MEDIEVAL TECHNOLOGY AND SOCIAL CHANGE

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It is archaeology, then, and not art history, which is decisive for the dating of the arrival of the stirrup in western Europe. And that date may be placed in the first part of the eighth century, that is, in the time of Charles Martel.

However, even if the Benedictine missionaries had worked a bit faster in extinguishing horse-burials, and had thus deprived us of the spade's testimony of the arrival of the stirrup in Germanic lands, we could have discovered by other means that it must have reached the Franks in the early eighth century. At that moment the verbs *insilire* and *desilire*, formerly used for getting on and off horses, began to be replaced by *scandere equos* and *descendere*,[1] showing that leaping was replaced by stepping when one mounted or dismounted. But a more explicit indication of the drastic shift from infantry to the new mode of mounted shock combat is the complete change in Frankish weapons which took place at that time.

The *francisca*, the distinctively Frankish battle-axe, and the *ango*, or barbed javelin, both infantry weapons, disappear in the eighth century, while the old *spatha* lengthens into a longsword for horsemen.[2] Moreover, from the ninth century onward these Germanic longswords were greatly prized by both Byzantines and Saracens.[3] But above all, in the early decades of the eighth century there comes into wide use a spear having a heavy stock and spurs below the blade[4] to prevent too deep penetration of the victim which might result in difficulty in withdrawing the weapon. This quickly developed into the typical Carolingian wing-spear, with a prominent cross-piece.[5] Such lances were used, if we may believe the miniatures, both by infantry and cavalry. But their novel design is intelligible in terms of the new style of mounted shock combat with lance at rest. As we have already noted,[6] a footman or an unstirrupped rider wielding the lance at the end of his arm could seldom have impaled an adversary so deeply that his weapon would get stuck. On the other hand, a stirrupped horseman with lance at rest delivering the stroke with the

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[1] Schlieben, op. cit. 180.   [2] See p. 146.
[3] A. Zeki Validi, 'Die Schwerter der Germanen nach arabischen Berichten des 9–11. Jahrhunderts', *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, xc (1936), 19–37. Salin, op. cit. iii. 97, 105–7, 112, 196, finds mass production of fine laminated swords for export in the Carolingian Rhineland; but, 107, believes that by the eleventh century the Germanic damascened sword passed out of use because of heavier defensive armour. However, such swords continued to be made into the twelfth century; cf. C. Panseri, 'Ricerche metallografiche sopra una spada da guerra del XII secolo', *Documenti e contributi per la storia della metallurgia*, i (1954), 5–33.
[4] See p. 147.   [5] See p. 147.   [6] *Supra*, p. 8.

full momentum of his own body and that of his horse must often have done so, unless his spear were fitted with some baffle behind the blade. The generalization of the wing-spear in itself is evidence that under Charles Martel and his sons the meaning of the stirrup for shock combat was being realized.[1]

The historical record is replete with inventions which have remained dormant in a society[2] until at last—usually for reasons which remain mysterious—they 'awaken' and become active elements in the shaping of a culture to which they are not entirely novel. It is conceivable that Charles Martel, or his military advisers, may have realized the potential of the stirrup after it had been known to the Franks for some decades. However, the present state of our information indicates that it was in fact a new arrival when he used it as the technological basis of his military reforms.

As our understanding of the history of technology increases, it becomes clear that a new device merely opens a door; it does not compel one to enter. The acceptance or rejection of an invention, or the extent to which its implications are realized if it is accepted, depends quite as much upon the condition of a society, and upon the imagination of its leaders, as upon the nature of the technological item itself. As we shall see, the Anglo-Saxons used the stirrup, but did not comprehend it; and for this they paid a fearful price. While semi-feudal relationships and institutions had long been scattered thickly over the civilized world, it was the Franks alone—presumably led by Charles Martel's genius—who fully grasped the possibilities inherent in the stirrup and created in terms of it a new type of warfare supported by a novel structure of society which we call feudalism.

III

Mounted Shock Combat and the Temper of Feudal Life

The feudal class of the European Middle Ages existed to be armed horsemen, cavaliers fighting in a particular manner which was made possible by the stirrup. This *élite* created a secular culture closely related to its style of fighting and vigorously paralleling the ecclesiastical culture of the Church.[3] Feudal institutions, the knightly class,

[1] See p. 147. [2] e.g. the mechanical crank; cf. *infra*, pp. 110-15.
[3] In its relationships with the ecclesiastical culture, chivalric culture seems to have been highly selective; e.g. E. R. Labande, 'Le "Credo" épique: à propos des prières

and chivalric culture altered, waxed and waned; but for a thousand years they bore the marks of their birth from the new military technology of the eighth century.

While money had by no means gone out of circulation in the Frankish realm, the West of the eighth century was closer to a barter economy than was either contemporary Byzantium or Islam.[1] Moreover, the bureaucracy of the Carolingian kingdom was so slender that the collection of taxes by the central government was difficult. Land was the fundamental form of riches. When they decided that it was essential to secure cavalry to fight in the new and very expensive manner, Charles Martel and his heirs took the only possible action in seizing Church lands and distributing them to vassals on condition of knight's service in the Frankish host.[2]

Fighting in the new manner involved large expenditures. Horses were costly, and armour was growing heavier to meet the new violence of mounted shock combat. In 761 a certain Isanhard sold his ancestral lands and a slave for a horse and a sword.[3] In general, military equipment for one man seems to have cost about twenty oxen,[4] or the plough-teams of at least ten peasant families. But horses get killed: a knight needed remounts to be effective; and his squire should be adequately mounted. And horses eat large quantities of grain, an important matter in an age of more slender agricultural production than ours.

Although in the Frankish realm the right and duty to bear arms rested on all free men regardless of economic condition,[5] naturally the great majority could afford to come to muster only on foot, equipped with relatively inexpensive weapons and armour.[6] As has been mentioned, even from this group Charlemagne tried to raise horsemen[7] by commanding that the less prosperous freemen should

dans les chansons de geste', *Mémoires et documents publiés par la Société de l'École des Chartes*, xii. ii (1955), 62–80, shows that these knightly prayers contain chiefly Biblical materials, and far less apocryphal and legendary matter than is to be found in the iconography of contemporary churches.   [1] See p. 148.

[2] Prejudice against confiscation of Church lands was so strong that by 755 the Carolingians began to require the holders of such *precariae verbo regis* to pay to their former clerical owners one-fifth of the produce annually. Clarifying much earlier confusion, G. Constable, '*Nona et decima*: an aspect of Carolingian economy', *Speculum*, xxxv (1960), 224–50, shows that these payments were quite distinct from the regular tithe which was due from all lands.

[3] H. Wartmann, *Urkundenbuch S. Gallen* (Zürich, 1863), i. 34, no. 31.

[4] *Lex ribuaria*, xxvi. 11, *MGH, Leges*, v. 231; cf. Delbrück, op. cit. iii. 4; Kaufmann, op. cit. i. 339, n. 1.   [5] See p. 148.   [6] See p. 149.

[7] Fehr, op. cit. 118–19, shows that the effort of A. Dopsch, *Wirtschaftsentwicklung*

band together, according to the size of their lands, to equip one of their number and send him to the wars.[1] Such an arrangement would be hard to administer, and it did not survive the confusion of the later ninth century.[2] But inherent in this device was the recognition that if the new technology of warfare were to be developed consistently, military service must become a matter of class. Those economically unable to fight on horseback suffered from a social infirmity which shortly became a legal inferiority. In 808 the infelicitous wording of a capitulary *De exercitu promovendo* distinguishes 'liberi' from 'pauperes':[3] the expression is legally inexact, but it points to the time when freedom was to become largely a matter of property. Two capitularies of 825 show how rapidly concepts were moving. One separates 'liberi' from 'mediocres quippe liberi qui non possunt per se hostem facere'; while the other refers to those latter as 'liberi secundi ordinis'.[4] With the collapse of the Frankish empire, the feudality which the Carolingians had deliberately created, in terms of the new military method of mounted shock combat, to be the backbone of their army became the governing as well as the fighting *élite*. The old levy of freemen (although not all infantry) vanished, and a gulf appeared between a warrior aristocracy and the mass of peasants. By about the year 1000, *miles* had ceased to mean 'soldier' and had become 'knight'.[5]

The feudal aristocrat might, indeed, be a ruler, but this was incidental to his being a warrior. A student of medieval poetry has remarked that the 'essential note of true knighthood is to put down wrong-doers—not a magistracy but a substitute or supplement for magistracy'.[6] The image of the cavalier reflected in his literature

der Karolingerzeit (Weimar, 1913), ii. 18–19, to prove that this plan of sharing military burdens is older than Charlemagne rests upon a misinterpretation of a capitulary of 825 (*MGH, Cap.* i. 325, c. 3).

[1] *MGH, Cap.* i. 134, c. 2; cf. Brunner, *Deutsche Rechtsgeschichte*, 2nd edn. (Munich, 1928), ii. 273–5.

[2] It last appears in 864; cf. *MGH, Cap.* ii. 310.

[3] *MGH, Cap.* i. 137, c. 2.

[4] Ibid. 329, c. 1; 325, c. 3; cf. K. Bosl, 'Freiheit und Unfreiheit: zur Entwicklung der Unterschichten in Deutschland und Frankreich während des Mittelalters', *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte*, xliv (1957), 206–7.

[5] G. Duby, *La Société aux XIᵉ et XIIᵉ siècles dans la region mâconnaise* (Paris, 1953), 231; F. L. Ganshof, 'Les Relations féodo-vassaliques aux temps post-carolingiens', *Settimane di studio del Centro Italiano di Studi sull'Alto Medioevo*, ii (1955), 83–85; K. J. Hollyman, *Le Développement du vocabulaire féodal en France pendant le haut moyen âge* (Paris, 1957), 129–34.

[6] G. Mathew, 'Ideals of knighthood in late fourteenth-century England', *Studies in Medieval History presented to F. M. Powicke* (Oxford, 1948), 360.

shows that his self-respect was based primarily on two ideal virtues: loyalty to his liege (after the troubadours had done their work, to his lady as well), and prowess in combat. Both *loiautee* and *proesce* were integral to feudal origins.

The members of the feudal class held their lands and enjoyed their status by reason of loyalty in regard to their obligation of knight's service. Gradually the concept was broadened to include other 'aids', notably assisting at the court of one's liege lord. But the original and basic knight's service was mounted shock combat. When the central royal authority evaporated during the later ninth century, subinfeudation assured that the concept of feudal loyalty remained vigorous. Feudal tenures quickly became hereditary, but they could be inherited only by one able to fulfil the duty of knight's service. Elaborate rules for the wardship of minors, and regulations requiring widows and heiresses to marry, guarded this essential requirement for enfiefment.

The chivalric class never repudiated the original condition of its existence: that it was endowed to fight, and that anyone who could not or would not meet his military obligations forfeited his endowment. The duty of knight's service is the key to feudal institutions. It is 'the touchstone of feudalism, for through it all else was drawn into focus; and its acceptance as the determining principle of land-tenure involved a social revolution'.[1]

The feudal sense that the enjoyment of wealth is inseparable from public responsibility chiefly distinguishes medieval ideas of owner-ship from both classical and modern. The vassal class created by the military mutation of the eighth century became for generations the ruling element of European society, but through all subsequent chaos, and despite abuses, it never lost completely its sense of *noblesse oblige*, even when a new and rival class of burghers revived the Roman notion of the unconditional and socially irresponsible possession of property.

The second element in a knight's pride, prowess, was inherent in the adequate performance of his service. Quite apart from the cost of arms and horses, the new mode of fighting necessarily destroyed the old Germanic idea that every freeman was a soldier. Mounted shock combat was not a business for part-time warriors: one had to be a skilled professional, the product of a long technical training, and in excellent physical condition. Towards the middle of the ninth

[1] H. A. Cronne, 'The origins of feudalism', *History*, xxiv (1939), 253.

century Hrabanus Maurus quotes a Frankish proverb that to learn to fight like a knight one must start at puberty. Even more significant is Hrabanus's indication that in his time the households of great lords had already become schools in which boys were trained in the chivalric arts, probably including practice in the tilt-yard.[1]

Stenton has remarked that 'the apprenticeship which preceded knighthood is the most significant fact in the organization of feudal society'.[2] It welded together a self-conscious, cosmopolitan military caste, aware of its solidarity and proud of its traditions, an essential part of which was great rivalry among knights in feats of arms. When a youth was at last admitted to the guild of knights,[3] he was professionally committed to slaying dragons. The new mode of combat, with its high mobility and fearful impact, opened fresh fields for deeds of individual prowess. The old days were gone of standing in formation in the shield-wall and thrusting and hacking. While in the feudal age major battles were often planned carefully, and executed with admirable discipline by squadrons of knights,[4] the emotional life of the chivalric warrior was highly individualized. Long passages of the *chansons de geste* are devoted to blow-by-blow accounts of mighty encounters which can be appreciated only if one pictures the technical interests of the feudal audience. And at last, in Froissart's *Chronicle*, the chivalric world produced a philosophy of history which announced the recording of great feats of arms for the edification of posterity to be the chief duty of Clio.[5]

Keeping physically fit and dexterous in the use of arms in shock combat were the presuppositions of ability to display both loyalty to the liege and prowess in battle. To that end the chivalric stratum

[1] See p. 149.

[2] F. M. Stenton, *First Century of English Feudalism, 1066–1166* (Oxford, 1932), 131.

[3] See p. 150.

[4] P. Pieri, 'Alcuni quistioni sopra la fanteria in Italia nel periodo comunale', *Rivista storica italiana*, l (1933), 567–8; J. F. Verbruggen, 'La Tactique militaire des armées de chevaliers', *Revue du nord* xxix (1947), 161–80, and his *De krijgskunst in West-Europa in de middeleeuwen, IXᵉ tot begin XIVᵉ eeuw* (Brussels, 1954), esp. 52–58, 148–54, destroy the conventional view that medieval battles were disorderly slaughter. On the contrary, knights habitually fought, both in the field and at tournaments, in *conrois* of from twelve to forty horsemen operating as a shock-combat group and placing great stress upon maintaining a line formation at the charge.

[5] *Chroniques de J. Froissart*, ed. S. Luce (Paris, 1869), i. 1: 'Afin que les grans merveilles et li biau fait d'armes, qui sont avenu par les grans guerres de France et d'Engleterre et des royaumes voisins, dont li roy et leurs consaulz sont cause, soient notablement registré et ou temps present et a venir veu et cogneu, je me voel ensonnüer de l'ordonner et mettre en prose.'

developed and elaborated a deadly and completely realistic game of war—the tournament. In 842 there was a formidable passage at arms near Strassburg in the presence of Charles the Bald and Louis the German, and evidently at that time such events were not excep- tional.[1] However, concrete evidence about such knightly free-for-alls is scanty until the twelfth century. Thereafter they 'formed the pastime of the higher class up to the Thirty Years War'.[2]

As the violence of shock combat increased, the armourer's skill tried to meet it by building heavier and heavier defences for the knight. Increasingly he became unrecognizable beneath his carapace, and means of identification had to be developed.[3] In the Bayeux Tapestry of the late eleventh century the pennons are more indivi- dualized than the shields.[4] By the early twelfth century, however, not only armorial devices but hereditary arms were coming into use in France, England, and Germany.[5] It is not playing tricks with semantics to insist that the feudal knight himself, and his society, knew who he was in terms of his arms. The exigencies of mounted shock combat, as invented by the Franks of the eighth century, had formed both his personality and his world.

Wherever the Carolingian realm extended its vast borders, it took its mode of fighting, its feudal institutions, and the seeds of chivalry. In Italy, for example, although anticipations of feudal relationships can be discovered in the Lombard kingdom, the feudal combination of vassalage and benefice was introduced by Charlemagne's conquest

[1] Nithard, iii. 6, *MGH, Scriptores*, ii. 667: 'Ludos etiam hoc ordine *saepe* causa exercitii frequentabant.' Cf. F. Niederer, *Das deutsche Turnier im XII. und XIII. Jahrhundert* (Berlin, 1881), 7.
[2] R. C. Clephan, *Defensive Armour* (London, 1900), 77. K. G. T. Webster, 'The twelfth-century tourney', in *Anniversary Papers by Colleagues of G. L. Kittredge* (Boston, 1913), 227–34, and N. Denholm-Young, 'The tournament in the thirteenth century', in *Studies in Medieval History presented to F. M. Powicke* (Oxford, 1948), 240–68, emphasize the brutal realism of the tourney as practice for war.
[3] That identification, not merely ornamentation, was the functional reason for the emergence of heraldry is indicated by the fact that the earliest term for arms is *cunuis- sances* or *conoissances*; cf. R. Chabanne, *Le Régime juridique des armoiries* (Lyons, 1954), 3–4. Since all warriors, until our age of camouflage, have decorated their arms, we should beware of discovering heraldry in the early tenth century when Abbo, *De bellis Parisiaci urbis*, i. 1. 256–7, in *MGH, Scriptores*, ii. 783, says that from the walls of besieged Paris 'nihil sub se nisi picta scuta videt'. [4] See p. 150.
[5] P. Gras, 'Aux origines de l'héraldique: La decoration des boucliers au début du XIIᵉ siècle, d'après la Bible de Citeaux', *Bibliothèque de l'École des Chartes*, cix (1951), 198–208; A. R. Wagner, *Heralds and Heraldry in the Middle Ages* (Oxford, 1956), 13–17; C. U. Ulmenstein, *Über Ursprung und Entstehung des Wappenwesens* (Weimar, 1935), 15, 56–60.

of the late eighth century.[1] But even where Frankish institutions and attitudes did not penetrate, their mode of fighting could not be disregarded.

In Byzantium the new military technology of the Franks was making itself felt by the time of Nicephoras II Phocas (963–9) who, because of the great increase in the cost of arms, felt compelled to raise the value of the inalienable minimum of a military holding from four to twelve pounds of gold.[2] Here, as in the West, military change on such a scale involved profound social change. As Ostrogorsky remarks, it 'must certainly have meant that the Byzantine army would henceforth be composed of a different social class. The heavily armed soldiers of Nicephoras . . . could no longer be the old peasant militia'.[3] Like their Germanic neighbours, the Greeks increased their emphasis on cavalry to the point where, in the tenth century, the garrison of Constantinople consisted of four regiments of horse as compared with one of infantry.[4]

Even the forms and uses of Byzantine arms came to be copied from the West. The earliest Frankish pictures of the lance held at rest come from the end of the ninth century;[5] the first Byzantine representations are of the tenth to eleventh centuries.[6] By about the year 1000 the demands of mounted shock combat had led the Franks

[1] P. S. Leicht, 'Gasindi e vassali', *Rendiconti della Reale Accademia Nazionale dei Lincei, Classe di scienze morali, etc.*, ser. 6, iii (1927), 291–307, and 'Il feudo in Italia nell'età carolingia', *Settimane di studio del Centro Italiano di Studi sull'Alto Medioevo*, i (1954), 71–107.

[2] F. Dölger, *Regesten der Kaiserurkunden des oströmischen Reichs* (Munich, 1924), i. 93, no. 721; J. and P. Zepos, *Jus graecoromanorum* (Athens, 1931), i. 255–6. P. Lemerle, 'Esquisse pour une histoire agraire de Byzance: les sources et les problèmes', *Revue historique*, ccxx (1958), 53, rightly deplores the lack of special studies of Byzantine armament which would permit us to judge exactly the basis of Nicephoras Phocas's drastic action.

[3] In *Cambridge Economic History of Europe*, i (Cambridge, 1941), 208; cf. E. H. Kantorowicz, ' "Feudalism" in the Byzantine Empire', *Feudalism in History*, ed. R. Coulborn (Princeton, 1956), 161–2. Lemerle, loc. cit., n. 4, challenges Ostrogorski on this point; but whatever Nicephoras Phocas's intentions, would not the result of his decree be to raise the endowed soldier to a higher social class?

[4] C. Diehl and G. Marcais, *Le Monde oriental de 395 à 1081* (Paris, 1936), 464.

[5] *Infra*, p. 148.

[6] A. Goldschmidt and K. Weitzmann, *Die byzantinische Elfenbeinskulpturen des X.–XIII. Jahrhunderts* (Berlin, 1930), i, nos. 12, 20; also no. 98e, of the twelfth century, in which the authentic portion of a modern forgery shows two Byzantine riders charging each other with lances at rest. D. Koco, 'L'Ornamentation d'un vase à mesurer du Musée Cluny et les "Stecci" bosniaques', *Artibus Asiae*, xv (1952), 198, fig. 2, shows a Bosnian tombstone of the later Middle Ages with two knights wearing helmets of oriental design but equipped with Western shields, and jousting with the lance at rest.

to modify the older circular or oval shield by lengthening it to a pointed kite shape which gave greater protection to the knight's left leg.[1] A century later this is found in Constantinople.[2] Moreover, the cross-bow, which the West had invented, or revived, or borrowed from China in the later tenth century as an 'anti-tank gun' to penetrate the massive new armour,[3] was a complete novelty to Anna Comnena in Byzantium at the time of the First Crusade.[4]

Nor was Islam exempt, even before the First Crusade, from the contagion of Frankish military ideas. In 1087, when Armenian architects built the Bāb an-Naṣr, one of the three great gates of Cairo, it was decorated with a frieze of shields, some round, but some rounded above and pointed below such as we see the Normans carrying in the Bayeux Tapestry.[5] The Arabic word for such pointed shields, *tārīqa*, is derived from the French *targe*.[6] By Saladin's day, the Muslims were using several kinds of cross-bows;[7] they employed the new method of shock combat;[8] and their word for the heavy lance, *qunṭarīya*, was either of Greek or Romanic derivation.[9] They much admired the brilliance of the Christian painted shields,[10] and there can be little doubt that the basic concept of Saracenic heraldry is a reflection of the Frankish. By the later thirteenth century the tournament on the Western pattern was practised by the Muslim chivalry of Syria and Egypt.[11] Perhaps most significant is the admiration with which al-Herewī (d. A.D. 1211) describes the carefully co-ordinated battle tactics of the Franks, and the way cavalry and infantry gave mutual support.[12]

[1] For a West German ivory of *c.* 1000, cf. H. Schnitzler, *Der Dom zu Aachen* (Düsseldorf, 1950), pl. 59; for the Catalan Farfa Bible, fols. 94ᵛ, 161ʳ, 342ʳ, 352ʳ, 366ᵛ, see *infra*, p. 150; for the Codex aureus Epternachensis, fol. 78, datable *c.* 1035–40, cf. A. Grabar and C. Nordenfalk, *Early Medieval Painting* (New York, 1957), 212.
[2] *Octateuch* of the Library of the Seraglio, MS. 8, fols. 134ʳ, 136ᵛ, 139ʳ, 368ʳ; photographs in Princeton Index. For date, cf. K. Weitzmann, *The Joshua Roll* (Princeton, 1948), 6.   [3] See p. 151.
[4] *Alexiad*, tr. E. A. S. Dawes (London, 1928), 255.
[5] K. A. C. Cresswell, 'Fortification in Islam before A.D. 1250', *Proceedings of the British Academy*, xxxviii (1952), 114.
[6] C. Cahen, 'Un traité d'armurerie composé pour Saladin', *Bulletin d'études orientales de l'Institut français de Damas*, xii (1948), 137, 155, n. 2, 160.
[7] Ibid. 127–9, 150–1.   [8] *Supra*, p. 2, n. 2.   [9] Ibid. 134–6, 154–5.
[10] Ibid. 137, 155, n. 2; L. A. Mayer, *Saracenic Heraldry, a Survey* (Oxford, 1933), does not offer evidence of East–West influences.
[11] H. Ritter, 'La Parure des cavaliers [of ibn Huḍail] und die Literatur über die ritterlichen Künste', *Der Islam*, xviii (1929), 122, 127. W. B. Ghali, *La Tradition chevalresque des arabes* (Paris, 1919), 28, 32–33, concludes that the idea of an 'order' of knighthood was likewise adopted from the West in the twelfth century.   [12] Ritter, op. cit. 147.

If such was the situation in the Levant, we should expect even greater Frankish influence upon Spanish Islam. We have already noted[1] that the Moors developed their emphasis on cavalry a generation after Charles Martel's reform, and were possibly inspired by it. In any case by the thirteenth century the knights of the Reconquista were setting the styles for their Saracenic adversaries. Ibn Sa'īd tells us that 'Very often the Andalusian princes and warriors take the neighbouring Christians as models for their equipment. Their arms are identical, likewise their surcoats of scarlet or other stuff, their pennons, their saddles. Similar also is their mode of fighting with bucklers and long lances for the charge. They use neither the mace nor the bow of the Arabs, but they employ Frankish crossbows for sieges and arm infantry with them for their encounters with the enemy.'[2] Since the Berbers across the Strait of Gibraltar were not so often in contact with Christian arms, Ibn Sa'īd notes that they could use light equipment, whereas the Christian peril compelled the Spanish Muslim warriors to be 'weighed down by the burden of buckler, long thick lance and coat of mail, and they cannot move easily. Consequently their one aim is to stick solidly to the saddle and to form with the horse a veritable iron-clad whole.'[3]

The most spectacular extension, however, of the Frankish military technology, together with all its social and cultural concomitants, was the Norman conquest of England. The Anglo-Saxons were acquainted with the stirrup,[4] but did not sufficiently modify their methods of warfare in terms of it. In Anglo-Saxon England there were seigniorial elements, as there had been in Merovingian Gaul; but there was little tendency towards feudalism or the development of an *élite* of mounted warriors.[5] Harold, his thegns and housecarls, rode stirrupped horses: at the battle of Stamford Bridge King Harold Hardrada of Norway said of him 'That was a little man, but he sat firmly in his stirrups'.[6] However, when they reached Hastings

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[1] *Supra*, pp. 12–13, n. 1.

[2] Quoted by E. Lévi-Provençal, *L'Espagne musulmane au Xᵉᵐᵉ siècle* (Paris, 1932), 146.

[3] See p. 152.

[4] For the Anglo-Saxon word, see *infra*, pp. 142–3. A stirrup of the Viking age has been found in the Thames; cf. *London Museum Catalogues, No. 1: London and the Vikings* (London, 1927), 39, fig. 17. On the use of cavalry by the invading Norsemen, see J. H. Clephan, 'The horsing of the Danes', *English Historical Review*, xxv (1910), 287–93, rather than F. Pratt, 'The cavalry of the Vikings', *Cavalry Journal*, xlii (1933), 19–21.

[5] Stenton, op. cit. 125, 130–1.

[6] *Heimskringla*, iv. 44, tr. S. Laing (London, 1930), 230. R. Glover, 'English warfare

they dismounted to do battle on foot, in the old Germanic shield-wall[1] with which Charles Martel had defeated the Saracens at Poitiers.

At Hastings[2] the Anglo-Saxons had the advantage of position on the hill of Senlac; they probably outnumbered the Normans; they had the psychological strength of fighting to repel invaders of their homeland. Yet the outcome was certain: this was a conflict between the military methods of the seventh century and those of the eleventh century. Harold fought without cavalry and had few archers. Even the English shields were obsolete: the Bayeux Tapestry shows us that while the royal bodyguard fought with kite-shaped shields—probably a result of Edward the Confessor's continental education—most of the Anglo-Saxons were equipped with round or oval shields.[3] From the beginning William held the initiative with his bowmen and cavalry, and the English could do nothing but stand and resist a mobile striking power which at last proved irresistible.

When William had won his victory and the crown of England, he rapidly modernized, i.e. feudalized, his new kingdom. Naturally he preserved and incorporated into the Anglo-Norman order whatever institutions of the Anglo-Saxon régime suited his purpose; but innovation was more evident than continuity. Just as the Carolingians 300 years earlier had deliberately systematized and disciplined the long-established tendencies towards seigniority in Frankish society in order to strengthen their position, so William the Conqueror used the fully developed feudal organization of the eleventh century to establish the most powerful European state of his generation.[4]

Indeed, the England of the later eleventh century furnishes the

in 1066', *English Historical Review*, lxvii (1952), 5–9, defends the use of this late source for an understanding of the battle of Stamford Bridge.

[1] W. G. Collingwood, *Northumbrian Crosses of the Pre-Norman Age* (London, 1927), 172, fig. 211, shows an Anglo-Saxon relief of *c.* 1000 from Gosforth in Cumberland depicting an army with heavy swords and round shields overlapping to form a shieldwall.

[2] Cf. W. Spatz, *Die Schlacht von Hastings* (Berlin, 1896); A. H. Burne, *The Battlefields of England* (London, 1950), 19–45. In his brilliant reappraisal not only of Hastings but of the entire campaign of which it was the culmination, R. Glover, op. cit., 1–18, shows that Anglo-Saxons could fight effectively as cavalry, and explains some of the special circumstances which led to their reversion to infantry at Senlac. However (14, n. 3) he underestimates the iconographic conservatism of the Bayeux Tapestry in representing Norman methods of combat (cf. *infra*, p. 147), and his findings, as is remarked by G. W. S. Barrow, *Feudal Britain* (London, 1956), 34, do not alter the essential fact 'that Hastings was a decisive defeat of infantry by cavalry-with-archers'.

[3] K. Pfannkuche, *Der Schild bei den Angelsachsen* (Halle a. S., 1908), 52–53.

[4] See p. 153.

classic example in European history of the disruption of a social
order by the sudden introduction of an alien military technology.
The Norman Conquest is likewise the Norman Revolution. But it
was merely the spread across the Channel of a revolution which had
been accomplished by stages on the Continent during the preceding
ten generations.

Few inventions have been so simple as the stirrup, but few have
had so catalytic an influence on history. The requirements of the
new mode of warfare which it made possible found expression in
a new form of western European society dominated by an aristocracy
of warriors endowed with land so that they might fight in a new and
highly specialized way. Inevitably this nobility developed cultural
forms and patterns of thought and emotion in harmony with its style
of mounted shock combat and its social posture; as Denholm-Young
has said: 'it is impossible to be chivalrous without a horse.'[1] The
Man on Horseback, as we have known him during the past millen-
nium, was made possible by the stirrup, which joined man and steed
into a fighting organism. Antiquity imagined the Centaur; the early
Middle Ages made him the master of Europe.

[1] Op. cit. 240.