against the 0·32-in. 231-grain Lebel bullet at the same distance, the striking velocities being approximately 1490 and 2070 ft. per second respectively. The bullet-proof steel made by Messrs Cammell, Laird & Co. in Great Britain may be taken as typical of that produced by the best modern manufacturers. It is proof against the 215-grain Lee-Enfield bullet of 0·303 in. calibre striking directly, as under:

Range.	Thickness of Plate.	Striking Velocity.
10 yards	0·187 inch	2050 f.s.
100 ,,	0·167 ,,	1865 ,,
560 ,,	0·080 ,,	1080 ,,

The weight of the 0·08-in. plating is only 3·2 lb per sq. ft. The material is stated to be readily adaptable to the ordinary operation of bending, machining, drilling, &c., and is thus very suitable for the purposes indicated above. (W. E. E.)

ARMS AND ARMOUR (Lat. *arma*, from the Aryan root *ar*, to join or fit; cf. Gr. *ἁρμός*, joint; the form *armour*, from Lat. *armatura*, should strictly be *armure*). Under this heading are included weapons of offence (arms) and defensive equipment (armour). The history of the development of arms and armour begins with that of the human race; indeed, combined with domestic implements, the most primitive weapons which have been found constitute the most important, if not the only, tangible evidence on which the history of primitive man is based. It is largely from the materials and characteristics of the weapons and utensils found in caves, tombs and various strata of the earth's crust, coupled with geological considerations, that the ethnological and chronological classifications of prehistoric man have been deduced. For a detailed account of this classification and the evidence see ARCHAEOLOGY; BRONZE AGE; FLINT IMPLEMENTS, &c., and articles on special weapons.

Offensive weapons may be classified roughly, according to their shape (*i.e.* the kind of blow or wound which they are intended to inflict), and the way in which they are used, as follows:—(1) Arms which are wielded by hand at close quarters. These are subdivided into (*a*) *cleaving* weapons, *e.g.* axes; (*b*) *crushing*, *e.g.* clubs, maces and all hammer-like arms; (*c*) *thrusting*, *e.g.* pointed swords and daggers; (*d*) *cutting*, *e.g.* sabres (such weapons frequently combine both the cut and the thrust, *e.g.* swords with both edge and point); (*e*) those weapons represented by the spear, lance, pike, &c., which deal a thrusting blow but are distinguished from (*c*) by their greater length. (2) Purely missile weapons, *e.g.* darts, javelins and spears. Frequently these weapons are used also at close quarters as thrusting weapons; the typical example of these is the medium-length spear of not more than about 6 ft. in length. (3) Arms which discharge missiles, *e.g.* bows, catapults and fire-arms generally. (See ARCHERY and section *Fire-arms* below.) The weapons in (2) and (3) are designed to avoid hand-to-hand fighting.

Classification.

Weapons are also classified in a variety of other ways. Thus we have *small-arms*, *i.e.* all weapons in classes (1) and (2) with those in (3) which do not require carriages. *Side-arms* are those which, when not in use, are worn at the side, *e.g.* daggers, swords, bayonets. *Armes blanches* is a term used for offensive weapons of iron and steel which are used at close quarters.

Defensive armour consists of body armour, protections for the head and the limbs, and various types of shield.

1. *Stone Age.*—One of the chief problems which have perplexed archaeologists is that of finding a criterion which will enable them to distinguish the most primitive products of human skill from similar objects whose form is due to the forces of nature. It is often impossible to say precisely whether a rough piece of flint is to be regarded as a weapon (except so far as it could be used as a missile) or merely as a fragment of rock. Passing over these doubtful cases, we come first to indubitable examples of weapons deliberately fashioned in stone for offensive purposes. The use of stone weapons appears to have been universally characteristic of the earliest races of mankind, as it is still distinctive of those savage races which are most nearly allied to primitive man. These weapons were naturally simple in form and structure. The earliest examples (Palaeolithic) found in river-drift gravel in various parts of Europe are merely chipped flints, celts, &c. Later on we find polished implements (Neolithic) progressively more elaborate in design and workmanship, such as socketed stones with wooden handles and knives or daggers of flaked flint with handles. Besides flint the commonest materials are diorite, greenstone, serpentine and indurated clay-slate; there are also weapons of horn and bone (daggers and spear-heads). Spear-heads and arrow-points (leaf-shaped, lozenge-shaped, tanged and triangular) were chipped in flint with such skill as to be little inferior to their metal successors. They have accurately flaked barbs and tangs, and in some cases their edges are minutely chipped. The heads appear to have been fastened to the shafts by vegetable fibre and bitumen. Knife-daggers of flint, though practically of one single type, exhibit much variety of form. They vary in size also, but seldom exceed 12 in. in length. They are sometimes obtuse-edged like a scraping-tool, sometimes delicately chipped to a straight edge, while the flakes are so regularly removed from the convex part of the blade as to give a wavy surface, and the corners of the handle are delicately crimped. The daggers attain their highest perfection in the short, leaf-shaped form,—the precursor of the leaf-shaped sword which is peculiarly characteristic of the Bronze Age,—and the curved knives found especially in Great Britain and Russia, and also in Egypt. The precise object of the sharpening of both convex and concave edges in the curved variety is not clear. There have also been found sling-stones, and, in Scotland and Ireland, balls of stone with their "surfaces divided into a number of more or less projecting circles with channels between them." These latter, Sir John Evans suggests, were attached to a thong which passed through the surface channels, and used like the *bolas* of South America. The weapon could thus deal a blow at close quarters, or could be thrown so as to entangle the limbs of an enemy. Of defensive armour of stone there is none. The only approximation is to be found in the small rectangular plates of slate, &c., perforated with holes at the corners, which are supposed to have been bound on to the arm to protect it from the recoil of the bow-string. Similar wristlets or bracers are in use among the Eskimos (of bone) and in India (of ivory). These plates measure generally about 4 in. by 1½ in.

History.

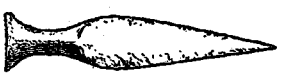

FIG. 1.—Leaf-shaped Flint Dagger.

2. *Bronze Age.*—It is impossible to assign any date as the beginning of the Bronze Age; indeed, archaeology has shown that the adoption of metal for weapons was very gradual. The stone weapon perseveres alongside the bronze, and there exist stone axes which, by their shape, suggest that they have been copied from metal axes. In the earliest interments in which the weapons deposited with the dead are of other materials than stone, a peculiar form of bronze dagger occurs. It consists of a well-finished, thin, knife-like blade, usually about 6 in. in length, broad at the hilt and tapering to the point, and attached to the handle by massive rivets of bronze. It has been found associated with stone celts; both of the roughly chipped and the highly polished kind, showing that these had not been entirely disused when bronze became available. A later type of bronze dagger is a broad, heavy, curved weapon, usually from 9 to 15 in. in length, with massive rivets for attachment to an equally massive handle. The leaf-shaped sword, however, is the characteristic weapon of the Bronze Age. It is found all over Europe, from Lapland to the Mediterranean. No warlike weapon of any period is more graceful in form or more beautifully finished. The finish seems to have been given in the mould without the aid of hammer or file, the edge being formed by suddenly reducing the thickness of the metal, so as to produce a narrow border of extreme thinness along

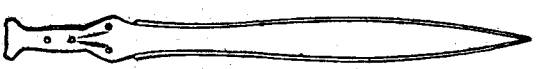

FIG. 2.—Leaf-shaped Bronze Sword.

both sides of the blade from hilt to point. The handle-plate and blade were cast in one piece, and the handle itself was formed by side plates of bone, horn or wood, riveted through the handle-plates. There was no guard, and the weapon, though short, was well balanced, but more fitted for stabbing and thrusting than for cutting with the edge. The Scandinavian variety is not so decidedly leaf-shaped, and is longer and heavier than the common British form; and instead of a handle-plate, it was furnished with a tang on which a round, flat-topped handle was fastened, like that of the modern Highland dirk, sometimes surmounted by a crescent-like ornament of bronze. A narrow, rapier-shaped variety, tapering from hilt to point, was made without a handle-plate, and attached to the hilt by rivets like the bronze daggers already mentioned. This form is more common in the British Isles than in Scandinavia, and is most abundant in Ireland. The spear-heads of the Bronze Age present a considerable variety of form, though the leaf-shaped predominates, and barbed examples are extremely rare. Some British weapons of this form occasionally reach a length of 27 in. The larger varieties are often beautifully designed, having segmental openings on both sides of the central ridge of the blade, and elaborately ornamented with

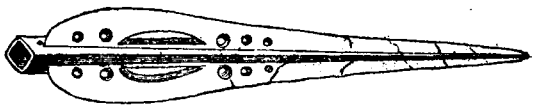

FIG. 3.—Bronze Spear-Head, length 19 inches.

chevron patterns of chased or inlaid work both on the socket and blade. Arrow-points are much rarer in bronze than in flint. In all probability the flint arrow-point (which was equally effective and much more easily replaced when lost) continued to be used throughout the Bronze Age. Shields of bronze, circular, with hammered-up bosses, concentric ridges and rows of studs, were held in the hand by a central handle underneath the boss. The transition period between the Bronze and Iron Ages in central Europe is well defined by the occurrence of iron swords, which are simple copies of the leaf-shaped weapon, sometimes with flat handle-plate of bronze. These have been found associated with articles assigned to the 3rd or 4th century B.C.

Hallstatt weapons.

An important distinction between the characteristic bronze swords peculiar to southern peoples and the swords both of iron and of bronze found together in the Hallstatt cemeteries (in the Salzkammergut, Austria, ancient Noricum) is that whereas the former invariably have short handles ($2\frac{1}{4}$ to $2\frac{1}{2}$ in.), the latter are provided with handles from 3 to $3\frac{1}{2}$ in. long, terminating in a round or oval pommel; the grip of one of the bronze swords even reaches a length of 4 in. The hilts are decorated with ivory, amber, wood, bronze, horn, and the decoration of blade and scabbard is often elaborate. The length of these swords is sometimes as much as 30 to 33 in. Again at La Tène on Lake Neuchâtel iron swords have been found to the number of one hundred, with handles of 4 to $7\frac{1}{2}$ in. long and a total length varying from 30 to 38 in. Similar remains have been found in France at Bibracte and Alesia, and even in Ireland (cf. Munro, *The Lake-dwellings of Europe*, pp. 282, 383).

The occurrence at Hallstatt of bronze swords together with iron, having the characteristic long handle, has led to the hypothesis that the graves are those of an immigrant (probably Celtic) people of northern extraction which had conquered and overlaid a smaller-framed Bronze Age people, and had introduced the use of iron while continuing to use the bronze of their predecessors with the necessary modifications. This theory derived from tangible remains is corroborated by literary evidence. Thus Polybius (ii. 33, iii. 114) describes the Celtic peoples as fighting with a long pointless iron sword, which easily bent and was in any case too large to be used easily in a mêlée.

The graves at Hallstatt yielded in addition to these important swords a much larger number of spears. Of these two only were of bronze, the head of the larger being $7\frac{1}{2}$ in. long. The much more numerous iron heads range up to as much as 2 ft. in length, and are all fastened to the shaft by rivets. All the arrow-heads found are of bronze, while of the axes the great majority are of iron; a few have iron edges fitted in a bed of bronze.

These examples are sufficient to show that the transition from bronze to iron was very slow. The fact that they were found in a district which is known to have been directly in the line of march pursued by invaders from the north tends to confirm the theory that the introduction of iron was the work of such invaders.

See Sir John Evans, *Ancient Stone Implements* (2nd. ed., 1897), *Bronze Implements*; W. Ridgeway, *Early Age of Greece*; and works quoted under ARCHAEOLOGY.

3. *Early Greek Weapons.*—The character of the weapons used by the early peoples of the Aegean in the periods known as Minoan, Mycenaean and Homeric is a problem which has given rise of recent years to much discussion. The controversy is an important part of the Homeric question as a whole, and the various theories of the weapons used in the Trojan War hinge on wider theories as to the date and authorship of the Homeric poems. One widely accepted hypothesis, based on the important monograph by Dr Wolfgang Reichel, *Über homerische Waffen. Archäologische Untersuchungen* (Vienna, 1894), is that the Homeric heroes, like those who created the civilization known as Mycenaean, had no defensive armour except the Mycenaean shield, and used weapons of bronze. This view is derived to a great extent from the Homeric poems themselves, in which the metal most frequently mentioned is χαλκός (bronze), and involves the assumption that all passages which describe the use of corslets, breastplates, small shields and greaves are later interpolations. It is maintained on the other hand (*e.g.* by Prof. W. Ridgeway, *Early Age of Greece*, i. chap. 3), that the Homeric Achaeans (whom he regards as the descendants of the central European peoples, the makers of the Hallstatt iron swords) were far advanced into the Iron Age, and that the use of bronze weapons is merely another instance of the fact that the introduction of a new element does not necessarily banish the older. This theory would separate the Homeric from the Mycenaean altogether, and is part of a much more comprehensive ethnological hypothesis. According to another hypothesis, the Homeric poems are true descriptions of a single age, or, in other words, the weapons of the Homeric age were far more diverse and elaborate than is supposed by Reichel.

Mycenaean and Homeric.

Very few traces of iron have been found in the Mycenaean settlements, nor have any examples of body armour been found except the ceremonial gold breastplates at Mycenae. The Mycenaean soldiers carried apparently a bronze spear, a bronze sword and a bow and arrows. The arrow-heads are first of obsidian and later of bronze. It would appear that only the chief warriors used spear and shield, while the majority fought with bows. The swords found at Mycenae are two-edged, of rigid bronze, and as long as 3 ft. or even more; from representations of battles it would seem that they were perhaps used for thrusting mainly. They are highly ornamented and some have hilts of wood, bone or ivory, or even gold mounting. Later swords became shorter and of a type like that of early iron swords found in Greece. Moreover in a few cases there have been found in pre-Mycenaean (late Minoan III.) tombs a few examples of short iron swords together with bronze remains. All Mycenaean spears are of bronze and, apparently, their shafts, unlike the Homeric, had no butt-piece. In the absence of any metal helmets in the tombs we may perhaps assume that the Mycenaean helmet was a leather cap, possibly strengthened with tusks, such as appears in Homer (*Iliad*, x.) also. The Mycenaean shield (generally, perhaps, made of leather) has given rise to much controversy, which hinges largely on the interpretation of the evidence provided by the representation on the Warrior Vase and the Painted Stele from Mycenae and pottery found at Tiryns. Professor Ridgeway regards these as describing post-Mycenaean conditions, and maintains that the true Mycenaean shield was always long (from neck to feet), and that it was either in the form of a figure-of-eight targe, or rectangular and sometimes incurved like the section of a cylinder; whereas the Homeric shield was round (*e.g.* κυκλότερος, εὔκυκλος, &c.). Dr Reichel's followers believe that the Homeric shield was long ("like a tower") and

incurved in the centre like the Mycenaean, that Homer knew nothing of the small round shield, and that the epithets implying roundness used in the poems are to be explained as meaning "well-balanced" or as late interpolations. On the whole we must conclude that the Mycenaean age is by no means a single homogeneous whole (see AEGEAN CIVILIZATION), and that the weapons are not exclusively of bronze, nor of any single type.

The Homeric warrior in full armour, according to the Homeric poems, wore: (1) shield (ἀσπίς, σάκος), (2) greaves (κνημῖδες), (3) band (ζῶμα), (4) belt (ζωστήρ) and *mitrē*, (5) tunic (χιτών), (6) helmet (κορύς), (7) breastplate (θώρηξ), (8) sword (ξίφος). The λαισήϊον was a protection worn by the archers in place of a shield. According to the usual view, the Homeric shield was, as we have seen, bent in about half way up each side (in the form of a figure-of-eight) to give freedom to the arms, and large enough to protect the whole body. The two curves were held rigid by two wooden (probably) staves inside. It was composed of layers of ox-hide overlaid with bronze, forming a boss in the centre, and sometimes had studs upon it. Reichel's view is that it was the weight of these huge shields which led to the use of the chariot as a means of going rapidly from one part of the field to another (though Professor Ridgeway and others contest this, and Helbig mentions more than one case of long journeys on foot under shield), and further that the round shield is entirely unknown to Homer. This large shield was clearly the natural protection against showers of missiles, rather than against enemies fighting with the sword.

The greaves were, no doubt, generally of hide, protected the leg all round, and were fastened at the knee with cords. On the other hand Mycenaean bronze greaves have been found at Enkomi (Cyprus) and at Glassinatz (Glasinac), and therefore it is not necessary, following Reichel, to cut out Homer's references to the "bronze-greaved" Achaeans (*Iliad*, vii. 41), a phrase which has been taken as evidence for regarding the passage as spurious. The tin greaves of Achilles are obviously exceptional.

The *thorex* again is the subject of controversy. Reichel, arguing that the great shield rendered any breastplate unnecessary, regarded the word as a general term for body clothing, but Ridgeway strongly maintains the older theory that it was a bronze breastplate, and Andrew Lang points out that, on Reichel's theory, a word which originally meant the "breast" was transferred to mean "loin-cloth" (which, to judge from the artistic representations, was all that the Mycenaean warrior wore), and subsequently in historic times returned to its natural use for the breastplate—a most unlikely evolution. The passages in Homer which describe it as a breastplate are regarded by Reichel's school as later interpolations. Gilbert Murray thinks that the Homeric poems must be regarded as belonging to different periods of development, and therefore attributes the more elaborate armour to the "surface" (late Ionian) stratum. The *zoma* was probably a loin-cloth, and the *mitrē* a metal band about a foot wide in front and narrow behind to protect the lower part of the body. As a matter of fact, however, the big shield does not exclude the use of body armour, and it is quite likely that the Homeric warrior wore a bronze corslet, *i.e.* a somewhat improved form of the λινοθώρηξ, or stiffened shirt. On the other hand, it is probable, as we gather from the poems, that this corslet was not strong enough to do more than stop a spent spear. The *chiton* was worn over the *mitrē*, and reached the knees; it was held to the body by the *zostēr*, a metal-plated belt. Helmets were both of metal on leather, and of leather throughout; the crests were of horsehair (not of metal like the later Greek helmets) and there were no cheek-pieces.

The sword has already been mentioned. Ridgeway, in spite of the almost invariable mention of bronze as the material of the Homeric weapons, believes that it was generally of iron, but, while the presence of iron in the Homeric age is admitted in the case of implements, it is generally held that weapons were all of bronze. Except for one arrow-head (*Iliad*, iv. 123), and the mace of Areithoüs, mentioned as a unique example by Nestor (*Iliad*, vii. 141), no reference to an iron weapon proper occurs in the Homeric poems. But the sword was used only when the favourite spear or javelin had failed to decide the contest.

It must be admitted that the problem of pre-Homeric armour and Homeric armour must always be largely a matter of inference, based on a comparative study of the evidence literary and archaeological. Unless we are prepared to adopt the theory that the Homeric poems consist of a mosaic of interpolation informed by an archaizing editor, we must assume that they describe a single period of transition intermediate between the Mycenaean prime and the dawn of history proper. In this case we shall believe that the Homeric warrior has so far adapted to changing conditions the simple appliances of the Mycenaean that he has evolved a feeble corslet with minor pieces of body armour, while retaining the big double-bellied shield as a protection against the arrows which are still the chief weapon of the rank and file and are even used on occasion by the chiefs. If we further believe that the iron at his disposal was similar to that used by the Celts of Polybius, it is natural to believe also that he preferred the harder bronze for his weapons, though iron was common for domestic and other implements.

On early Greek arms in general see, besides Reichel and Ridgeway *op. cit.*: A. Lang, *Homer and his Age* (London, 1906; and criticisms in *Classical Review*, February 1907); G. G. A. Murray, *The Rise of the Greek Epic* (Oxford, 1907), chap. vi.; R. M. Burrows, *Discoveries in Crete* (2nd ed., London, 1907); Leaf and Bayfield, *Iliad*, i.–xii. Appendix A (follows Reichel); W. Helbig, *Homerische Epos* (1884 and 1899), and *La Question mycénienne* (1896); C. Robert, *Studien zur Ilias* (Berlin, 1901); Chr. Tsountas and J. I. Manatt, *The Mycenaean Age* (1897); V. Bérard, *Les Phéniciens et l'Odyssée* (Paris, 1902); Cauer, *Grundfrager d. Homerkritik* (Leipzig, 1895); much valuable discussion will be found in articles in *Journ. Hell. Stud.*, *Classical Rev.* and *Journ. of Anthropol. Instit.*; see also editions of *Iliad* and *Odyssey* (espec. D. B. Monro), and works quoted under AEGEAN CIVILIZATION; HOMER; MYCENAE.

4. *Greek, Historical.*—The equipment does not differ generically from that described in the Homeric poems, except when we come to the reforms of the Macedonians. The hoplites, who formed the main army, wore helmet, body armour, greaves and shield, and fought with pike and sword. The helmets were (1) the Corinthian, which covered the face to the chin, with slits for the eyes, and often had no plume or crest; (2) the Athenian, which did not cover the face (though sometimes it had cheek-plates which could be turned up if necessary), had crests, sometimes triple, with plumes of feathers, horsehair or leather; (3) a steel cap (πῖλος) without crest, plumes or cheek-plates. The last seems to have been most common in the Spartan army. The body armour consisted of breast and back plates fastened together by thongs or straps and buckles; sometimes poverty compelled a man to be content with a leather jerkin (σπολάς) partly strengthened by metal plates, or even a quilted linen or stuffed shirt. Greaves were of pliant bronze fastened at the back above the ankle and below the knee. Shields were of the small round or oval type, adapted to the new conditions in which the bow and arrow had given place to hand-to-hand fighting. They were held by means of two handles (ὄχανα), the left hand being thrust through the first and grasping the second. In the 5th and 4th centuries the shield bore a device or initial representing the state and also the individual's own crest. The hoplite's pike, about 8 ft. long, unlike the Homeric weapon, was hardly ever thrown. In the Macedonian phalanx a pike (σάρισσα), certainly 18 ft., and perhaps later in the 3rd and 2nd centuries even 24 ft. long, was introduced. The sword was straight, sharp-pointed, short, sometimes less than 20 in., and rarely more than 2 ft. long. It was double-edged and used for both cut and thrust. A less common type was the μάχαιρα or curved sabre used by the Spartans, with one sharp edge. The hoplite had no other offensive weapons.

The cavalry were heavy-armed like the hoplites except that they carried a smaller shield, or, more usually, none at all. They were armed with a lance which they wielded freely (*i.e.* not "in rest") and occasionally threw. The Macedonian cavalry had a σάρισσα. The light-armed (γυμνῆτες, ψιλοί) were (1) ἀκοντισταί, armed with a javelin (3 to 5 ft. long) and a small shield; (2) τοξόται, archers; and (3) σφενδονῆται, slingers, whose missiles

were balls of lead, stones and hardened clay pellets. Between the heavy and the light armed were the peltasts. The *pelta*, from which they took the name, was a light shield or target, made of skin or leather on a wooden or wickerwork frame. The Athenian Iphicrates armed them with linen corslet and a larger spear and sword than those of the hoplites; he also invented a new footgear (called after him *iphicratides*) to replace the older greaves.

5. *Roman.*—The equipment of the Roman soldier, like the organization of the army (see ROMAN ARMY), passed through a great number of changes, and it is quite impossible to summarize it as a single subject. In the period of the kings the legion was the old Greek phalanx with Greek armour; the front ranks wore the Greek panoply and fought with long spears and the circular Argolic shield. The early Roman sword, like that of the Greeks, Egyptians and Etruscans, was of bronze. We have no direct statement as to its form, but in all probability it was of the ordinary leaf-shape. We gather from the monuments that, in the 1st century B.C., the Roman sword was short, worn on the right side (except by officers, who carried no shield), suspended from a shoulder-belt (*balteus*) or a waist-belt (*cingulum*), and reaching from the hollow of the back to the middle of the thigh, thus representing a length of from 22 in. to 2 ft. The blade was straight, double-edged, obtusely-pointed. On the Trajan column (A.D. 114) it is considerably longer, and under the Flavian emperors the long, single-edged *spatha* appears frequently along with the short sword.

The second period ending with the Punic wars witnessed a change. The *hastati* and the *principes* are both heavily armed, but the round shield has given way to the oblong (*scutum*), except for one-third of the *hastati* who bore only the spear and the light javelin (*gaesa*). The third period—that described by Polybius—is characterized by greater complexity of armour, due no doubt in part to the experience gained in conflicts with a wider range of peoples, and in part to the assimilation of the methods peculiar to the new Italian allies. Thus we find the skirmishers (*velites*) armed with a light javelin 3 ft. long and ¾ in. thick, with an iron point 9 in. long; this point was so fragile that it was rendered useless by the first cast. For defence they wore a hide-covered headpiece and a round buckler 3 ft. in diameter. The heavy-armed carried a *scutum* formed of two boards glued together, covered with canvas and skin, and incurved into the shape of a half-cylinder; its upper and lower edges were strengthened with iron rims and its centre with a boss (*umbo*). A greave was worn on the right leg, and the helmet was of bronze with a crest of three feathers. The wealthier soldiers wore the full cuirass of chain armour (*lorica*), the poorer a brass plate 9 in. square. For offence they carried a sword and two javelins. The former was the Spanish weapon, straight, double-edged and pointed, for both thrust and cut, in place of the old Greek sword.

The characteristic weapon, however, was the *pilum* (Gr. ὀσσός). The form of this weapon and the mode of using it have been minutely described by Polybius (vi. 23), but his description has been much misunderstood in consequence of the rarity of representations or remains of the *pilum*. It is shown on a monument of St Rémy, in Provence, assigned to the age of the first emperors, and in a bas-relief at Mainz, on the grave-stone of Quintus Petilius Secundus, a soldier of the 15th legion. A specimen of the actual weapon is in the museum at Wiesbaden. It is a javelin with a stout iron head (7 in.), carried on an iron rod, about 20 in. in length, which terminates in a tang for insertion in the wooden shaft. As represented on the monuments, the iron part of the weapon is about one-third of its entire length (6¾ ft.). It was used primarily as a missile. When the point pierced the shield the weight of the stave pulled the shield downwards and rendered it useless. At close quarters it answered all the purposes, offensive and defensive, of the modern bayonet when "fixed." Vegetius, in his *Rei militaris instituta*, describes it in a modified form as used in the armies of the lower empire, and in a still more modified form it reappears as the "argon" of the Franks. This equipment was characteristic of *hastati*, *principes* and *triarii* (save that the latter used the *hasta* instead of the *pilum*). We thus see how great is the change from the time when the *hastati* were the light-armed (from *hasta*) of the Greek phalanx.

The cavalry, which had originally been protected only by a light ox-hide shield and the most fragile spears, adopted, about Polybius's time, the full Greek equipment of buckler, strong spear and breastplate.

In the last period of the republic the *pilum* became the universal weapon of the heavy-armed, while the auxiliaries (all foreigners, the *velites* having disappeared) used the *hasta* and the long single-edged sword (*spatha*). Under the empire the heavy-armed, according to Josephus, had helmet, cuirass, a long sword worn on the left side, and a dagger on the right, *pilum* and *scutum*. The special detachment detailed to attend the commander had a round shield (*clipeus*) and a long spear. The cavalry wore armour like that of the infantry, with a broadsword, a buckler slung from the horse's side, a long pole for thrusting, and several javelins, almost as large as spears, in a sheath or quiver. Arrian, writing of a period some fifty years later, gives further particulars from which we gather that of the cavalry some were bowmen, some polemen, while others wielded lances and axes.

For the arms and armour of other peoples of antiquity see *e.g.* PERSIA: *History, Ancient*, section v. "The Persian Empire of the Achaemenids"; BRITAIN, *Anglo-Saxon*, section v. "Warfare"; ETRURIA; EGYPT, &c. (J. M. M.)

6. *English from the Norman Conquest.*—It is unnecessary here to trace in detail the history of European armour in the middle ages and after, but its use and fashion in England may illustrate the broad lines of the gradual perfection and the hurried abandonment of the ancient war-harness. Each country gave its armour something of the national character, the Spanish harness being touched with the Moorish taste, the Italian with the classical note borrowed from the monuments of old time, and the German with the Teutonic feeling for the grotesque.

To understand the development of English arms and armour it is well for us to consider carefully the fashion of these things at the time of that landmark of history, the Norman Conquest. Poets, chroniclers and law-makers give us material for their description, and in the great embroidery of Bayeux, with its more than six hundred lively figures, we have pictured all the circumstances of war. We find that weapons and war gear have advanced little or nothing beyond the age which saw the Dacian warrior armed from crown to foot. A knight is reckoned fully armed if he have helmet, hawberk and shield; his weapons are sword and lance, although he sometimes carries axe or mace and, more rarely, a bow. The coat of fence, which the Norman called *hawberk* and the English *byrnie*, hangs from neck to knee, the sleeves loose and covering the elbow only, the skirt slit before and behind for ease in the saddle. The Bayeux artists (see fig. 4) commonly show these skirts as though they were short breeches, the hawberk taking the fashion at first sight of a man's swimming dress, but other authorities set us right, and towards the end of the tapestry we see men stripping hawberks from the slain by pulling them over the head. Back and front are so much alike that he who armed Duke William for the fight slipped on the armour hind side before, an omen that he should change his state of a duke for that of a king. The hawberk might be mail of woven rings, of rings sewn upon leather or cotton, of overlapping scales of leather, horn or iron, of that jazerant work which was formed of little plates sewn to canvas or linen, or of thick cotton and old linen padded and quilted in lozenges, squares or lines. There are indications that the

11th-century Bayeux tapestry.

FIG. 4.—From the Bayeux Tapestry.

hawberk was sometimes reinforced at the breast probably by a small oblong plate fastened underneath. Its weight is shown in the scene where William's men carry arms to the ships, each hawberk being borne between two men upon a pole thrust through the sleeves.

The helmet is a brimless and pointed cap, either all of metal or of leather or even wood framed and strengthened with metal. Its characteristic piece is the guard which protects the nose and brow from swinging cuts, so disguising the knight that William must needs take off his helmet to show his men that he had not fallen. Such a nasal appears in a 10th-century illumination; at the time of the Conquest it was all but universal. It grows rare and all but disappears in the 13th century, although examples are found to the end of the middle ages. The helmet is laced under the chin, and under it the knight often wore a hood of mail or quilting which covered the top of the head, the ears and neck, but left the chin free—in two or three cases he has this hood without the helmet. A close coif was probably worn beneath it when it was of ringed mail, to spare the fretting of the metal on the head.

The knights' legs are shown in most cases as unprotected save by stout hose or leg-bands: only in two or three instances does the tapestry picture a warrior with armed legs, and it is perhaps significant of the rarity of this defence that the duke is so armed. The feet are covered only by the leather boot, the heels having prick spurs.

Broad-bladed swords with cross-hilts of straight or drooping quills are fastened with a strap and buckle girdle to the left side. They have a short grip, and the blade would seem to be from $2\frac{1}{2}$ to 3 ft. in length. The chieftain unarmed in his house is often seen with unbuckled and sheathed sword sceptre-wise in his hands, carrying it as an Indian raja will nurse his sheathed tulwar. The ash spears brandished or couched by the knights as they charge seem from 7 to 8 or 9 ft. in length. In a few cases a three-forked pennon flutters at the end. The axe, a weapon which the Normans, in spite of their Norse ancestry, do not carry in the battle, is of the type called the Danish axe, long-shafted, the large blade boldly curved out. Maces, such as that with which the bishop of Bayeux rallies his young men, seem knotted clubs of simple form. Short and strong bows are drawn to the breast by the Norman archers.

Of the shields in the fight, four or five borne by the English are of the old English form—large, round bucklers of linden-wood, bossed and ribbed with iron. For the rest the horsemen bear the Norman shield, kite-shaped, with tapering foot, and long enough to carry a dead warrior from the field. On the inner side are straps for the hand to grip and a long strap allowed the knight to hang the shield from his neck. Let us note that although wyvern-like monsters, crosses, roundels and other devices appear on these shields, none of them has any indication of true armory, whose origins must be placed in the next century.

12th century.

The 12th century, although an age of riding and warring, affects but little the fashion of armour. The picture of a king on his seal may well stand for the full-armed knight of his age, but Henry Beauclerc, Stephen and Henry II. are shown in harness not much unlike that of the Bayeux needlework. But the sleeve of the hawberk goes to the wrist, and the kite shield grows less, Stephen's shield being 30 in. long at the most. On Stephen's second seal the mail hood is drawn over the point of the chin, and Henry II.'s seals show the chin covered to the lips. At least one seal of this king has the legs and feet armed with hose of ringed mail, probably secured by lacing at the back of the leg as a modern boot is laced. The first seal of Richard Lionheart marks an important movement. His hawberk, hood and hose clothe him, like his father, from crown to toe, and to this equipment he adds gloves of mail. Under the hawberk flows out to the heels the skirt of a long gown slit in front. But helm and shield are the most remarkable points. The shield has become flatter at the top, and at last the shield of an English king bears those armorial devices whose beginnings are seen elsewhere a generation before. The earlier seal has the shield with a rampant lion ramping to the sinister side and closely resembling that on the shield of Philip of Alsace, long believed to be the earliest example of true armory. But the shield in the second seal bears the three leopards which have been ever since the arms of the kings of England, and from this time to the end of the middle ages armorial devices become the common decorations of the knight's shield, coat, saddle and horse-trapper. The helmet of the first seal is a high thimble-topped cap, without a nasal guard, but the second has the king's head covered with the great helm, barrel-shaped and reinforced in front with a flat ventaile pierced in slits for the sight. This helm is crested with a semicircular ridge from which spring two wings, or rows of feathers fan-wise. On its side the ridge bears a single leopard, the forerunner of the coming crests.

13th century.

For 13th-century arms, although but poor scraps remain of original material, we have authority in plenty—pictures, seals and carving, and, above all, the effigies in stone or brass which give us each visible link, strap and ornament. All these have for a commentary chronicles, poems and account books, so that the history of armour may be followed in detail.

The long, sleeveless surcoat seen over King John's mail on his broad seal goes through the century and is often embroidered with arms. The shield becomes flat-topped the better to receive armorial charges. The great helm is common, although many knights on the day of battle like better the freedom of the mail hood with a steel cap worn over or under its crown, keeping for the tourney-yard the great helm which towards the century-end begins to carry its towering crest. Great variety is seen in the forms of the flat or round-topped helm, some being in one piece, pierced for sight and air, others having hinged or movable ventailes. At the end of the century a sugar-loaf type is the established form. The knight's hawberk is worn over a gambeson of linen, quilted linen or cotton, which lesser men wear with a steel cap for all defence. Breast and back plates also are sometimes borne under the hawberk, and the first plates in sight at last appear in those knee-cops which protect the joining of the upper and lower hose, and in a few examples of bainbergs or greaves of metal or leather. At the end of Henry III.'s reign we have the admirable illustrations of a manuscript of Matthew Paris's *Lives of the Offas*, with many pictures of knights. (See fig 5.) Here we see knights with knee-cop and greave and a plenty of curious headpieces, the plain mail hood and mail hoods with a plate ventaile to cover the face, barrel-helms and round-topped helms and even round-topped helmets with the Norman nose-guard.

From *The Ancestor*, by permission of A. Constable & Co. Ltd.

FIG. 5.—Knights' Armour, *c.* 1250.

In the last half of the 13th century appears the curious defence known as *alettes*. This name is given to a pair of leather plates generally oblong in form and tagged to the back of the shoulder. As a rule they are borne to display the wearer's arms, but being sometimes plain they may have had some slight defensive value, covering a weak spot at the armpit and turning a sweeping sword-cut at the neck. They disappear in the earlier years of Edward III.

Surcoat, shield and trapper have the arms of their owner. The rowel-spur makes a rare appearance. Weapons change little.

although the sword is often longer and heavier. Richard I. had favoured the cross-bow, in spite of papal denunciations of that weapon hateful to God, and its use is common through all the 13th century. after which it makes way for the national weapon of the long-bow.

14th century.

In the 14th century, the high-day of chivalry, the age of Crecy and Poitiers, of the Black Prince and Chandos, the age which saw enrolled the noble company of the Garter, the art of the armourer and weapon-smith strides forward. At its beginning we see many knights still clad in chain mail with no visible plate. At its end the knight is often locked in plates from head to foot, no chainwork showing save the camail edge under the helm and the fringe of the mail skirt or hawberk.

Before the first quarter of the 14th century is past many of these plates are in common use. Sir John de Creke's brass, about 1325–1330, is a fair example (fig. 6). His helmet is a basinet, pointed at the top, probably worn over a complete hood of mail flowing to the mid-breast. This hood was soon to lose its crown, the later basinets having the camail, a defence of mail covering neck, cheeks and chin and secured to the basinet with eyelet holes and loops through which a lace was passed. A rerebrace of plate defends the outer side of the upper arm, plain elbow-cops the elbow, and round bosses in the form of leopard heads guard the shoulder and the crook of the elbow. The fore-arm is covered with the plates of a vambrace which appears from under the hawberk sleeve. Large and decorated knee-cops cover the knees, ridged greaves the shins, and the upper part of the foot from pointed toe to ankle is fenced with those articulated and overlapping plates the perfection of which in the next century enabled the full-harnessed knight to move his body as freely as might an unarmed man. Under the plates the mail hose show themselves and the heels have rowelled spurs. He has a hawberk of mail whose front skirt ends in a point between the knees, the loose sleeves between wrist and elbow. Under this is a haketon of some soft material whose folds fall to a line above the height of the knee. Over the hawberk is a garment, perhaps of leather with a dagged skirt-edge, and over this again is a sleeveless gambeson or pourpoint of leather or quilted work, studded and enriched. Over all is the sleeveless surcoat, the skirt before cut squarely off at the height of the fork of the leg, the skirt behind falling to below the knee. The loose folds of this surcoat are gathered at the waist by a narrow belt, the sword hanging from a broader belt carried across the hip. Before 1350 the long surcoat of the 13th century was still further shortened, the tails being cut off squarely with the front. The fate of Sir John Chandos, who in 1369 stumbled on a slippery road, his long coat "armed with his arms" becoming tangled with his legs, points to the fact that an old soldier might cling to an old fashion.

FIG. 6.—Brass of Sir John de Creke.
From Waller's *Monumental Brasses.*

The desire for a better defence than a steel cap and camail and a less cumbrous one than the great helm, in which the knight rode half stifled and half blind, brought in as a fighting headpiece the basinet with a movable viser. This is found throughout this century, disappearing in the next when the salet and its varieties displaced it. But there were many knights who still fought with the great helm covering basinet and camail, a fact which speaks eloquently of the mighty blows given in this warlike age. The many monumental brasses of the last half of the 14th century show us for the most part knights in basinet and camail with the face exposed, but their heads are commonly pillowed on the great helm and in any case the viser would hinder the artist's desire to show the knight's features.

The fully-armed man of the latter half of the 14th century seems to have worn a rounded breastplate and a back-plate over his chain hawberk. Chaucer's Sir Thopas must always be cited for the defences of this age, the hero wearing the quilted haketon next his shirt, and over that the habergeon, a lesser hawberk of chain mail. His last defence is a fine hawberk "full strong of plate" showing that "hawberk" sometimes served as a word for the body plates. Over all this is the "cote-armure" or surcoat. Many passages from the chroniclers show that the three coats of fence one over the other were in common use in the field, and Froissart tells a tale of a knight struck by a dart in such wise that the head pierced through his plates, his coat of mail and his haketon stuffed with twisted silk. The surcoat in the age of Edward III. became a scanty garment sitting tightly to the body, laced up the back or sides, the close skirts ending at the fork of the leg with a dagged or slittered edge. The waistbelt is rarely in sight, but the broad belt across the hips, on which the dagger comes to hang as a balance to the sword, grows richer and heavier, the best work of the goldsmith or silversmith being spent upon it. Arms and legs and feet become cased in plate of steel or studded leather, and before the mid-century the shoulder-plates, like the steel shoes, are of overlapping pieces and the elbow also moves easily under the same defence. (See fig. 7.)

FIG. 7.—Brass of Sir John de Foxley.
From Waller's *Monumental Brasses.*

Such harness, ever growing more beautiful in its rich details, serves our champions until the beginning of the 15th century, when the fashion begins to turn. The scanty surcoat tends to disappear. It may be that during the bitter feuds and fierce slaughters of the Wars of the Roses men were unwilling to display on their breasts the bearings by which their mortal foe might know them afar. The horseman's shield went with the surcoat, its disuse hastened by the perfection of armour, and the banners of leaders remained as the only armorial signs commonly seen in war. But at jousts and tourneys, where personal distinction was eagerly sought, the loose tabard, which, after the middle of the century, bore the arms of the wearer on back, front and both sleeves, was still to be seen, with the crest of parchment or leather towering above a helm whose mantle, from the ribbon-like strip of the early 13th century, had grown into a fluttering cloak with wildly slittered edge streaming out behind the charging knight.

15th century.

When a score of years of this 15th century had run we find the knight closed in with plates, no edge of chain mail remaining in sight. The surcoat being gone we see him armed in breast and back plate, his loins covered by a skirt of "tonlets," as the defence of overlapping horizontal bands comes to be named (fig. 8). The chain camail has gone out of fashion, the basinet continuing itself with a chin and cheek plate which joins a gorget of plate covering the collar-bone, a movable viser shutting in the whole head with steel. The gussets of chain mail sewn into the leathern or fustian doublet worn below the body armour are unseen even at the gap at the hollow of the arm where the plates must be allowed to move freely, for a little plate, round, oval or oblong, is tagged to each side to fence the weak point. These plates often differ in size and shape one from the other, the sword-arm side carrying the smaller one.

FIG. 8.—Brass of Sir John Lisle at Thruxton.

Soon after this the six or eight "tonlets" grow fewer, being continued on the lower edge by the so-called tuilles, small plates strapped to the tonlets and swinging with the movement of the legs. A fine suit of armour is shown in the monument of Count Otto IV. of Henneberg (fig. 9). Knightly armour takes perhaps

FIG. 9.—Gothic Style of Armour. Monument of Count Otto IV. of Henneberg.

its last expression of perfection in such a noble harness as that worn by Richard Beauchamp, earl of Warwick, whose armed effigy was wrought between 1451 and 1454 (fig. 10). In this we see the characteristic feature of the great elbow-cops, whose channelled and fluted edges overlapping vambrace and rerebrace become monstrous fan-like shapes in the brass of Richard Quartremayns, graven about 1460. At this time the harness of the left shoulder is often notably reinforced, as compared with that of the sword-arm shoulder. Towards the latter part of the century chain mail reappears as a skirt or breech of mail, showing itself under the diminished tonlets, and, when helm and gorget are removed, as a high-standing collar. The articulation by overlapping plates extends even to the breastplate, whose front is thus in two or more pieces. Very long-necked rowel-spurs are often found, and the toes of the sabbatons or steel shoes are sharply pointed. The characteristic helmet of the latter half of the century is the salet or salade, a large steel cap, whose edge is carried out from the brows and still more boldly at the back of the neck.

Knights abandon the great helm in war, but it is perfected for use in the tilt-yard, taking for that purpose an enormous size, to enable two good inches of stuffing to come between head or face and the steel plate. Such a helm sits well down on the shoulders, to which it is locked before and behind by strong buckles or rivets. The note of the 15th century in armour is that of fantastically elaborate forms boldly outlined and a splendour of colour which gained much from the custom of wearing over the full harness short cloaks or rich coats turned up with furs, or from another fashion of covering the body plates or brigandines with rich velvets studded with gold. The details of the harness take a thousand curious shapes, and even amongst the simpler jacks and steel caps of the archers the same glorious variety is seen.

FIG. 10.—Brass of Richard Beauchamp, earl of Warwick.
From Stothard's *Monumental Effigies.*

If the note of the 15th century be variety of form, that of the 16th century, the last important chapter in the history of armour, is surface decoration, the harness of great folk atoning in some measure for loss of the beautiful medieval sense of line by elaborate enrichment. Plain engraving, niello, russet work, golden inlay and beaten ornament are common methods of enrichment. The great plume of ostrich feathers flows from the helmet crown of leaders in war. As in the reign of Edward III., costume's fashion affects the forms of armour, the broad toe of the Henry VIII. shoe being imitated in steel, as the wide fluted skirts of the so-called Maximilian armour imitate the German fashion in civil dress which the Imperial host popularized through northern Europe (fig. 11). These skirts have been called "lamboys" by modern writers on military antiquities, but the

16th century.

From Hewitt's *Arms and Armour.*
FIG. 11.—Meeting of Henry VIII. and Maximilian.

word seems an antiquarianism of no value, apparently a misreading of the word "jambeis" in some early document. So many notable examples of the armour of this 16th century are accessible in European collections, other illustrations occurring in great plenty, that its details call for little discussion; a fine and characteristic suit is that by the famous English armourer, Jacob Topf (fig. 12), which belonged to Sir Christopher Hatton. Into this century the arquebusier marches, demanding a chief place in the line of battle, although it is a common error that the improvement in fire-arms drove out the fully armed warrior, whose plates gave him no protection. Until the rifle came to the soldier's hands, plate armour could easily be made shot-proof.

It was driven from the field by the new strategy which asked for long marches and rapid movements of armies. This century's armour for the tilt-yard gives such protection to the champion, with its many reinforcing pieces, that unless the caged helm were used—the same which cost Henry II. of France his life—the risks of the tilt-yard must have fallen much below those of the polo-field. The horse with crinet, chafron and bards of steel was as well covered from harm.

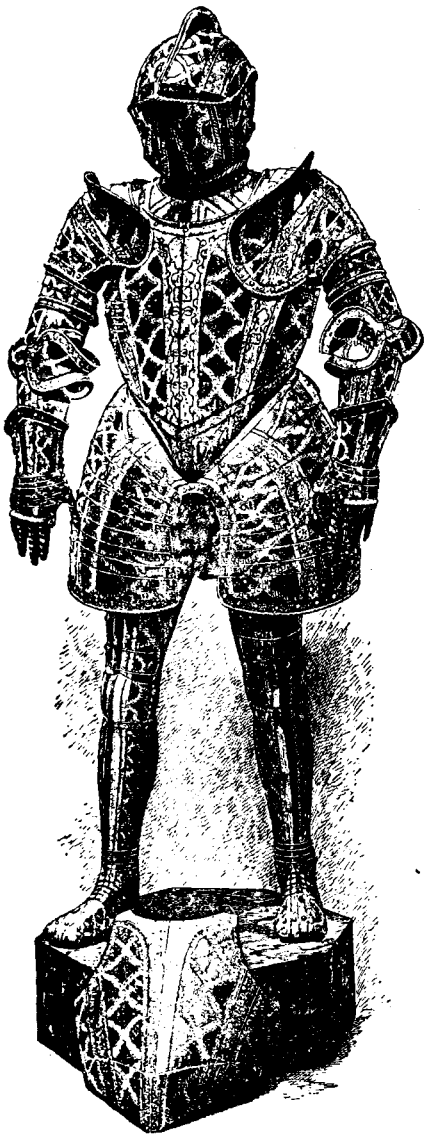

FIG. 12.—Suit by Jacob Topf, nearly complete; the gorget does not belong to it. Below is the placcate.

Before the end of the 16th century the full suit of war harness is an antique survival. Long boots take the place of greaves and steel shoes, and early in the 16th century the military pedants are heard to bewail the common laying aside of other pieces. The mounted cavalier—cuirassier or pistolier—might take the field, even as late as the Great Rebellion, armed at all points save the backs of the thighs and the legs below the knee; but a combed and brimmed cap, breast and back plate and tassets equipped the pikeman, and the musketeer would march without any metal on him save his headpiece, for it was soon found that heavily armed musketeers, after a long trudge through summer dust or winter mud, were readier to rest than to shoot. Everywhere there was revolt against the burden of plates, and as early as 1593 Sir Richard Hawkins found that his adventurers would not use even the light corslets provided by him, "esteeming a pot of wine a better defence." Gervase Markham, in his *Souldier's Accidence* of 1645, asks that at least the captain of cuirassiers should be armed "at all peeces, cap a pee," but he would have found few such captains, and Markham is a great praiser of noble old custom. The famous figure of a pikeman of 1668 (fig. 13) in Elton's *Art Military* has steel cap, corslet and tassets, but he stands for a fashion dead or dying. The last noteworthy helmet was what is now termed the lobster-tail helmet, a headpiece with round top, flat brim before, a broad articulated brim behind, cheek-pieces hanging by straps and a grate of upright bars to cover the face, some having in place of the grate a movable nose-guard to be raised or lowered at will. The close resemblance of this helmet to that worn by the Japanese, with whom the Dutch were then trading, is worth remark, although each of the two pieces seems to have had its separate origin. Thus, save for a steel cap here and a corslet there, especially to be found amongst the guards of sovereigns who must cling to something of antique tradition, armour departs out of the civilized world.

When in the reign of Queen Victoria her mounted guardsmen were given back their breast and back plates, the last piece of body armour had been the tiny gilt crescent worn at the throat by officers of foot, which crescent was the shrunken symbol of that great gorget of plate that came in with the 15th century. The shining plates of the Guards are parade pieces only, but a curious revival of an old defence was carried by English cavalry in the field at the end of the 19th century, when small gussets of chain mail were attached to the shoulders of certain cavalrymen as a defence against sword cuts. Through all the age of modern warfare inventors have pressed the claims of various bullet-proof breastplates, but where they have been effective against rifle fire their weight has made them too heavy an addition to the soldier's burden. (See, however, ARMOUR PLATES, *ad fin.*) Last of all we may reckon those secret coats of mail which are said to be worn on occasion by modern rulers in dread of the assassin. The London detective department has such coats of fence in its armoury; and on the other side it may be remembered that the Kelly gang of bushrangers, driven to bay, were found to have forged suits of plate for themselves out of sheets of boiler-iron.

Survival of armour.

FIG. 13.—Pikeman
From *The Compleat Body of the Art Military*, by Lieut.-Col. Elton (1668).

Ancient arms and armour are now eagerly sought by European and American collectors, and high prices are paid down for every noteworthy piece. The supply is assisted by the efforts of many forgers of false pieces, the most cunning of whom bring all archaeological skill to their aid, and few great national or private collections are free from some example of this industry. For the genuine pieces competition runs high. Suits of plate of the earliest period may be sought in vain, and the greatest collectors may hardly hope for such a panoply of the late Gothic period as that which is the ornament of the Wallace collection. Even this famous harness is not wholly free from suspicion of restoration. Armour of the latter half of the 16th century, however, often appears in the sale-rooms and is found in many private collections, although the "ancestral armour" which decorates so many ancient halls in England is generally the plates and pots which served the pikemen of the 17th-century militia.

Collections.

It is not hard to understand this scarcity of ancient pieces. In the first place it must be remembered that the fully armed man was always a rare figure in war, and only the rich could engage in the costly follies of the later tournaments. The novelists have done much to encourage the belief that most men of gentle rank rode to the wars lance in hand, locked up in full harness of plate; but the country gentleman, serving as light horseman or mounted archer, would hold himself well armed had he a quilted jack or brigandine and a basinet or salet. Men armed *cap a pee* crowd the illuminations of chronicle books, the artists having the same tastes as the boy who decorates his Latin grammar with battles which are hand-to-hand conflicts of epauletted generals. Monuments and brasses also show these fully armed men, but here again we must recognize the tendency which made the last of the cheap miniaturists endow their clients lavishly with heavy watch-chains and rings. As late as the 18th century the portrait painters drew their military or naval sitters in the breastplates and pauldrons, vambraces and rerebraces of an earlier age. Ancient wills and inventories, save those of great folk or military adventurers, have scanty reference to complete harnesses. Ringed hawberks, in a damp northern climate, will not survive