinder, and an anvil for it to strike on. The various stages of development from this simple form to the more complex flintlock are well described in a paper by Oberst Thierbach.<sup>2</sup> The snaphaunce does not owe its name or invention to any marauding Dutch poultry-snatchers, as is often absurdly stated. The word *schnapphahn* means simply snapcock, and expresses the smart snap action of the cock bearing on the steel anvil, the contact producing a shower of sparks, which fall on the priming in the pan, and the word became corrupted in England and elsewhere, like the names of so many other weapons having their origin

<sup>1</sup> The term "firelock" is applied to the flintlock and not to the wheel-lock in the seventeenth century.

<sup>2</sup> *Zeitschrift*, iii, 305.

in other countries. The lock was probably invented between the years 1525 and 1535, not much later than the wheel-lock, and it is surprising that it took so long to make its way, more especially against the matchlock. The earliest English mention of it is, we think, in 1580, in connexion with the equipment of some troops for Ireland;<sup>1</sup> and Mr. John Hewitt<sup>2</sup> refers to a payment by the Chamberlain of Norwich, in 1588 "to Henry Radoe, smyth, for making one of the old pistols with a snaphaunce and a new stock for it." In the Würzburg inventory of 1584 a large number of handguns, originally furnished with matchlocks and tinder-locks, had been gutted and fitted with snaphaunces. Five snaphaunces are scheduled in the Hengrave inventory of 1603. The earliest dated locks of the kind preserved are, we think, on a pair of Scottish pistols in the museum at Dresden,<sup>3</sup> which bear the year of manufacture, 1598: the springs are outside the plate, the pan uncovering as the cock descends. The earliest dated example in the Tower of London is of the year 1614. There is a fine collection of models of locks at the arsenal at Dresden, and one of pistols at the Johanneum there.

In 1581 the combined entries in the arsenal-books of Dresden, Leipzig (Pleissenburg), Wittenberg, Pirna (Sonnenstein), and Zwickau show the following numbers and varieties of handguns stored in these towns at the time, together 11,425, comprising 3,160 rohre, with schwamm-schlössern; 1,348 rohre, with feuerschlössern; 644 doppelhaken, with schwammschlössern; 42 faustrohrlein, with feuerschlössern; 74 Spanische rohre, with feuerschlagendem-schlösse; 6 muster-rohre (sample guns), with feuerschlössern and schwammschlössern;<sup>4</sup> 3 rohre with 3 cocks "für drei schüsse"; 1 rohre with 2 cocks, "daraus kann man drei schüsse thun"; 4 rohre, für zwei schüsse, etc, etc. The rohre are langerohre, similar weapons to the caliver or perhaps the currier: the faustrohrlein, pistols of small size; and the muster-rohre, sample weapons which had been sent in advance, with guarantee of bulk to be delivered, both as to general quality, and a strict adherence to a standard

<sup>1</sup> *Proc. Soc. Antiq.* xvii, 108.

<sup>2</sup> *Ancient Armour*, iii, 657.

<sup>3</sup> Wall-case xi, 316.

<sup>4</sup> The term *feuerschlagende* was applied to wheel-locks in the first half of the century, afterwards snaphaunces were meant.

calibre. Three kinds of locks are mentioned, wheel-locks, tinder-locks and snaphaunces, the last-named fitted to Spanish rohre. The two first-mentioned locks are in combination.<sup>1</sup> The ordinary matchlock does not appear.

Bandoliers or bandileers are cases of wood, leather, copper or tin, holding measured charges of gunpowder, eleven or twelve of them being strung on a necklet, or on a "baudricke or border," worn across the body. The invention is probably due to the Dutch or Walloons, and the earliest record of their use appears in the *Triumph of Maximilian*, where they are shown as being carried in the first-named position. In the inventory of the goods of Sir Thomas Ramsey, taken in 1577, "iij bandilyeres" are scheduled. Actual specimens may be seen at Dresden. By the courtesy of Mr. W. B. Redfern, D.L. of Cambridge, an illustration of a set belonging to him is given on plate III. Cartridges began to come into use in the second half of the century. At first they were of powder only, but ball was added towards the end. An apparatus for making them, dating from about 1590, may be seen at Dresden.

Powder-flasks, with chambers for the measured charge, are also shown in the *Triumph*, and examples are given in the zeugbücher of Maximilian. They are first circular in form, but later three-cornered. Much ornamentation was often lavished on them, and they were frequently enriched with an inlay of bleached stagshorn. Plate IV illustrates a flask of the sixteenth century in the writer's possession, exquisitely inlaid in this manner, and fitted with two staples for a strap. It is circular in form, bound round with iron, and measures five inches in diameter: the charge tube closes with a spring snap, and attached to it is a curved pin for clearing out the touchhole of a handgun. The flask had an advantage over bandoliers in that it kept the powder dry. A bullet-bag was carried on the right hip, and the powder-flask was slung to the belt.

In my first paper<sup>2</sup> it is mentioned that the process of rifling barrels, by cutting long straight grooves lengthwise, dates from the closing years of the fifteenth century, if not earlier, but such parallel grooves would not lend any rotary motion to the projectile; and any great advan-

<sup>1</sup> *Zeitschrift*, III, 40.

<sup>2</sup> *Archaeological Journal*, LXVI, 170.



A BANDOLIER OF THE TIME OF CHARLES I. FROM THE COLLECTION OF MR. W. B. REDFERN.

tage they might possess is difficult to imagine. One of the objections to early firearms lay in their high trajectory, but early efforts were made to obviate the difficulty. It was observed, it is said, that the trajectory of an arrow from a bow was much flatter than that of a projectile from a gun. The arrow was seen to spin rapidly round during its flight, and the application to gun-barrels of rifling in spiral curves was found to produce the same effect on the projectile.<sup>1</sup> The principle is said to have been applied in 1510, but the earliest patent granted at the patent office is dated 24th June, 1635, "to rifle, cutt and saw barrels, etc." In the sixteenth century the number of curves cut varied greatly, 5, 6, 7, 8, 9, 11, and even as many as 20 or more. A barrel acquired by the Museum of Artillery, Woolwich, bearing the year of manufacture, 1547, was found to be rifled with six fine grooves, the twist being such that the bullet makes one complete revolution whilst travelling 22 inches; that is one turn in 49 calibres of 0.45 inches. The next earliest example at Woolwich is dated 1592. There are a number of sixteenth-century harquebuses in the museum at Zürich, with rifled barrels, and one, dating very early in the seventeenth, is rifled in 34 fine angular grooves: the calibre is 0.65 inch, barrel 49.6 inches long: the lock, a combination of the matchlock and wheel-lock. In the Musée d'Artillerie, Paris, is a rifled arquebuse, bearing the date 1542. Fishart, a German, claims the honour of the invention of rifling in spiral curves for Nuremberg, by August Kotter, between 1500 and 1520, while others locate it at Vienna, by Gaspard Kollner, in 1498. There are "einige geschraubte rohrlein"<sup>2</sup> scheduled in a Nuremberg inventory of 1578. The earliest dated example in the Tower of London is 1610, and at the Porte de Hal, Brussels, 1624.

#### THE HARQUEBUS.

The harquebus of the fifteenth century is described in my former paper in the *Journal*. It derives its name from the *bak* or *baken*, the spur on the underside of the

*Archaeological Journal*, lxi, 170.

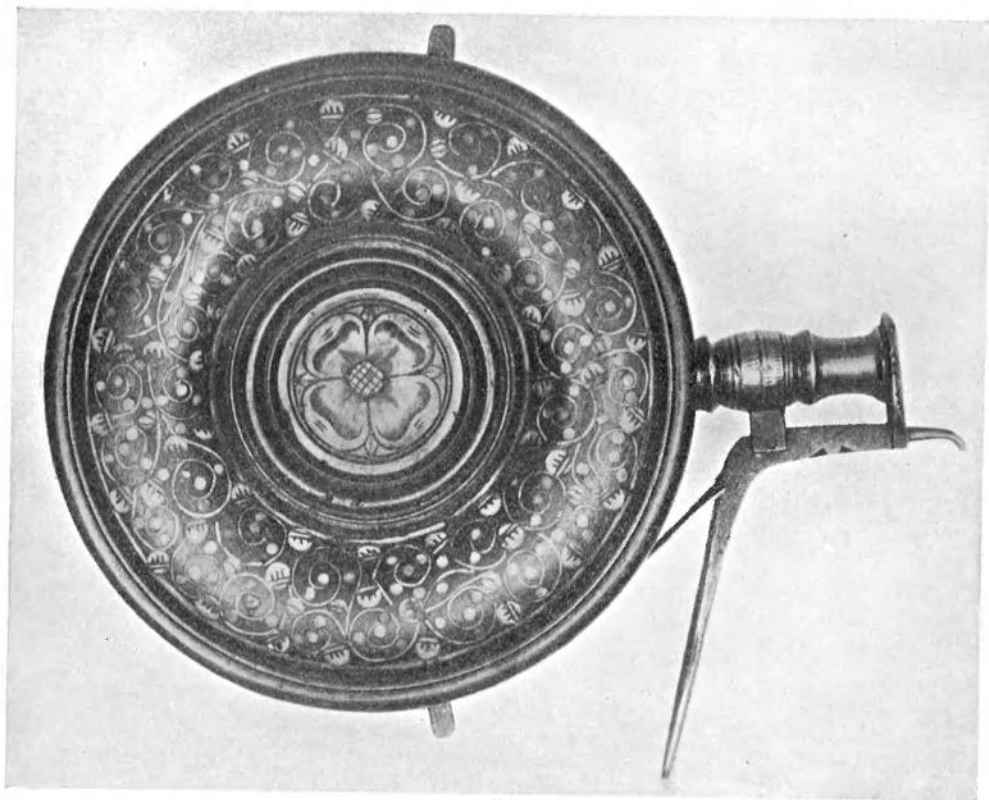
<sup>2</sup> The weapon was a small handgun of the pistol family.

piece, which was placed against a portable rest in order to break the force of the recoil. The weapon is referred to as "hakenbuchse" in a town record of Brunswick of the year 1409, and again in MS. Harl. no. 433, *temp.* Richard III, when, in an order to the Constable of the Tower, reference is made to "28 hakbushes with their frames"; the frames being the stocks. The infantry harquebus is a heavier and more powerful piece than that known specially as "handgonne." That of the sixteenth century is in several varieties, breech-loaders and muzzle-loaders: some with barrels of equal bore to the muzzle, others with expanding orifices: one kind used with a rest, another without; but before the close of the century the rest came to be dispensed with altogether, and it was transferred to the heavier musket. The Roll of the entry of Charles V into Bologna in 1530 gives a figure of a harquebusier using a forked rest.<sup>1</sup> Martin du Bellay, referring in 1521 to the meeting of the combined forces of the pope and the emperor with those of France, in the plain of Ghiara, says "De ceste heure là furent inventées les arquebouzes, qu'on tiroit sur une fourchette";<sup>2</sup> but he was probably referring to the "arquebuse à croc," for a rest had been used, with the ordinary harquebus, throughout the fifteenth century and earlier still. The usual length of a harquebus was about three and a half feet, shooting one and a half- to two-ounce balls, the weapon weighing about ten to twelve pounds. Belonging to the family are demi-hakes and double-hakes, with their German equivalents in halbe-haken and doppel-haken; but besides these the Germans had doppelte-doppel-haken, or scharf-dünklen, weapons six to seven feet long, shooting six- to eight-ounce balls, the weight of the piece being 40 to 50 lbs, with a range of 500 to 600 paces. There were also viertelhaken and streuhaken, the former four and a half to five feet long, shooting bullets each weighing four ounces. A strauhaken<sup>3</sup> would seem to be a harquebus, bell-mouthed and of large calibre. The inventory of 1547, taken at the Tower, schedules "Demy-hakes or handgonnes, cxxix<sup>m</sup>"; flaxis and touche-boxes of eche,

<sup>1</sup> The illustration is copied in Hewitt's *Ancient Armour*, pl. 120.

<sup>2</sup> *De l'art militaire*, i, 358.

<sup>3</sup> *Strauen*, to expand, scatter.



A POWDER-FLASK OF THE SIXTEENTH CENTURY.



ccxiiij<sup>or</sup>; hagbusshes à croke of brasse, iij<sup>en</sup>; hagbusshes à croke are arquebuses à croc. The French did not classify the harquebus in the German manner; their arquebuses varied in size from light cavalry pieces to heavy infantry weapons, the latter forming a connecting link between handguns and ordnance. These, the arquebuses à croc, were used with portable rests, and were served by two men: similar pieces, in fact, to double-hakes if not actually the same. At foot are some contemporary particulars of the French weapons.<sup>1</sup> Actual specimens may be seen at the Musée d'Artillerie, Paris, and at the Porte de Hal, Brussels. There is the barrel of an arquebus à croc in the Rotunda, at Woolwich, dating early in the sixteenth century, with side-vent and breech-sight, calibre 1·1 inch, weight 22·1 lbs. The "hoole-hackes" mentioned in the inventory are ordinary harquebuses, the term used in contradistinction to that of demi-hakes. Saint Luc<sup>2</sup> thus refers to the weapon used by the French cavalry, "L'arquebuse avait de longueur quatre palmes et demie, mesure de Milan, et tirait une balle pesant un tiers d'once." In 1567 "300 feuerschlagende-haken"<sup>3</sup> were purchased at Nuremberg for the Dresden arsenal, at three thalers, or nine shillings apiece.<sup>4</sup> The cost of a "harquebuch complete" in 1574 in England was eight shillings.<sup>5</sup> The harquebusier was enjoined always to have a good weapon, so that he would be able to hit a mark at two hundred to three hundred paces. An ordinance of the United Netherlands of 1599 fixes the bullet for the harquebus at twenty-four to the pound.<sup>6</sup>

<sup>1</sup> "Les harquebuttes à crochets que portoyent les gents de cheval." I. Bouchet, ch. 32. *Anno 1527*.

In 1567 "Les harquebuses à croc sont de plusieurs longueurs, et calibres et aussi faut qu'ils servent pour plusieurs effets. Les communes que l'on fond ordinairement pour le roy, ont 3 pieds 1 poulce de long ou environ. La circonference à l'endroit de la lumiere est de 7 poulces 2 lignes, sur le devant 5 poulces 2 lignes. La longueur depuis, la douille jus-ques au crochet 1 pied poulces. L'embouchure contien en

diametre 11 lignes, le boulet 6 lignes." Latreille. *Discours sur l'artillerie*, MS.

In 1620. "11 arquebuses à croc, 7 montees sur bois noir, aians environ 7 pieds de long de canon. . . . *Inventaire de l'hotel de Salin* (Gay).

<sup>2</sup> *Observations militaires*, 175, dating 1580.

<sup>3</sup> These were wheel-locks.

<sup>4</sup> *Zeitschrift*, iii, 89.

<sup>5</sup> Queen Elizabeth's instructions to the earl of Bedford of that year.

<sup>6</sup> Capt. Schon's *Geschichte der Handfeuerwaffen*.

## THE MUSKET.

The musket or musquet is believed by some to have received its name, like so many other kinds of firearms, from a member of the hawk family,<sup>1</sup> while others would derive it from an Italian gunsmith of Feltri, named Mochetta, and the weapon is thought to have been first employed by the Venetians and Genoese. It is generally stated to have first appeared in the third quarter of the sixteenth century, but Père Daniel assures us that he saw some muskets marked with the cognizance of Francis I, 1515-1547. Though similar to the harquebus in general form, the musket is larger and more powerful. Brantôme tells us in his *Biography of the Duke of Alva* that "gros mousquets" were first employed by that captain in the campaign in the Netherlands in 1568, and he also states that Philippe Strozzi, Colonel-General of the French infantry under Charles IX, introduced the weapon into the French service in 1573. The usual weight of the musket of the third quarter of the century was sixteen to twenty pounds, shooting two-ounce bullets, at two hundred paces, and it was always used with a forked rest, which was averagely about four and a half feet long, shod with a spiked iron shoe. The Netherlands musket and rest weighed sixteen pounds, shooting ten bullets to the pound. Saint Luc, in *Observations militaires*, writes "l'arme (le mousquet) avoit quatorze (quatre) pieds de long, et la balle pesait une once et deux (grammes ?) environ." In the inventory of Sir Thomas Ramsey, taken in 1577, is the entry "vi muskets w<sup>th</sup> flasks and rests." Muskets are referred to as "*musceten*" in a Würzburg inventory of 1584, and some of these weapons are mentioned as having been purchased in 1582. A year or two later they were made in Germany in large numbers, and cost four gulden apiece. In the museum at Dresden are two matchlock muskets made at Suhl about 1570. The earliest dated muskets in this fine collection are several examples fitted with wheel-locks and richly ornamented, bearing the year of manufacture, 1589, incised: they are

<sup>1</sup> *Muchetus*, the sparrow-hawk.

weapons of the guard of the elector Christain I, 1560-1591. They were made at Dresden, but the stocks are of the French type. The weight and calibre of the musket became considerably reduced towards the end of the century. The Würzburg inventory mentions other kinds of muskets, "halbe-musketen," bought at two gulden apiece, and there are "doppel-musketen." Five muskets fitted with wheel-locks and schwammschlosser, cost four gulden apiece; and a hundred half-muskets, made of old rohrlein, are scheduled. The city of Norwich purchased for the troops it raised in 1588 "xi Englishe musketts, at xxviis. apiece, with the rest, fflax and touche-boxes; xi playne muskets, xiiis. ivd. apiece." The Spanish musket had a straight stock, while that used in the French, German and English armies was bent. The recoil is said by Sir Roger Williams, in *Brief Discourse of Warre*, published in 1590, to have been less troublesome with the Spanish weapon. The barrel of a German musket is about four feet long, the same as the English: the earlier bullets eight to ten to a pound, later twelve. Sir Thomas Kellie, in *Art Militarie*, published in 1620, says "that the barrel of a musket should be four feet long, and bullets twelve to a pound." The cost of a musket at Dresden, in 1592, with wheel-lock, spanner, flask and rest, was six florins.<sup>1</sup> The equipment of a musquetier at the end of the sixteenth century comprised his weapon and rest, with bandoliers, primer, bullet-bag containing twenty bullets, matchcord and sword; and he had to go through twenty-three motions in firing: the weapon carried at the shoulder. In Spain each marksman had a servant who carried his heavy weapon and rest. Musket-arrows or quarrels were sometimes used with the musket, and such are scheduled in a Tower inventory of 1895 "musket-arrowes, 895 shefe." These arrows were much employed at sea for piercing the sails of a hostile fleet, and setting them on fire. Mr. J. Hewitt<sup>2</sup> gives a drawing of a musket now in the Tower, dating about the end of the sixteenth century. Length of piece, 5 feet 5½ inches, of the barrel 4 feet 2¼ inches.

<sup>1</sup> Thierbach's *Handfeuerwaffen*, 45.

<sup>2</sup> *Archaeological Journal*, x, 67.

## THE CALIVER AND THE CURRIER.

The caliver is an improved harquebus, with a lengthened barrel and of a uniform standard calibre. It is lighter than the musket, and about six or seven inches shorter, of a smaller calibre, and it could be discharged more rapidly. The caliver and the currier or currian were in all probability both introduced from Spain, and were used without rests. The last-named weapon is scheduled in the Tower inventory of 1559, "currians, 400;" but the other piece does not appear. The French called a caliver a *pièce de calibre* or *arquebus de calibre*, meaning a harquebus of a regulated standard of bore or calibre, in which respect it had the great advantage over the older weapon in having a uniformity of projectile, for the bullets of the earlier handgun were not interchangeable, a fruitful cause of inconvenience and even of disaster. The Germans, in the third quarter of the century, also had handguns bored to a standard calibre, as is evidenced by guarantees in this respect given by makers, such as have been already referred to. In *Things Nedefull for this Present State*, a manuscript written in 1562, which has been quoted earlier in these notes, the writer presses various reforms on the military authorities, strongly recommends these weapons, saying that the French and Spaniards, and even the Turks and Venetians, had generally adopted them, while England clung to her longbow, and even passed laws against "shooting in handguns." He also recommends "sondrie games for the said currier and harquebus, as hathe been devized in times past, and as in other countries are used, as the poppingaye, the buttes and suche like." Edmund York, an officer who had seen much service abroad, and who was employed in 1588 in training the London militia, thus remarks on the origin of the word "calliver": "We had our particular calibre of the harquebuze to our regiment in Piemont, in the countie of Brisack's regiment of Old Bandes, both for that one bullet should serve all the harquebuzes of our regiment, as for that our collonell would not be deceived of his armes, of which the word calibre came first, that inapt term in use to call a harquebuze a calliver, which is the

height of the bullet and not of the piece. Before the battle of Mountgunter,<sup>1</sup> the Prynces of the Religion caused seven thousand harquebuzes to be made all of one calibre, which was called harquebuze de calibre de Monsieur le Prince ; so I think some man, not understanding French, brought hither the name of the height of the bullet of the piece ; which word calibre is yet continued with our good canoniers.”<sup>2</sup> Sir John Smith in his *Confutations of Captain Humphrey Barwick*,<sup>3</sup> defines a caliver as being a harquebus of a “ bigger circuite,” i.e. calibre, but he says nothing about it being longer in the barrel than the harquebus, as it certainly afterwards became. An inventory of the goods of Dame Frances Talbott, taken in 1568, schedules “ Kalyvers, handgonnes and flasks, touche-boxes, and ropes of matches.” Brantôme says that Philippe Strozzi<sup>4</sup> introduced the harquebuze de calibre into the French service from Spain.<sup>5</sup> The stock of calivers in the Tower of London in 1578 was 7,000, and aboard the ships 320.<sup>6</sup> A requisition of queen Elizabeth to the sheriff of Lancashire, dated in 1584, runs : “ to levy cc footmen ” in that county for the Irish service, of which “ lxxx shall be furnished with calivers.” These weapons “ furnished with flaske and touche-box, laces and moulds,” cost 13s. 6d. apiece. In 1588 the prices paid by the city of Norwich for arming a contingent it had been ordered to provide were as follows : “ Item, to John Cork, alien, for vii calyvers with flasks and touch-boxes, at viiis. a pece ” ; “ Item, for ix calyvers, without flasks, at 5s. a pece.”<sup>7</sup> Sir John Smith, in his *Animadversions on the writings of Captain Berwick* (Barwick), says that a currier was of the same strength as a harquebus, but with a longer barrel and “ of one caliver heighthe of bullet.” Sir John complains of the imperfections of the calivers in use after the long peace, saying, “ their calivers are of divers heightes and lengthes, few of them being ranforced backwards as they ought to bee ” ; and he makes the same remarks on the muskets. Whether or not the currier was longer

<sup>1</sup> Moncontour, 3rd Oct. 1569.

<sup>2</sup> Maitland's *History of London*, ed. of 1772 (Hewitt), ii, 1229.

<sup>3</sup> *A Briefe Discourse concerning the force and effect of al manuall weapons of fire, and the disability of the Long-Bowe.*

<sup>4</sup> Colonel-General of the French infantry.

<sup>5</sup> Hewitt's *Ancient Armour*, iii, 679.

<sup>6</sup> Peck's *Desiderata Curiosa*, 76.

<sup>7</sup> Hewitt's *Ancient Armour*, iii, 680 ; *Norfolk Archaeology*, i, 11.

than the caliver is nowhere expressly stated, but we may infer that it was, for Sir John remarks on its "greate length." In 1570, Thomas Riggess, caliver maker, received £50 for making "100 calivers of old curriers, at 10 shillings each, with their furnishings";<sup>1</sup> and it is clear that these were not merely different names for the same weapon. In the inventory, several times mentioned, of the goods of Sir Thomas Ramsey, eight English and twelve Flemish calivers are scheduled.<sup>2</sup> Lord Wentworth, in a letter to queen Mary, makes mention of curriers more than once, when writing respecting the siege of Calais; and it is noted in memoranda concerning the campaign of the earl of Essex in Ireland, in the reign of Elizabeth. Plate 1, no. 2 illustrates a caliver in the possession of the writer, which is fitted with a matchlock, and is 5 feet in length; that of the barrel 3 feet 9 $\frac{3}{8}$  inches, steel mounts; weight 9 pounds 5 ounces, without ramrod, which is missing. The late Mr. John Hewitt, in a contribution to the *Journal*,<sup>3</sup> illustrates a caliver and a musket, both now in the Tower. The dimensions are: musket, length 5 feet 5 $\frac{1}{4}$  inches, that of the barrel 4 feet 2 $\frac{3}{4}$  inches; caliver, length 4 feet 10 inches, that of the barrel 3 feet 6 $\frac{1}{4}$  inches. The general form and style of both weapons is the same, and they closely resemble some others in the collection from which they were obtained, namely that of Penhurst Place, Kent. These guns have sliding pan-covers and tube sights, and bear the year of manufacture, 1595, on the barrels. In 1574 a "currier complete" cost 16s. 8d.<sup>4</sup> The equipment of a caliver-man consisted of flask, touch-box, bullet-bag, match, sword and dagger, besides his caliver. Hexham, writing in 1637,<sup>5</sup> says "forasmuch as of late yeares there are no calivers in a foot companie," so we may conclude that by that time the weapon had become obsolete: it was certainly no more heard of after the middle of the century.

#### THE CARABIN AND THE ESCOPETTE.

The derivation of the word carabin, carabine or caraben, the sixteenth century name for the short handgun which

<sup>1</sup> *Archaeological Journal*, I, 126.

<sup>2</sup> *Archaeologia*, XI, 331.

<sup>3</sup> *Archaeological Journal*, x, 67.

<sup>4</sup> Queen Elizabeth's instructions to the earl of Bedford, of that year.

<sup>5</sup> *Principles of the Art Militaire*.

developed into the carbine of later times, is disputed : some writers maintain that it came from the weapons having been used on ships called carabs, others that it was derived from a Spanish corps of horse, called carabins, which carried a short handgun and gave its name to it, others again that it came from the weapon having been first used by Calabrian troops. In *Memoires pour l'artillerie*, 1548,<sup>1</sup> we read "Et pour la cavallerye, je la distingueray en deux parties, l'une de la gendarmerye, et l'autre des cheveu-légers, et harquebuziers à cheval nommez argoletz, et par les Espagnols, carabins," Louis Napoleon writes concerning the matter,<sup>2</sup> "En 1558 chaque compagnie de gendarmerie avait cinquante arquebusiers à cheval qu'on appelait argoulets en France, et carabins en Espagne," and he further states that these cavalry weapons, in the reigns of Henry IV and Louis XIII, were called in France carabins or dragons.<sup>3</sup> Meyrick says<sup>4</sup> that in the "extraordinaries" for the war in Picardy in 1559, we first meet with troops called carabins, which were light horse in the service of Henry II of France, armed with carabins  $3\frac{1}{2}$  feet long, so named from the troops that bore them. Brantôme, in his *Biography of the Duke of Alva*, writes, "Le grand prieur estoit general de la cavallerie, composée de quatorze compagnies de lanciers, et quatre d'arquebusiers à cheval, que depuis on a appelle, parmy eux et nous, carabins."<sup>5</sup> The dragoons would appear to have had their origin towards the end of the sixteenth century, if not before : indeed Louis Napoleon<sup>6</sup> thinks to find it as early as 1543, in Pierre Strozzi having put 500 footmen, armed with the arquebus, on horseback "afin qu'ils ne se fatiguassent pas." It is thus quite clear that the troops called carabins or dragons were trained to fight either on foot or on horseback : in fact, René le Normand remarks "qu'on capitaine de carabins doit savoir les fonctions d'un capitaine d'infanterie."<sup>7</sup> Emmanuel de Meteren in his *Histoire des Pays-Bas*, in describing the battle of Turnhout in 1597, thus refers to the carabin as "arquebuses

<sup>1</sup> Bibl. Rich, MS. 7113, fo. 52 (Gay).

<sup>2</sup> *Du Passe*, etc. 199.

<sup>3</sup> Dragon was also the name of a piece of ordnance of medium calibre of the nature of a *coulevrine*. La Fons. *Artill. de Lille*, 1582.

<sup>4</sup> *Archæologia*, xxii, 81.

<sup>5</sup> Brantôme, 29.

<sup>6</sup> *Du Passe*, etc. 199.

<sup>7</sup> *Ibid.* 360.

à rouet qu'on nomme carabins." The weapon is mentioned in connexion with the siege of Rouen in 1591 and is scheduled in the Hengrave inventory of 1603. Montgomery<sup>1</sup> says, "Les carabins avoient pour arme une cuirasse échancrée à l'épaule droite, afin de mieux coucher en joue . . . et pour armes offensives une longue épée, une escopette ou carabin longue de trois pieds et demy, une pistolet à l'arçon et des cartouche à la reître": thus, as late as the reign of Henry IV of France, the light cavalry of that country still continued to discharge their weapons from against the cheek, and used the cartridge as early! We may conclude from the foregoing contemporary records that the name of the handgun "carabin" was derived from that of the troops using the weapon, and that the piece had its origin in Spain.

Regarding the escopette,<sup>2</sup> Montgomery states that the gens d'armes carried "une escopette qui portait cinq cens pas, le pistolet et l'estoc longue et roide": thus, the escopette was carried by heavy cavalry: the statement as to range must be accepted with some reserve. In the Musée d'Artillerie, Paris, is a short handgun of the middle of the fifteenth century, length of barrel 0.40 mètres, calibre .022. The weapon is described in the catalogue as "une petite scopette pour cavalier."

The military handguns of Germany up to the end of the century, most of which had their counterparts among the weapons used in England, were the various kinds of harquebus; the langerrohr, or lengthened soldnerbuchse; bockgewehre or multi-barrelled guns; kolben<sup>3</sup> or short handguns of the pistol family with one or more barrels; short handguns for cavalry; and the faustrohr or reiter's pistol, with its diminutives in smaller pistols. A raissrohr or reissrohr is a small rampart-gun of the nature of a handgun. The illustrations of Jost Amman's *Kunstlerbuchlein*, and other contemporary woodcuts, show many of the

<sup>1</sup> *Du Passé*, etc. 313.

<sup>2</sup> The escopette or escopette was a short handgun, 3½ feet long; the name inherited from *scopos* or *scloptus*, which was probably the earliest form of cannon; having its origin in Italy. The handguns for cavalry of the second half of the century were doubtless all similar in character to one another, though called by different names. Probably

there was a slight difference between those used by heavy and by light cavalry.

<sup>3</sup> The German word *Kolben* means a club or mace, and it is applied to the butt-end of a gun or pistol; but in early German records a variety of handgun was called by the name, though there is some uncertainty as to its size and form.



weapons as being still fitted with long triggers. As the century advances the tendency of the calibres of handguns is to lessen, and the weapons to become lighter. The conditions of purchase of a parcel of handguns for the arsenal at Dresden in 1570, were as follows: 29 grosse rohre, at  $1\frac{1}{2}$  gulden each; 25 kleine rohre, at 1 gulden 3 groschen, all the weapons must answer strictly to sample sent, in being uniform and bored evenly to a standard calibre.<sup>1</sup>

The airgun is variously stated to have been invented in 1430 and 1560, at Nuremberg, and by Robert von

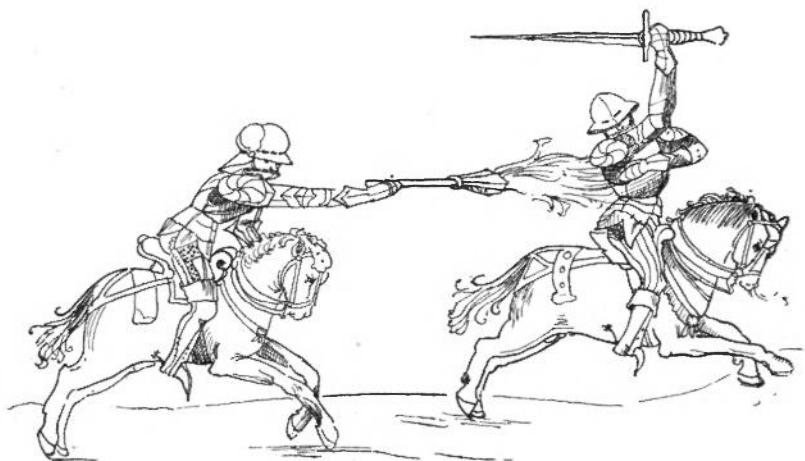


FIG. 7. A FAUSTROHR, C. 1460-1470.

der Pfalz, in 1619; but there is no record of its use as a military weapon before the eighteenth century.

#### THE PISTOL.

The early history of the pistol is now all that remains to be dealt with. A small handgun, an early faustrohr or fustrohr, is figured in Codex Germ. 734, a manuscript at Munich, dating about 1460, and the illustration is reproduced here in fig. 7. A cavalier in the "Gothic" armour of the period, is in the act of discharging his

<sup>1</sup> *Zeitschrift*, iii, 89.

weapon, held at arm's length, at another horseman, who is sheathed in similar plate-armour, and brandishing a cross-hilted sword. There is no indication as to how the priming of the piece was exploded, but one or two diminutive handguns of this kind have been preserved; and they are without any sufficient depression around the touch-hole for containing a priming; how then was the charge exploded? Probably by a piece of tinder stuffed into the touch-hole itself. The manipulation of such a weapon must have been very dilatory and troublesome from horseback: still in spite of such drawbacks, the use of small-arms by cavalry continued to increase. The handgun as shown in the illustration, served the purpose of a mace, and was thus a combination weapon. Mention of the *faustrohr*, with variations in the name, frequently occurs in German contemporary records of the fifteenth and sixteenth centuries, and before the middle of the latter, or even possibly early in its first quarter, the weapon had developed into the reiter's pistol, which continued to be called *faustrohr* right through the century, and even later. Towards the close of the century, French influence in Germany had brought about a change in the form of the weapon, and by 1630-1640, it had become generally known by the name of pistol in Germany, as had been the case in other countries for some time before. A pair of *faustrohre*, of the reign of the elector Maurice, 1541-1553, fitted with wheel-locks, are in the museum at Dresden. Such weapons were used long after the pistol proper had become common, and some of them are double-barrelled, and very long. One meets in German records with several varieties of the *faustrohr*-pistol family, some of which are by no means easy of identification. A *faustling*, *fausterling* or *feuerrohr* is a small *faustrohr*. A *puffer*, a small pistol with a short barrel and sharply bent stock, ending in a long, heavy, round pommel; there is a pair at Dresden, of the year 1573, an engraving by C. B. Hopfer, dated 1531, shows what would appear to be a "puffer," a word with an English signification; but the drawing is too small to be of much use. A *drehling* is a revolver, and a *rohrlein* a small, short handgun.

In a Grotkau inventory of 1421, a number of "pis-

schullen" are entered,<sup>1</sup> and in one of Breslau of 1483, some small handguns are scheduled as "pischallen"; a word otherwise rendered petstoln, psycheln and bettstoln: such weapons are again present in a Nuremberg inventory of 1578, entered as halbe-haken oder pettestoln, and again as kurze landknechtaken, called bettstoln. All these names imply a short, light handgun. There is nothing to help us as to the etymology of these words, but "*petstol*" and "*bettstol*" certainly bear a curious resemblance to the word pistol. Claude Fauchet, writing in *Origines des Chevaliers, etc.* would derive the word pistol from the weapon having been first made at Pistoia, or that it took its name from the coin called *pistole*, the diameter of which is said to have corresponded with that of the bore of the weapon.<sup>2</sup> Others would derive the

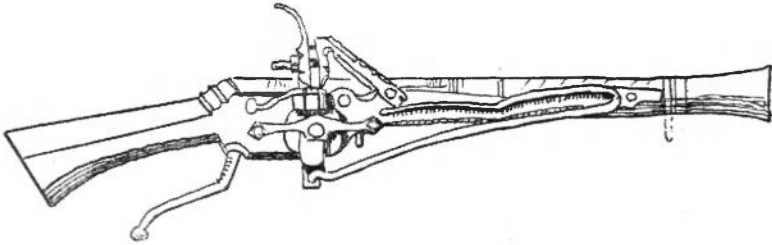


FIG. 8. A FAUSTROHR, C. 1520-1525.

name from the Spanish word *pistola*, signifying a driver or a spout; or from the Italian equivalent for dagger, *pistolese*. Louis Napoleon<sup>3</sup> remarks that in about 1544, the French cavalry adopted a small handgun of large calibre, which was called a pistole; but the fact, if it be one, does not help us to the derivation of the word. He adds, concerning the weapon, "Cette était très-dangereuse, parce qu'on la tirait à bout portant" (point-blank).

A faustrohr, now in the collection at Nuremberg, formerly in that of count Festeticz, has been alluded to in my remarks on wheel-locks. The stock, which is of

<sup>1</sup> *Zeitschrift*, ii, 45.

<sup>2</sup> "... et lors ils sont nommez Pistolles et Pistolets; pour avoir premieremet este faits a Pistoye: comme aussi ayans les escus d'Espagne este reduits a une plus petite forme que les escus (ecus) de

France, ont pris le nom de Pistolet, et les plus petits, Pistolets, Bidets, comme lon appelle aussi les plus petits chevaux." The small pistol "bidet" is mentioned as early as 1550 in *Nuits de Straparde*.

<sup>3</sup> *Du Passe, etc.* 198.

iron, is only slightly bent ; there are rings for the insertion of a ramrod, and a hook for hanging the weapon to the reiter's belt. The calibre is one centimetre, and the lock a very early form of wheel-lock. The weapon is illustrated on fig. 8.

The word pistol does not occur in any of the inventories taken at the Tower, Westminster or Greenwich in 1547, but dagges and tackses are mentioned. The terms dagge or dag and tacke are not merely other words for ordinary pistols ; from which they must have differed in some way, for we meet with dagges and pistols scheduled together in inventories ; as for instance, in that of the goods of Sir Thomas Ramsey, taken in 1577, we find, "item, a pistoll and a dagge." We want to ascertain what weapons those names represent, but the materials for any certain definition, as far as the writer is aware, are absent, and what there is, is confusing. Meyrick says the dag has a pommel like that of a musket, but he gives no authority for the statement. These names have sometimes been applied to daggers, but they certainly mean handguns of some sort : and it seems probable that one of them at least originally indicated a weapon in size something between a "handgonne" or demi-hake and a pistol, a large pistol in fact, like the early reiter's faustrohr, which has a stock formed very like that of a musket, and that the other may have been applied to its diminutive, the faustling, or to the small pistol, the puffer ; for we find entries in inventories of long, short and pocket daggs ; one in the Hengrave list, 1603, "two little pocket dagges." From the survey taken at Westminster in 1547 we extract the following entries : "a white tacke with a fier-lock (wheel-lock) graven" ; "two tackses hafted like a knyff, with fire-lockes and double-lockes" ; "tackses after the fashion of a dagger" ; there are other entries of the same kind, but nowhere any clear definition. In 1574, a dagge complete, that is with its accessories, cost 16s. 8d.<sup>1</sup> the same price as did a pistol in 1599.

Paul Jove, referring to the capitulation of Stuhlweissenburg to the Turks, in 1548, mentions the admiration expressed by the Orientals for the wheel-lock pistols of

<sup>1</sup> Queen Elizabeth's instructions to the earl of Bedford, of that year.

the German reiters.<sup>1</sup> The equipment of the reiter, who first came into prominence in 1546-1547, in the battles of the League of Smalcalde, consisted of a pair of faustrohre, with heavy pommels, convenient to club with; barrels, a foot and a half long; weight about 5 pounds; bullets 20 to the pound; and a sword and dagger. Fig. 9 is a reproduction of an illustration



FIG. 9. GERMAN REITER OF THE SECOND HALF OF THE SIXTEENTH CENTURY, WITH HIS PAIR OF FAUSTROHRE.

by Jost Amman, of a German reiter, of the second half of the sixteenth century, armed with a brace of faustrohre. The reiter-faustrohr was inlaid, more or less, with bleached stagshorn;<sup>2</sup> and the stocks of these weapons of the second half of the century are much less bent than they afterwards become. De la Nouë, writing in 1587, says that pistols are not effective at more than three paces.<sup>3</sup> Bodies of horsemen armed with these weapons, trotted up to the attack by ranks; they delivered their fire, and then

<sup>1</sup> Thierbach's *Handfeuerwaffen*, 47.

<sup>2</sup> This inlay is often mistaken for ivory. Herr Max von Ehrenthal, formerly curator of the royal museum at Dresden, writes in *Zeitschrift*, ii, 83, that this material was

used in preference to ivory for the reason that it bends more easily and is less influenced by changes of temperature.

<sup>3</sup> *Archaeological Journal*, lix, 80.

wheeled outward by half troops, for the next rank to come forward in their places. Captain Crusoe states that fifteen motions are involved in firing. The pistol was often combined with other weapons, used both for battle and the chase; and such combinations are met with in the axe, mace, sword, dagger and wood-knife. Some beautiful examples of the battle-axe and pistol, and of the sword and pistol, in combination, may be seen at Dresden and Berlin.

Niklas Zurkinden of Berne is stated to have invented the *drehling*,<sup>1</sup> the prototype of the revolver, in 1584, and here we have a weapon with a drum bored with chambers, revolving on its axis, bringing each chamber in succession to the lock and the barrel. The career of this weapon was a short one, for it soon burst, owing to inaccuracies in the junctions.<sup>2</sup> Later, weapons were made as described in Ward's *Animadversions of Warre*, published in 1639. "the touch-holes of the Barrels to turne to the locke one after another."<sup>3</sup> There is a harquebus-revolver of this kind in the Tower, no.  $\frac{1}{4}$ , attributed in the catalogue to the second half of the century, with a revolving breech for four charges.

<sup>1</sup> *Drehen*, to turn, revolve.

<sup>2</sup> *Zeitschrift*, ii, 338.

<sup>3</sup> *Tower Catalogue*, 69.