War in History. Doctrine, Leadership and an attempt to Illustrate the Effect on Society

K.G.H. Hillingsø

Introduction

That war is a cultural and social force needs no other proof than the fact that English is the language of this conference held in Copenhagen and that this paper produced by a Danish soldier is in English or at least the kind of English used by someone who does not have English as his mother tongue! Following the Second World War, where the major part of Denmark was liberated by the victorious Anglo-American coalition, English became the most important language, after Danish. Before 1939, German or French would have been preferred as conference languages in this country, at least by the participating military personnel.

However, whereas language preferences have changed, the reasons for the interest in military history remain unchanged. In general, military history is studied in the Danish as in other armed forces

— to make soldiers, sailors and airmen understand the influence of the special elements of danger, fear, and confusion on their ability to solve the given tasks,
— to prevent the repetition of mistakes of the past, and
— to prevent officers from remaining tied to theories derived from history in a situation where the theories, in reality, are outdated because conditions have changed.

Specifically those military historians engaged in teaching and instructing officer candidates and higher ranking personnel and in developing doctrine[1] study military history

— to gain inspiration for the development of the doctrine or to examine whether the existing doctrine is still correct, and
— to find examples which can illustrate why the doctrine is written as it is.

As the greatest military historian of our time, the British Professor Michael Howard said in 1973:

> It is the task of military science ... to prevent the doctrines from being too badly wrong. All scientific thought is a sustained attempt to separate out the constants in any situation from the variables, to explain what is of continuing validity and to discard what is ephemeral, to establish certain abiding principles and to reduce them to their briefest, most elegant formulation. (Chesney Memorial Gold Medal Lecture 1973).

In *Geschichte und Militärgeschichte,* Allmayer-Beck points out that the soldier holds the only job where you cannot gain experience in peacetime (von Gersdorff (ed.), 189). It is therefore natural that of the armed forces, the army attaches the greatest importance to the study of military history. Soldiers must simulate more

than 90% of the conditions of war, and this simulation gives at best a superficial picture of the outcome of the battle. As opposed to this, sailors and airmen in their daily struggle with the elements perform 90% of the tasks they have to perform in time of war, and of the last 10% almost all—except for the feeling of fear—can be simulated realistically because of the long range of their weapon systems.

Military history, however, plays an important role in all three forces, and therefore the military scholar should be well equipped to discuss with the civilian historian. There is, however, a snag in this observation if the military scholar is involved in the business of doctrine development. The military scholar, male or female, attached to army, navy or air force, is bent on preparing herself or himself and young officers, as well as other ranks, for leadership in war and for warfare. The main tool for planning and leading his troops is doctrine. If he/she is not very objective, he/she will tend to browse through military history to seek out examples—battles, phases and episodes in battles—that can be used to illustrate the prevailing doctrine or prove his/her personal ideas about the need for that doctrine to be adjusted. Hans van Wees points out that the role of the military in the rise of democracy in the Greek city states has been cited and manipulated by way of justification after the fact. He may well be right, at least that is very often what a soldier would do to history. Furthermore, most often the military scholar will be a generalist knowing the little he/she can use from all periods of history, and not a specialist in an epoch or episode. Finally, the military scholar mainly studies what others and often other military personnel have written. Such writings are often subjective, especially when written by participants who will tend to present their lucky strikes as the result of logical analysis and meticulous planning, and to explain away their failures. And to a great extend they use secondary or tertiary sources in English, German or French and not primary sources in more obscure languages, as the historians do.

The way military scholars utilize military history when they deal with doctrine development can be described with the following example. The two basic methods for destroying enemy forces are a) the *envelopment* to crush or force the enemy to surrender, and b) *penetration* aimed at putting the enemy leadership out of action and thus paralyzing or demoralizing his soldiers to make them easy prey. The British general Fuller called these methods, respectively, body warfare and brain warfare (Fuller 1920, 311; 1928, 93). These methods are generally referred to as inventions of Hannibal and Alexander the Great and illustrated by the battles of 216 BC at Cannae and 331 BC at Gaugamela, in spite of the fact that envelopment and penetration had taken place in many battles before the days of these two illustrious generals. I would therefore suggest to the historian that she/he mainly use the soldier, sailor or airman to explain why the warring parties and the fighters did what they did on a particular occasion. Because that is what the military man understands as he has spent his adult life looking for the best way of destroying enemy forces and protecting his own.

Interaction between the civil and military parts of society

When dealing with the subject of the conference it is difficult and perhaps even wrong to single war out from the general military impact on society. Many people will know that the sceptre of a royal head of state is just the artistic interpretation of the mace—the club used in battle. In feudal times, by the way, the mace was the main weapon of warring clergimen as they were not allowed to draw blood and thus could not use sword and lance in combat (Howard 1976, 5).

You probably also know that one of the functions of a parade originally was to introduce the soldiers to the commander and the colours under which they were going to fight. Today the parade has mainly a representative function, and a degeneration of it is the guard of honour formed in front of the church by friends of the bride and groom. This was of course more obvious in the good old days, when this line was formed solely by sword-bearing officers, than it is today where the young are armed with less martial tools such as oars or tennis rackets. Another example of the former combat

relevance of today's parade is the countermarching of the band. This maneuvre is a repetition of the drill of the 16th and 17th century musketeers.

It is probably rather common knowledge that the title 'civil engineer' was introduced in the 19th century to distinguish the non-military bridge and road builder from the soldier who until then had almost held a monopoly on engineering (Pyenson 1996, 136). For instance the French military engineering schools in the late 19th century had standards at least equalling if not exceeding those of the universities, and until this century the US Military Academy at West Point was one of the few higher technical schools in the States (von Gersdorff 1974, 192 ff.).

It is less known, however, that for instance surgery, mapping, meteorology, and radio-communication were originally military specialties. The armed forces were first at schooling medical specialists to work with technical dexterity, speed, and detailed anatomic knowledge as it was easier to patch up seasoned soldiers than to train new ones (Pyenson 1996, 136). The military systematized mapping of territories, the stars, and naval hydrography. The use of radio and the organization of meteorology derived from military needs not least in connection with aviation. Even the standard metre was constructed by military experts from the French Bureau des Longitudes (Pyenson 1996, 138).

Doctrine and leadership

In the following I will give some examples of doctrine and leadership from the period in focus at this conference. As war essentially is a conflict between states, classes or coherent groups, I will not deal with individuals and duels but only with armies and warfare. Emphasis will be on land warfare as I will focus on tactics.[2] And I must remind the reader that I only relay the interpretation that military historians generally give.

The Greeks

The first example chosen is Greek warfare until 400 BC. The Greek concept was adapted to the democratic city-state. Male inhabitants of the town were organized in a phalanx that was 8 men deep so that the hindmost man could influence the battle with his spear. They were armed with a 6m long thrusting spear—infantry lance or pike—and a sword. They protected themselves with helmet, breastplate, and greaves in bronze, and a round shield one metre in diameter, which they carried on the left arm in straps. Straps being a new invention protecting the fingers.

The doctrine was to run forward with the lance, thrust it at the uncovered parts of the opponent's body, and when too close to the enemy to use the lance they hacked at him with the sword.

The shield not only protected the bearer but also part of his neighbour to the left, and the phalanx that was able to keep up cohesion and constant pressure on the opponent for the longest time carried the day.

The leader fought in the ranks with the others. If he was a skilled and strong warrior he probably fought on the right flank unprotected by any neighbour. From there he would be able to lead the outflanking of the enemy's left followed up by the rolling up of the enemy phalanx. Apart from the lumbering attack this was generally the only manoeuvre in battle.

In sea battles the Greeks used the galley with strengthened bow. They tried to ram and sink the enemy vessel, and if it did not sink directly they bombarded the enemy crew with spears or other missiles, boarded and fought with their swords.[3]

The Macedonians

Around 300 BC the warships and naval doctrine were generally unchanged, but on land the Macedonians had improved the organization and tactics. When Alexander the Great entered Persia he had an army well suited for sustained campaigning abroad. The forces contained a variety of specialists including bowmen, slingthrowers, engineers and logisticians, but the core of the army was made up of the heavy cavalry, the Cataphracts or Companion Cavalry, and the light infantry, the Hypaspists or Shield Bearers (Keegan 1987, 35).

The main weapon of the Companions was a 2,5 to 3m long thrusting spear, and they wore a cuirass for protection. Thus what made the Companion Cavalry heavy was not so much their armament but their ability to manoeuvre and attack. The cavalry was no longer some stray horsemen used for scouting, harassing, or as messengers; it was now a phalanx on horseback. The ordinary, heavy infantry was protected like the Greek infantry and armed with sword and a 4m long pike, whereas the Hypaspists, according to some sources, used a short lance (Lauffer 1978, 52). This sounds right because it enhanced mobility, and in general the infantry was now more mobile as the phalanx could vary its depth and be subdivided (Keegan 1987, 36-38). It was thus able to move more quickly and to take up formations suited for the terrain, the enemy formation, and other special circumstances. The standard infantry formation of the Macedonians was a phalanx 16 ranks deep.

The doctrine was to start the battle by bombarding the enemy with stones and arrows to wear him down—what we today would call preparatory fire. The bombardment was followed up by an attack using a formation suited to the actual circumstances.

At Gaugamela in 331 BC Alexander concentrated his main forces on the right flank and manoeuvered using an oblique order (cf. p. 122, above) with the result that the Persian king Darius' forces lost cohesion. Then Alexander attacked with his companions aiming at Darius, who eventually fled. Alexander then solved the problems that had arisen where he had weakened his formation to make his right flank strong, and when the Persians heard of Darius' flight and began to flee, Alexander started the pursuit (Fuller 1972, 102-6).

Alexander led by indulgence and example. He was conspiciously clad and spoke to his troops—or at least to his officers—before the battle. He also presented himself in front of the formation on his renowned horse Bukefalos, which he did not use in battle in its later years. And until his wounds made it impossible he fought at the head of the Companions, or the Hypaspists if infantry went in first (Keegan 1993, 45-46, 61-63; Lauffer 1978, 197-212).[4]

The Romans

Around 200 BC the Romans began to break up the Greek inspired phalanx into Maniples (companies, as they would be called today) of 120 men. This made the phalanx—the Legion—more manoeuverable and better suited to adapt to the terrain, and gave the Romans a smaller formation—the Maniple—with a certain ability to fight on its own. (Keegan 1993, 264).

The legion consisted of 3,000 to 4,000 light and heavy infantry and 300 cavalry. The light infantry, the Velites, were armed with a sword, two throwing spears—javelins—and carried as the only protection a round shield 1m in diameter. The heavy infantry was divided into three groups according to age and experience. The youngest were the Hastati, then came the Principes, and the oldest group was formed by the Triarii. The heavy infantry was armed with two javelins and a sword, except for the triarii, who carried a thrusting spear (lance), a sword and a dagger. For protection they all wore a helmet and breastplate of bronze, and a semi-cylindrical, rectangular shield. The cavalry had lances, swords and round leather shields. On the march everybody carried entrenching tools (Montgomery 1968, 86-89; Keegan 1993, 264).

The legion organized for battle with the velites in front. Behind them stood the main force, the heavy infantry, in three lines. The first line consisted of the 1200

hastati, the second of the 1200 principes, and the third line of the 600 triarii, all broken up in maniples placed in a chequered formation where the maniples of the second line covered the intervals between the first and the third (Montgomery 1968, 86).

The doctrine included the building of fortified camps. In hostile country a camp was erected at the end of every day. It served as a base and defence position into which one could retire if things went wrong on the battlefield (Montgomery 1968, 87-89). On the battlefield the maniple legion fought in open formation against an enemy formed in phalanx and could thereby, through its manoeuverability, break the phalanx apart. Against the loose formations of the barbarians the whole legion could fight in close order as a phalanx. The idea of offensive battle was to put the enemy under relentless and constant pressure. It was opened by the velites who after having thrown their javelins retired into the formation of the heavy infantry to fight between maniples or to protect flanks. At this point the hastati would be within range of the enemy, throw their javelins, and go for the enemy with their swords. When the hastati were worn down they were relieved by the principes. The triarii were the last reserve. They only rarely went into combat, but if the victory had not been secured by the attack of the hastati and the principes, they would form a single line and retire through the triarii who would then attack as a phalanx. In adverse conditions the triarii could also form a hedgehog formation to protect the others with their lances or secure the retreat to the fortified camp. Cavalry was used to scout, harass the enemy, protect the flanks and in the pursuit.

Against an even enemy with discipline and training equal to that of the Romans the maniple legion was not sufficiently flexible. This was seen in the battle at Cannae in 216 BC, where the Carthaginian Hannibal demonstrated his operative superiority and gave us the classic example of the double envelopment. He let the Roman infantry advance and press his centre back. Thereby the Romans were lured forward, abandoning their conventional linear formation and squeezing themselves together to push through. When the Carthaginian formation was concave and the Romans had too little space to develop their fighting power, Hannibal advanced his infantry from the left and right and turned them inwards on to the Roman flanks. At the same time he attacked the Roman rear with his cavalry, and the Roman army 'was swallowed up as if by an earthquake' (Fuller 1972, 129).

Although the maniple legion after Cannae was enhanced and used with success against Hannibal, e.g., in the battle at Zama in 202 BC, the Romans in the last century BC introduced the professional cohort legion. This legion of up to 6,000 men was broken up in cohorts of 600, consisting of one maniple of hastati, one of principes and one of triarii. The battle formation thus mixed the three groups of heavy infantry, and enabled the best and most experienced soldiers to influence the rest directly. The heavy infantry was now a force of professional Roman soldiers, whereas the light infantry, the velites, were foreign auxiliaries.

Armament and doctrine were not changed very much. Only the lance of the triarii had been replaced by javelins, and these were now only thrown at very close range (25m) where the effect was optimal. The cohort legion manoeuvred and fought in formations adapted to terrain and other circumstances. They could use one (simplex acies), two (duplex acies) or three lines (triplex acies). Triplex acies, with four cohorts in the first, and three in the second and third line, was the preferred formation. The third line was a much more flexible reserve than the triarii had been in the maniple legion, and could be used to circumvent the enemy.

The Roman leaders were conspiciously dressed. Caesar, for example, wore a red cloak, his battlefield oratory was famous and he took part in the battle, though only in special cases in the first rank (Keegan 1987, 332). But there he had the officers, in particular the centurions—the backbone of the army—company commanders raised from the ranks because of their skill and bravery.[5]

The Vikings

A paper produced for any conference in the Scandinavian countries would be incomplete—at least seen with Scandianvian eyes—if the Vikings were not mentioned. However, in this context I find it relevant to deal with Viking warfare as it took place within the time span in question, and Romans and Vikings undoubtedly met in combat.

The Viking Age is generally defined as the periode from the 8th to the 11th century AD (Griffith 1995, 16-19). To be more specific, from AD 793 when the Vikings sacked St. Cuthbert's Abbey on Lindisfarne, to 1066 when Harald Haarderaade's landing in England aborted or, if you like, when the Rouen Vikings from Normandy beat the Anglo-Saxons at Hastings.

The Vikings fought foreigners, but they mainly fought other Vikings. We don't know much about their art of war. The Icelandic Sagas are of course great reading, but they were written 100 or more years after the events, and were meant to be stories told to entertain, not to rely literal and well-attested fact (Griffith 1995, 28-37, 212-15; Jensen 1993, 10-19). They convey the same truth about Viking warfare as would a Sylvester Stallone or Schwarzenegger video about late 20th century warfare.

The Vikings generally operated on a small scale against weaker or unprepared opponents, but large scale organized warfare was undertaken in Royal army campaigns with 5,000 or more men (Griffith 1995, 122-26). The army could be split up in units, 'battles', of men from the same area. It probably fought in columns rather than in line, the boat crew being the smallest tactical unit (Griffith 1995, 189) .

They were armed with throwing spear, a sword, and/or an axe. Later in the period the sword was double edged without point as it was used for slashing and not for stabbing. Generally the axe would be the light type used by farmers, but a cumbersome two-handed, long-handled axe was used by the professional soldiers—the house-carls. Poorer Vikings could carry a stabbing spear. And then some would use bow and arrow. The famous archers are mentioned in the Sagas, but in general the use of missiles was not considered to be as honourable as the use of sword and axe (Griffith 1995, 163).

For protection they carried a round shield. A metal helmet, never with horns (Griffith 1995, 24; Jensen 1993, 369), was worn, but probably only by high-status men as only 80 helmets have been found worldwide. The poorer men probably only wore a leather or woollen cap. Mail shirts came into use, some so long that they even covered the ankles, but the ordinary Viking probably only protected his body with sheepskin or the like.

The doctrine was simple. First the enemy was bombarded with stones, arrows and spears to wear him down or discourage him. Then the Vikings attacked in close order, trying to split up the enemy and drive him off the battlefield by relentless pressure. A lot of yelling was heard at least in the beginning, later to be replaced by puffing and groaning.

We know of two, probably Roman inspired, formations:

— The shield burgh much like the Roman *testudo*, in which 6x5 men covered themselves or the leader with their shields (Griffith 1995, 143), and
— The *svinefylkja* (swine's wedge) which the Vikings used in attack to break up the enemy formation. Like the Roman swine's-head formation it had two men in front, right behind them three men, then four etc. (Griffith 1995, 188-96).

Horses were only used in combat at a very late stage. Till then they were a means for transport.

So were the boats. From around 800 the Vikings used the combination of galley and sailing ship that we today call the Viking ship. This was a means of strategic transport that in the biggest versions theoretically could hold up to 200 men. The average ship could hold around 100, but only for short trips. For long distance voyages the ship probably only took 30 men on board with all their gear, provisions etc.

Naval battle was avoided if possible as the ships were too valuable to be risked. If necessary, however, the ships lined up to meet the opponent bow to bow where the bravest and most skilled men would probably be positioned. The defender tied his ships together and made a raft of decks where he could fight as on land. The attacker could do the same or lash his boats to those of the enemy. They rowed up to the enemy, grappled, lashed,

boarded, and fought as on land. Sea battles were anti-personnel, not anti-ship warfare. The reinforcing of the ship's stern ('barded ship') was probably done more for protection than for ramming (Griffith 1995, 196-202).

The leader of the Viking horde, be he king or chieftain, was conspicuously dressed so that everybody could see him and follow his example. His position would be in the centre of the battle formation, probably marked by men carrying a banner—in the heathen days the Raven banner. As the loss of the leader could decide the outcome of the battle he might in the opening phase be protected from the enemy missiles by the shield burgh, but when infighting started he would emerge and fight at the head of his men (Griffith 1995, 127-32 and 142-53).

Lessons learned and forgotten

As shown the Macedonians learned from the Greeks, the Romans learned from the Greeks and the Macedonians, and the Vikings seem at least to have learned from the Romans. But it is also obvious that change of doctrine is not a logic development towards still higher combat efficiency. The youngest doctrine does not always seem to be the most efficient, there are strange lapses in the process, and lessons that were learned not only by another army but even within one's own seem to be forgotten.

Manoeuvre, or mobility, in battle is one of the deciding factors. Units manoeuvre to get into a position whence they can use their weapons against the enemy with maximum effect or to minimize the effect of the weapons of the enemy. The Greek phalanx had very little manoeuvrability, the Macedonian army developed into a highly mobile force, but soon manoeuvrability in battle was again reduced. Until the cohort legion was introduced in the Roman army the outcome of the battle was mainly decided by the ability of the legion to put constant pressure on the enemy, as was the case in the battles fought by the Greeks. This could be due to the fact that the Roman cohort legion was conscripted, but it does not explain why the Romans did not until a much later date, use cavalry the way the Macedonians had. It seems that the lessons learned about how heavy cavalry could change and decide a battle were forgotten for many years.

This was not the last time a vital factor was forgotten by the Romans. After they had brought their navy to good use against the Carthaginians, they forgot about the importance of a navy and neglected it. And more astonishing, later as they finally developed heavy cavalry to counter an enemy on horseback, they let the infantry deteriorate and forgot that well-led infantry with a high morale and the will to stay in position has substantial power of resistance against cavalry. This lesson, by the way, was also forgotten in the centuries where the armoured knight dominated the battlefields of Europe until the 13th century where the British longbow archers, and later the Swiss pikemen and the Hussite gunners, killed the myth of the invulnerability of the armoured knight.

When you look at the Viking doctrine you see that although the Vikings had taken up some details from the Romans the tactics were basically very primitive: attack head on and force your way into the enemy force. But an efficient battle formation, not to speak of the manoeuvering of the cohort legion, was not adopted. This was not due to lack of knowledge, as the Danes as early as the third century BC apparently had become acquainted with a phalanx-type battle formation (Randsborg 1995, 53-62). The explanation could be that the Viking warriors, except for the house-carls, were militia and thus not sufficiently trained to fight in a phalanx. It could also be that experience had shown them that their tactics were superior to the phalanx tactics. The Hjortspring find seems to suggest that stray and minor units of well-trained warriors able to fight in a phalanx had visited Denmark and succumbed to the hordes of locals. But the simple reason might well be that past experience was forgotten.

To sum up it can be concluded that there are many similarities between the way war was fought by different societies within the time-span 400 BC to AD 1000. The warring class of the societies probably learnt from past generations, and also forgot or discarded what had been passed down to them. The social structure decided the military possibilities, e.g., to build a fleet or to conscript large numbers. It also had some impact on the doctrines

adopted, but the main reasons for using a certain method were probably the same as today:

— the others (the formidable enemy or ally or the older generation) did things in this way, and
— the doctrine or method seemed to work.

In other words: the fighting men did, other things being equal, as they thought best no matter how their society was composed or built up.

Effects of war on society

In my mind there is no doubt that war and those who fight wars have affected society and that war can be regarded as an important cultural factor. It is, however, impossible to prove whether in the period discussed here military development changed society or development in society brought a change in doctrine. In general I believe that society changed first, as the military establishment always has been and still is very conservative. I also believe that changes were initiated by individual reformers who had vision as well as power, or at least influence, to force them through. Some of these individuals might of course have held high military positions.

However, what we today consider to be basic factors in psychological behaviour and leadership are without question strongly influenced by the studies of war, including the wars in the period in focus at this conference. This paper will be rounded off by a few examples of how the study of warfare has influenced modern psychology and leadership, taken from Géza Pérjes' chapter on military history and psychology (von Gersdorff (ed.) 1974, 201-9) and a compendium produced in February 1998 by the Center for Leadership of Danish Defence and Faggruppe Management at the Royal Danish Defence College.

Psychological research in wartime stress has shown that fatigue caused by fighting not only influences the muscles but also the nervous system. The nervous system is also influenced by uncertainty, and uncertainty is a constant factor in battle. Psychologists point to the closed battle formations as used by Greeks, Macedonians, Romans, and Vikings as an explanation for how the warriors were able to function under the extreme stress in battle. Today soldiers are spread thinly over the battlefield because of the enhanced effect of weapons and to keep casualties down, and you try to compensate for the stress at least by letting the soldiers fight in pairs.[6]

Another factor that compensates for stress is the noise that the soldier himself produces. The Vikings and other ancient warriors are known to have used war cries and hammering on the shields. As studies have shown this not only spread fear amongst the enemy but also bolstered the noise-makers. Therefore modern soldiers are trained to yell and scream when in close combat thereby at least gaining self confidence.

Turning to leadership you will find that Scientific Management is based on the studies of leadership and management under the most extreme circumstances namely military leadership in battle. Scientific Management is also called Taylorism as the system was drawn up by the American engineer Taylor around the turn of the century. Taylorism is based on the principles of unity of command, specialization, and leadership through exception. Today's Total Quality Management is by many seen to be a hidden return to Taylorism.

The concept of personal control was developed by the US paratroopers in 1944, and even the latest fashions in leadership theory were developed on the basis of studies of war and the military:

— Benchmarking is the measuring of own performance against the performance of others in order to get inspiration for changing own methods in order to obtain better results. To illustrate benchmarking it is mentioned that German officers in 1914 studied a travelling circus to find the most rational way of pitching and pulling down tents. During the conference another example was mentioned when Tønnes Bekker-Nielsen talked about how Pyrrhus and the Romans mutually gained good ideas by watching the opponent constructing his camp.
— Value based leadership or culture management is the principle of running an organization through

the furthering of common values and attitudes. It is generally acknowledged that this principle has been practised in military organizations since the beginning of organized warfare.

But the most striking example is that the type of leader that led the armies between 400 BC and AD 1000 is still held in the highest esteem. Leaders are today seen to belong to three categories: the heroic type, the manager, and the technologist. The military leaders of the period discussed here were all of the heroic type. And although we live in the post-heroic age (Keegan 1987, 310 ff.), and the values of the manager and the technologist are well recognized, the heroic leader is still the most sought after.

Royal Danish Defense Academy, Copenhagen

Bibliography

Allmayer-Beck, J.C. 1974. Militärgeschichte in ihrem Verhältnis zur historischen Gesamtwissenschaft, in Gersdorff (ed.) 1974, 177-99.

Faggruppe Management i samarbejde med Forsvarets Center for Lederskab 1998. *Krigens indflydelse på samfundet – set fra et management og ledelsessynspunkt*. Copenhagen: Forsvarsakademiet.

Forman, Paul (ed.) 1996. *National Military Establishment and the Advancement of Science & Technology*. Dordrecht, Boston and London: Kluwer.

Fuller, J.F.C. 1920. *Tanks in the Great War*. London: John Murray.

Fuller, J.F.C. 1928. *On Future Warfare*. London: Sifton Praed.

Fuller, J.F.C. 1970. *The Decisive Battles of the Western World*. London: Granada (Paladin).

Gersdorff, Ursula von (ed.) 1974. *Geschichte und Miltärgeschichte*. Frankfurt: Bernard & Graefe.

Griffith, Paddy 1995. *The Viking Art of War*. London: Greenhill Books.

Howard, Michael 1976. *War in European History*. Oxford: Oxford University Press.

Jensen, O.R.H. 1993. *Vikinger*. Copenhagen: Munksgaard.

Keegan, John 1987. *The Mask of Command*. Harmondsworth and New York: Penguin.

Keegan, John 1993. *A History of Warfare*. London: Hutchinson.

Lauffer, Siegfried 1978. *Alexander der Grosse*. Munich: Deutscher Taschenbuch Verlag.

Montgomery of Alamein, Bernard 1968. *A History of Warfare*. London: Collins.

Parker, H.M.D. 1958. *The Roman Legions*. Cambridge: W. Heffer & Sons.

Perjès, Géza 1974. Geschichte und Militärgeschichte, in Gersdorff (ed.) 1974, 201-9.

Pyenson, Lewis 1996. On the Military and the Exact Sciences in France, in Forman (ed.) 1996, 135-52.

Randsborg, Klavs 1995. *Hjortspring. Warfare and Sacrifice in Early Europe*. Aarhus, Oxford and Oakville, Conn.: Aarhus University Press.

Notes

1 Doctrine: Fundamental principles by which the military forces guide their actions in support of objectives. It is authoritative but requires judgement in application (*NATO Glossary of Terms* (AAP 6) 1995).

2 Tactic(s): The employment and leading of military units in combat. At the tactical level of war battles and engagements are planned and executed to accomplish military objectives assigned to tactical formations and units (generally from the smallest unit up to division (10.000 – 20.000 men)). Compare with
—operational level: at which campaigns and major operations are planned, conducted and sustained to accomplish strategic objectives within theatres or areas of operations, and
—strategic level: at which a nation or group of nations determines national or multinational security objectives and deploys national, including military, resources to achieve them. (NATO Glossary of Terms (AAP 6) 1995).

3 On Greek warfare see, e.g., Montgomery 1968, 59-70; Keegan 1993, 248-57.

4 On Macedonian warfare see, e.g., Montgomery 1968, 70-83; Keegan 1987, 27-63; Keegan 1993, 257-263; Lauffer

5 On Roman warfare see Montgomery 1968, 85-133; Keegan, 263-281; Parker

6 This and other of the subjects touched upon are treated by the French colonel Ardant du Picq in his *Études sur Le Combat, Combat Antique* and *Combat Moderne*, Paris: Chapelot 1914.

Plate 1. The Chigi Vase. Museo di Villa Giulia, Rome. H. 26.2cm. *C.* 640-630 BC. The shoulder frieze showing hoplite formations about to join battle. (After *Antike Denkmaeler* II Taf. 44)

Plate 2. Detail from plate 1.

Plate 3. Red figure chalice krater by the Niobid Painter. Musée du Louvre, Paris. H. 54cm. *C.* 460 BC. Side A (After *FR* Taf. 108).

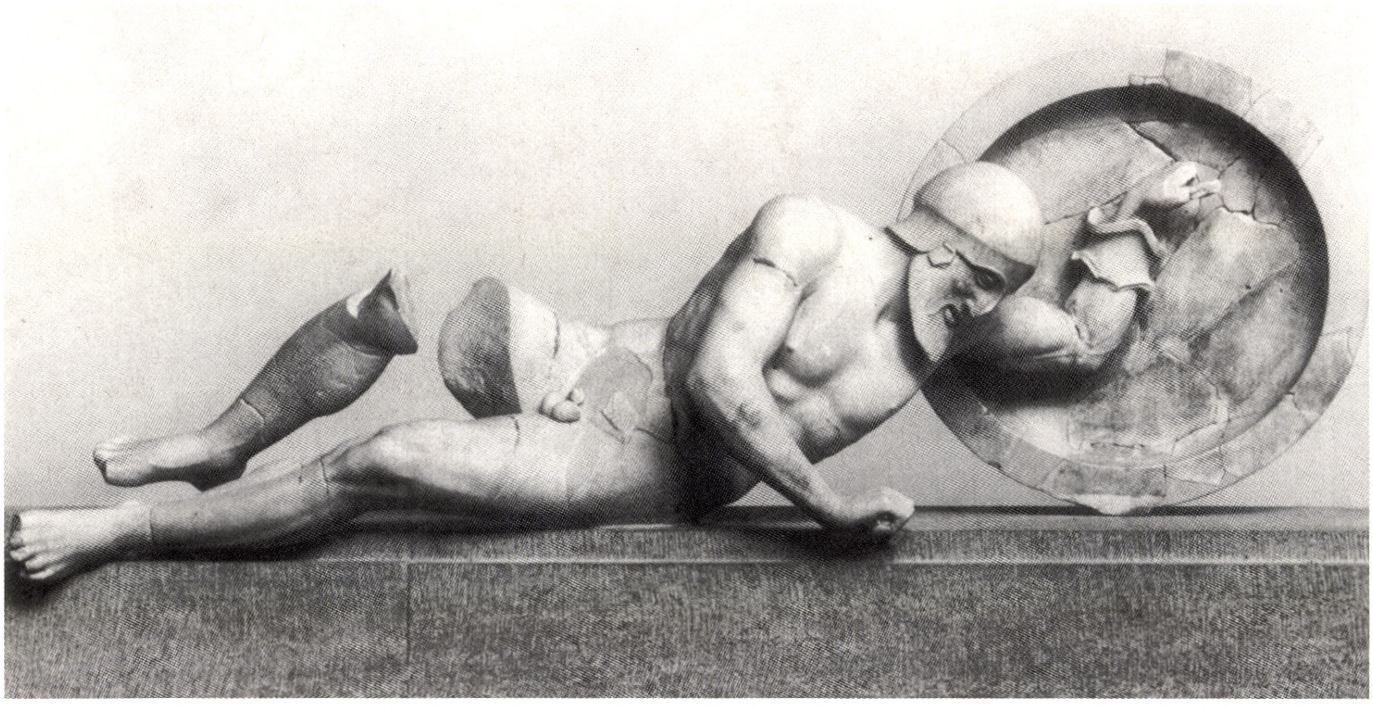

Plate 4. Dying warrior from the left corner of the east pediment of the Aphaia Temple in Aigina. *C.* 480 BC. The Glyptothek, Munich. (After Ohly, D. *Die Aegineten, Band I: Die Ostgiebelgruppe*, Munich 1976, Taf. 64).

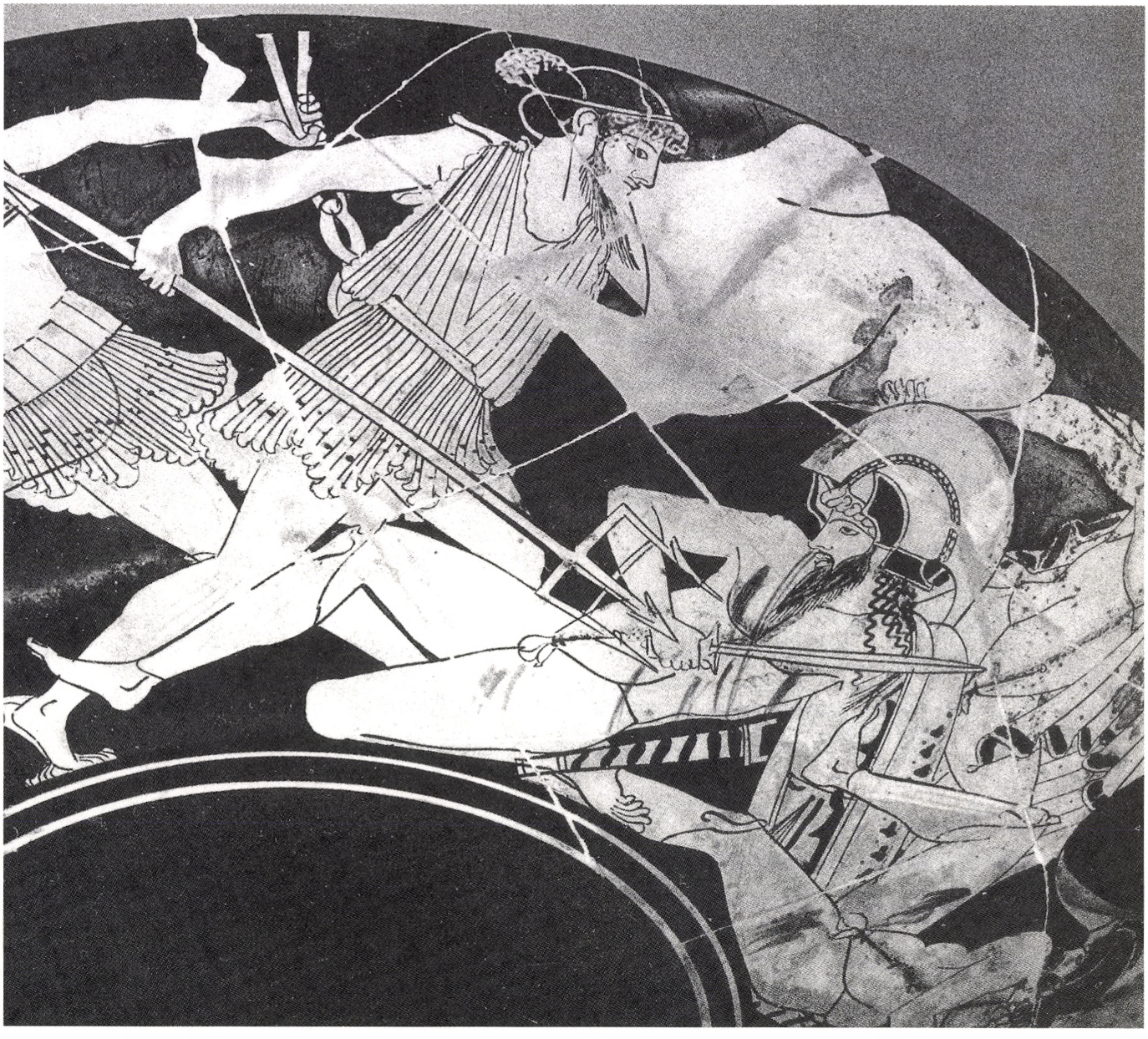

Plate 5a. Red figure kylix by the Brygos Painter. Berlin F2293. D. 32cm. *C.* 490-480 BC. (After *CVA* Berlin 2 Taf. 67-68).

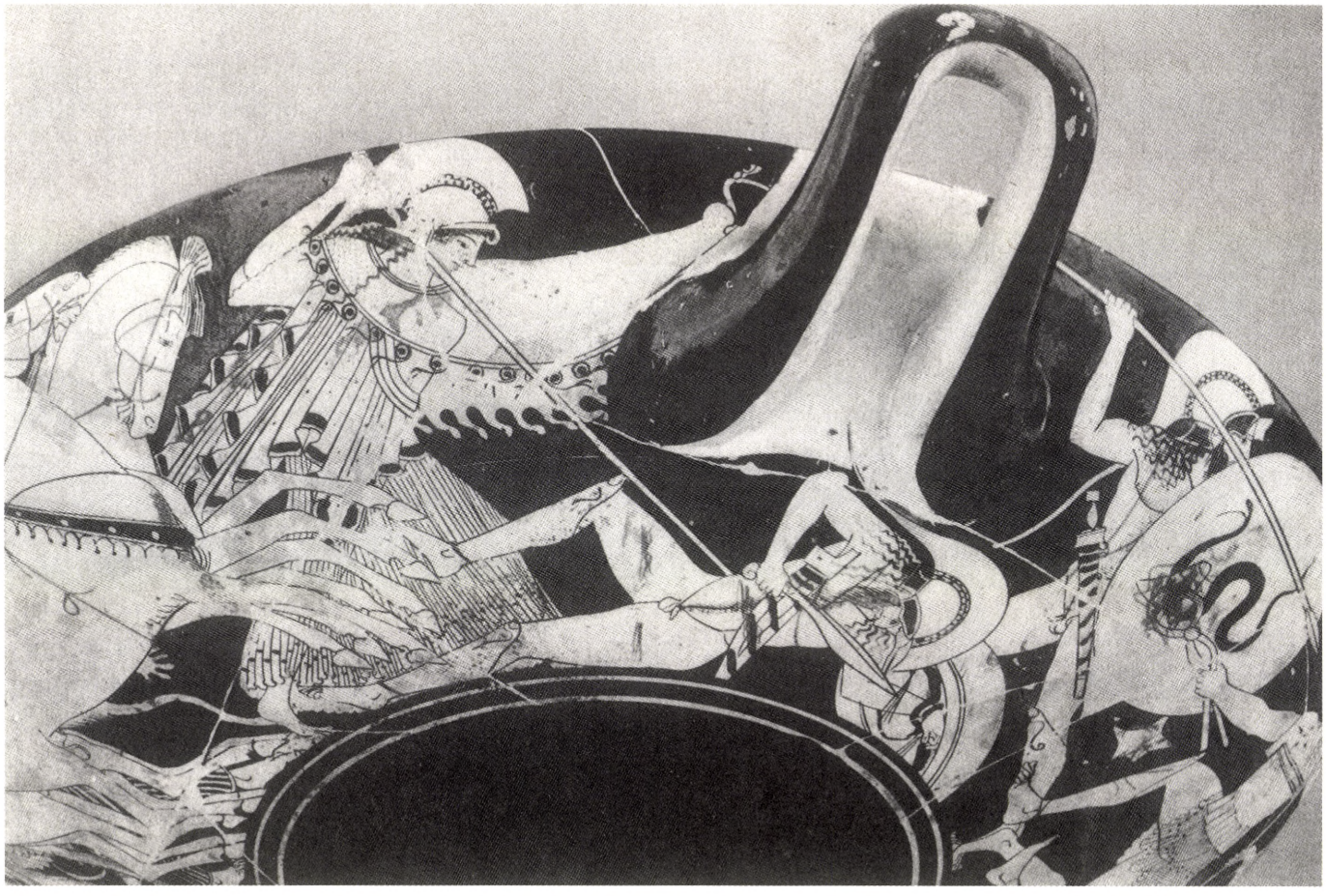

Plate 5b. Red figure kylix by the Brygos Painter. Berlin F2293. D. 32cm. *C.* 490-480 BC. (After *CVA* Berlin 2 Taf. 67-68).

Plate 6. Red figure volute krater by Euphronios. Arezzo, Museo Archeologico Nazionale inv. no. 1465. H. (including handles) 59.5cm. *C.* 510-500 BC. (After *FR* Taf. 61).

Plate 7. Black figure volute krater decorated by Kleitias, the so-called Francois vase. Firenze, Museo Archeologico inv. no. 4209. H. 66cm. *C.* 570 BC. (After *FR* Taf. 13).

Plate 8. Detail from the north frieze of the Siphnian Treasury at Delphi. Delphi Museum. *C.* 525 BC. (Photo: Niels Hannestad).

Plate 9. Detail from the north frieze of the Siphnian Treasury at Delphi. Delphi Museum. *C.* 525 BC. (Photo: Niels Hannestad).

Plate 10. Detail from the north frieze of the Siphnian Treasury at Delphi. Delphi Museum. *C.* 525 BC. (After G. de Miré, *Delphi*, 1943, pl. 84).

Plate 11. Detail from the north frieze of the Siphnian Treasury at Delphi. Delphi Museum. *C.* 525 BC. (Photo: Niels Hannestad).

Plate 12. Red figure kylix by the Sosias Painter. Berlin F2278. *C.* 500 BC. Tondo. (After *CVA* Berlin 2 Taf. 49).

Plate 13a. Black figure volute krater by Kleitias, the so-called François vase. Firenze, Museo Archeologico inv. no. 4209. H. 66cm. *C.* 570 BC. (After *FR* Taf. 1-2).

Plate 13b. Black figure volute krater by Kleitias, the so-called François vase. Firenze, Museo Archeologico inv. no. 4209. H. 66cm. *C.* 570 BC. (After *FR* Taf. 1-2).

Plate 14. Black figure amphora by Exekias. Antikensammlung, Munich inv. no. 1470. H. (with restored foot) 42 cm. *C.* 540 BC. Side A (After *CVA* München 7 Taf. 351).

Plate 15. See plate 14. Side B (After *CVA* München 7 Taf. 352).

Plate 16. Red figure chalice krater by Euphronios. New York, Metropolitan Museum inv.no. 1972.11.0. H. 45.8cm. *C.* 510-500 BC. (After *Euphronios der Maler* 1991 p. 94).

Plate 17. Laconic black figure drinking cup by the Hunt Painter. Berlin 3404. Tondo. (After Stibbe Taf. 74).

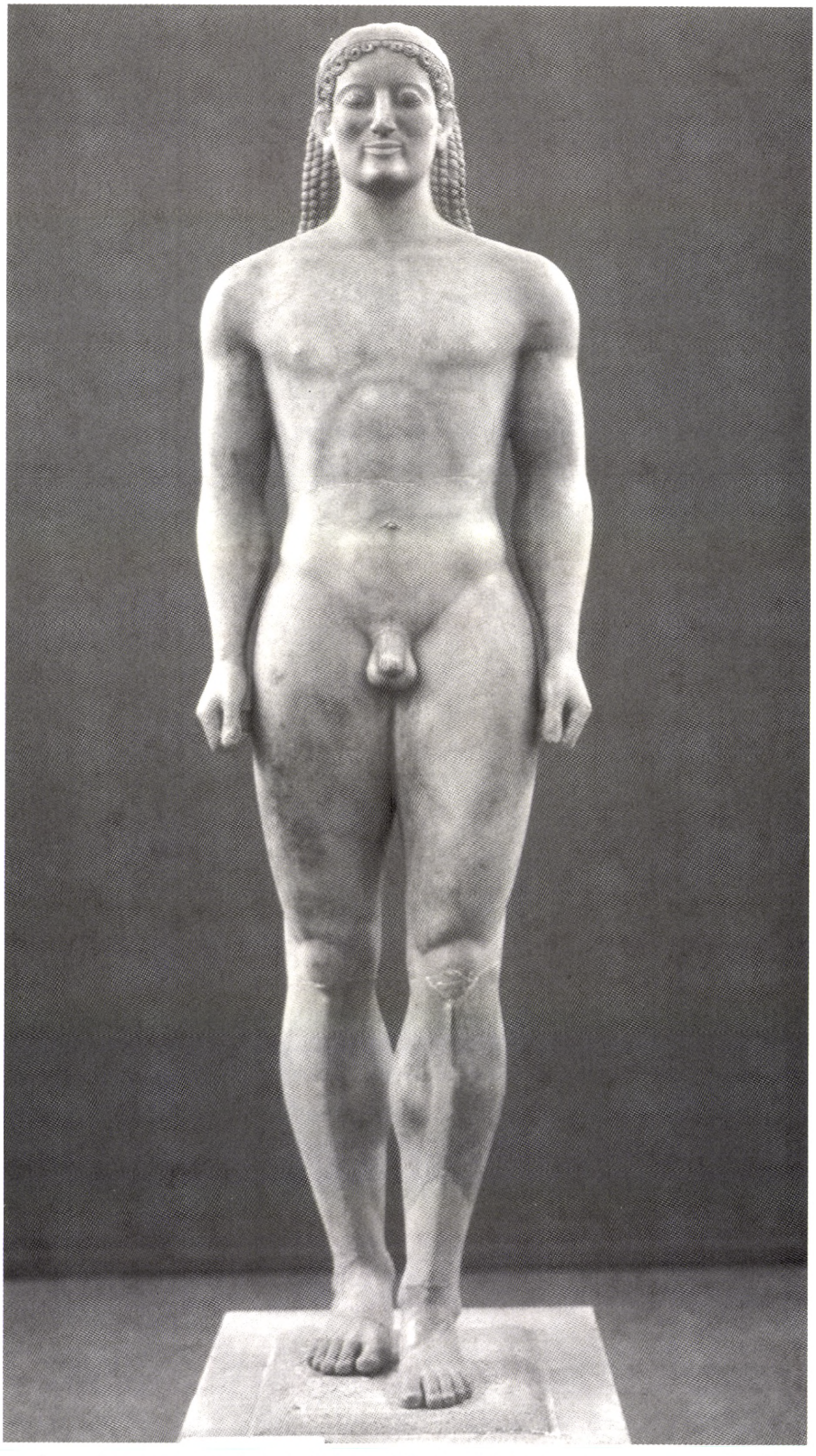

Plate 18. Kouros statue from Anavyssos in Attica. Athens, National Museum inv.no. 3851. Parian marble. H. 1.94 m. *C.* 525 BC. (Photo: Niels Hannestad).

Plate 19. Grave stele of Aristion. Athens, National Museum inv. no. 29. From Velanideza in Attica. Pentelic marble. H. of shaft as preserved 2.40m. *C.* 510 BC. (Photo: Niels Hannestad).

Plate 20. Grave relief from Athens. Athens, National Museum inv. no. 737. Pentelic marble. H. 2.64m. Second half of fourth century BC. (Photo: Niels Hannestad).

Plate 21. Denarius *c.* 115 bc. Rev: rider holding severed head. (Author).

Plate 22a-b. Denarius. Obv: Augustus. Rev. crocodile. (Bibl.Nat., Paris).

Plate 23. Denarius of Augustus. Rev.: Parthian Arch. (Bibl.Nat., Paris).

Plate 24 Augustus from Prima Porta. (Vatican).

Plate 25a-b. Sesterce. Obv. Vespasian. Rev. Iudaea Capta. (Nat. Mus., Copenhagen).

Plate 26. Aureus of Domitian. Rev: captive Germania. (British Museum)

Plate 27. Cancelleria Reliefs, detail of frieze A: profectio of Domitian. (Vatican).

Plate 28. Sesterce of Trajan. Rev: Trajan amidst subdued areas. (British Museum).

Plate 29. Great Trajanic Frieze, Arch of Constantine: Emperor in battle. (DAI, Rome).

Plate 30. Trajan's column, scene XXIV: Battle of Tapae. The Roman auxiliary, who bites his teeth into his trophy (the severed head of a Dacian) not to lose it, is a unique example of irony in Roman State art. (Author).

Plate 31. Trajan's Column, scene LIV: adlocutio. (DAI, Rome).

Plate 32. Panel relief of Marcus Aurelius, Palazzo dei Conservatori: clementia scene. (Fot. Un. 1956).

Plate 33. Column of Marcus Aurelius, scene XVI: rain miracle. (Anderson).

Plate 34. Column of Marcus Aurelius, scene XX: devastation of a village. (Anderson).

Plate 35. Philip I the Arab. (Vatican).

Plate 36. Tetrarchs, San Marco, Venice. (Alinari).

Plate 37a-b. Gold medallion. Obv: Constantine. Rev: Victorious Constantine. (British Museum).

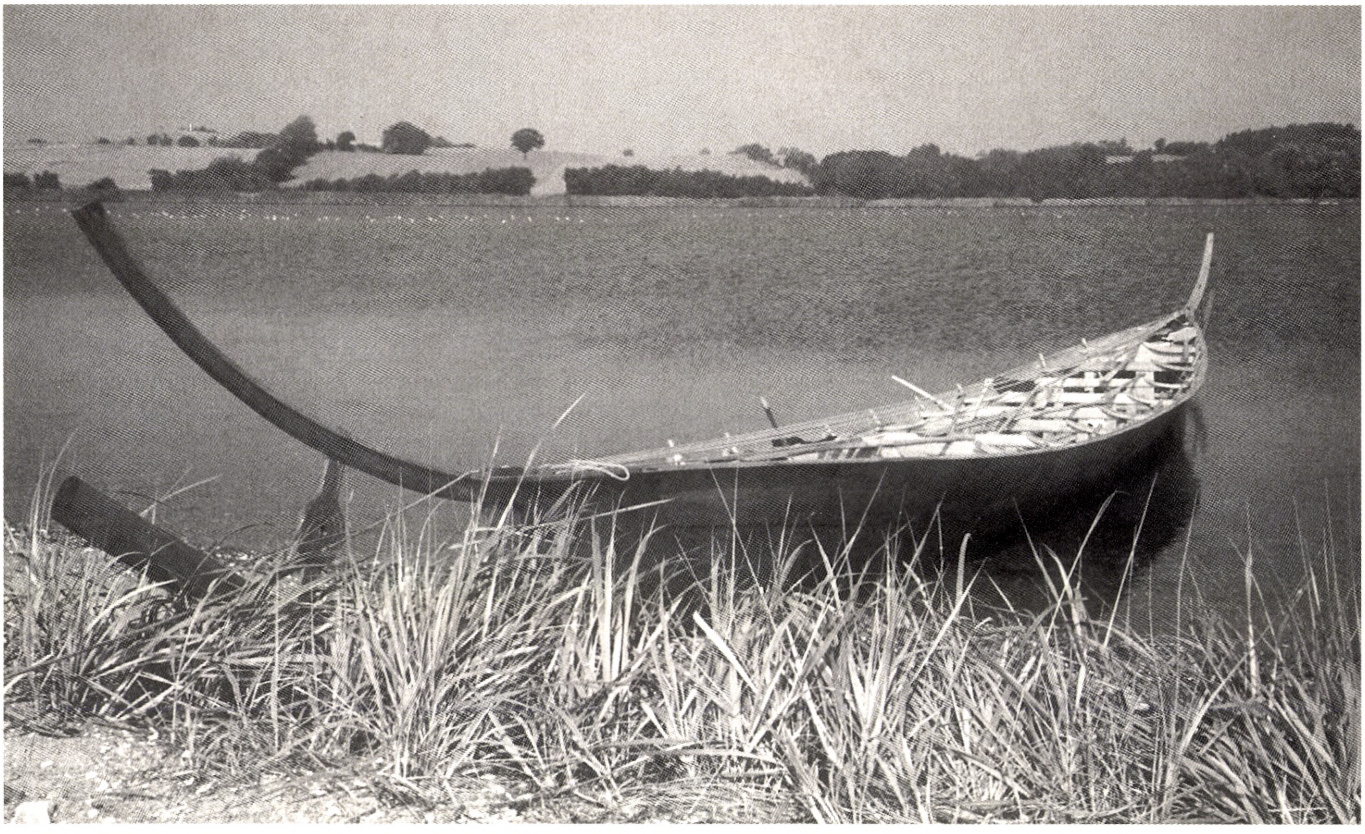

Plate 38. The Hjortspring boat. Recent trials have brought the boat above eight knots; dry rides in waves of one and a half metre in open sea are also possible. (Photo: Klavs Randsborg).

Plate 39. The Hjortspring boat, detail. (Photo: Klavs Randsborg).