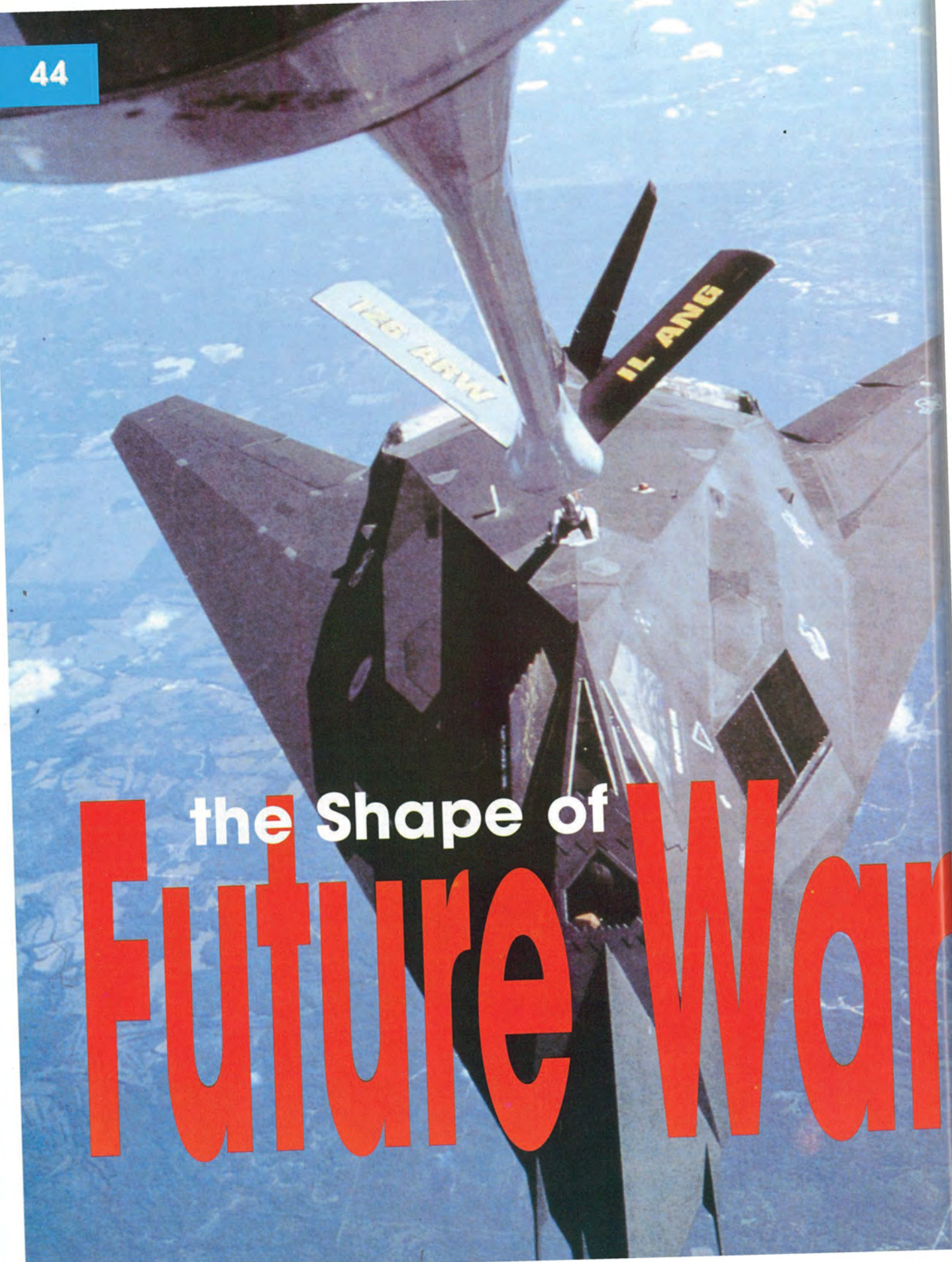

the Shape of Future War

Are Traditional Weapons Platforms Becoming Obsolete?

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We are notoriously bad at predicting the shape of future wars. Sometimes this is because we are too fixated by the image of the last war, and fail to adjust our ideas sufficiently to the changed circumstances. Hence, most people in 1914 expected the war to be decided fairly swiftly, as in 1866 and 1870. Later, after the searing experience of years of stalemate in the trenches, it was common to assume that future land fighting would take a similarly static form. The French even went so far as to prepare the 'ultimate trench' in the shape of the Maginot Line, only to be confounded by the new mobility made possible by blitzkrieg. Saddam Hussein made a similar error in 1991, when he dismissed air power as indecisive, and counted on imposing unacceptable attrition on Coalition forces in a grinding land battle like that which he had just conducted against Iran.[1]

However, 'preparing for the last war' is not the only form of error which can occur. Sometimes misperceptions arise because of precisely the opposite error, namely excessive fixation on the novelties promised by new technology. In the inter-war years, many were convinced that aircraft would be able to evade any future trench stalemate and decide a war within weeks, through the bombing of cities with poison gas. Even though World War Two in fact took a very different form, the advent of atomic and thermonuclear weapons led to the persistence of this technology-dominated image of future war, as a brief but intense spasm of mutual annihilation. Now that the Cold War is finally over, we can see more clearly that real war in the decades after 1945 developed in ways which bore little relation to the nuclear holocaust with which we were so preoccupied.[2]

The one clear lesson of recent conflicts is how diverse wars can be, even if they are fought in the same period and in the same region of the world. Hence, in the Middle East, the swift blitzkrieg contests of the Arab-Israeli wars and the Gulf War were very different from the grinding and long drawn-out attritional struggles of the Iran-Iraq war, the conflict in Afghanistan, and the Palestinian

The enormous impact which micro-chips have already had on the face of conflict is only a foretaste of the real revolution which is still to come. A common view is that this continuing revolution will progressively make traditional weapons platforms obsolete - *Tomahawk launch from US ship, target Baghdad.*

intifada. Some of this diversity can be attributed to specific situational factors such as variations in geography and terrain, but it stems also from the complexity of the interaction between military technology and the human actions and reactions which remain the primary determinants of the shape of any war.

Since it is so hard to predict what form war will take even in the immediate future, it is obviously almost impossible to see clearly the shape of war a generation ahead. Trying to foresee the conflicts of 2020 is like expecting an observer in 1975 to have predicted the type of military challenges facing us today in Bosnia, the Gulf and elsewhere. This is itself a profoundly important and humbling conclusion. It makes it vital that military forces, like modern businesses, learn to become as flexible and adaptable as possible, so that they can manage change and react quickly as new challenges appear. With his customary good sense, Michael Howard made exactly this point a generation ago, when he wrote that:

> I am tempted ... to declare dogmatically that whatever doctrine the Armed Forces are working on now, they have got it wrong. I am also tempted to declare that it does not matter that they have got it wrong. What does matter is their capacity to get it right quickly when the moment arrives.[3]

The trouble is that no organisation can be infinitely adaptable, since certain options require years of prior planning and preparation and cannot simply be improvised at a moment's notice. This applies particularly to the procurement of major weapons systems, which now have to be conceived decades in advance and will be in service for decades beyond that. The sheer inertia of manpower planning and weapons procurement in modern military forces is the main reason why we cannot simply dispense altogether with the whole unpromising activity of speculating about what war might be like a generation hence.

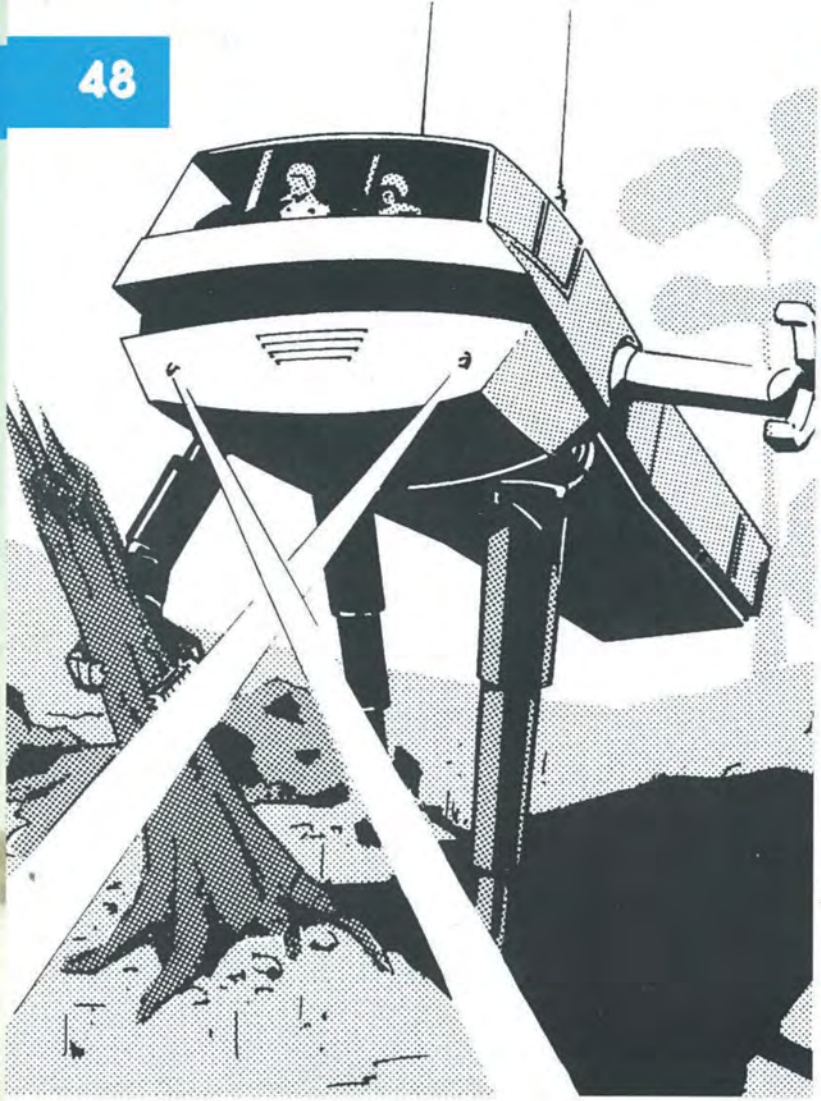
The problem is particularly significant for defence planners today, since there are now various radical ideas in circulation which suggest that traditional weapons platforms like tanks, warships and aircraft are in fact rapidly becoming obsolete, and that continued investment in them is a waste of money. If true, this has the most profound implications for current force planning. I will now explore the issues involved, by addressing the two key determinants of the shape of future war - changing technology, and the all-important human dimension of conflict.

The Technological Dimension

Over the past few years, there has appeared a flood of literature concerning the supposed 'Revolution in Military Affairs' (RMA) which is now under way.[4] Many believe that the transformation in the face of war will be at least as profound as that caused by the advent of gunpowder. The technology pinpointed as lying at the root of the present revolution is the micro-processor. Enthusiasts argue that the enormous impact which micro-chips have already had on the face of conflict (as demonstrated so strikingly in the Gulf War) is only a foretaste of the real revolution which is still to come. A common view is that this continuing revolution will progressively make traditional weapons platforms obsolete.

One strand of the argument is that such platforms will increasingly be displaced by swarms of intelligent robots. Advocates of this view point to the continuing progress in artificial intelligence and in miniaturisation (including nanotechnology). They also point out that robotic software (unlike human operators) can be replicated at virtually no cost, and that advances in networking will make it possible to coordinate the operation of the multiple systems without creating vulnerable central nodes.[5] From this perspective, modern systems like cruise missiles, reconnaissance drones and intelligent mines represent the way ahead for military power as a whole. In the words of US commentator Alvin Bernstein:

> Organizing our forces around major platforms as we have in the past is therefore an idea whose time has gone. Precise accuracy will force personnel out of vulnerable tanks, surface ships, and manned aircraft. Eventually, these large platforms will simply be out-numbered by systems of small but extraordinarily effective items all working in harmony towards a single lethal end.[6]



View foils are cheap, but the systems envisaged, such as this 'Landwalker' from a US Army exhibit in 1964, often do not prove practical or affordable.

The other strand of the argument for a micro-chip led revolution in the nature of conflict is that hostilities will increasingly focus on 'information warfare' rather than traditional physical combat between armed forces. Many see the growing pervasiveness of the media, computer networks, cyberspace and so on as encouraging an integrated campaign to 'dominate the infosphere', so achieving victory as much through electronic means as through the more traditional route of bombs and bullets. Such analysts worry that the West's own dependence on sophisticated information systems may render it highly vulnerable to attacks of this kind, be they through hackers disrupting key military or civilian computer systems (such as the financial markets) or through the astute manipulation of the 'CNN factor' to influence Western publics and politicians. George Stein warns that:

> .. if the US military approaches information warfare merely as a force multiplier and adapts bits and pieces of technology to just do our current way of warfare a bit better - if we 'digitize the battlefield' for an endless rerun of mechanized desert warfare - the real danger will be that someone else will refuse to play the game our way.[7]

So how plausible is the idea that such 'micro-chip wars', fought by intelligent robots or electronic duels in cyberspace,

will come to supplant war as we currently know it? Among defence planners, the 'information-oriented modernists' presently face severe resistance from 'platform-oriented traditionalists', as indicated by the persistence of numerous procurement programmes for costly manned platforms.[8] I suggest that this is not simply the result of misplaced conservatism and an outdated 'horse cavalry' mentality, but that there are several real problems with the more radical visions of revolutionary technological change.

First, since science offers a broader and broader menu of technological possibilities, the resource constraints under which defence planners operate mean that not all options will be brought to fruition. Hence, some of our current visions of radical future developments in warfare may prove as abortive as US visions from the 1960s which depicted 'Landwalkers', cargo rockets or jet propelled tank turrets.[9] As with President Reagan's 'Star Wars' programme in the 1980s, it is one thing to articulate a radical new aspiration in weaponry, but quite another to overcome the engineering challenges to make it work, or to find the money to pay for it. View foils are cheap, but real military capabilities are not.

The inertia of weapons procurement means that we already know what kind of platform (such as Eurofighter 2000) the armed forces will depend on in 2020.

Second, despite the rhetoric of the enthusiasts about the obsolescence of traditional weapons platforms, the sheer inertia of defence procurement means that these platforms are likely to be around for a very long time to come. Much of the kit with which the British armed forces will be equipped in 2020 is already well along in development (as with Eurofighter), and some systems (like Trident) are already in service. Although there will undoubtedly also be some very fancy new military capabilities available to advanced nations by then, arising from the ongoing revolution in electronics (and perhaps

also from developments in biotechnology), most antagonists will not have access to such 'state of the art' capabilities and so will be forced to fight in a more traditional way.

Third, one must bear in mind that weapons development is a dynamic process of measure and countermeasure, rather than a straightforward case of unilateral evolution. Hence, the effectiveness of particular capabilities may fluctuate wildly over time, rather than sliding gradually along a curve towards dominance or obsolescence. In the 1967 Arab-Israeli war, air power seemed utterly dominant, but in 1973 the effectiveness of Arab surface-to-air defences led many to go to the opposite extreme and predict the imminent demise of the manned aircraft, only to be confounded by the complete suppression of Syrian air defences in Lebanon in 1982.[10] In the same way, mini-robots and information warfare may not live up to their apparent promise as countermeasures are devised, while more traditional weapons platforms may be given a new lease of life.

Finally, it is vital to consider the objectives which military forces may be called upon to fulfil in the future. Robot systems and computer warfare may well have great potential in intelligence gathering and in destroying or disrupting an enemy target system, but they seem likely to remain severely limited in their ability to fulfil other more positive goals such as providing protection and assistance to imperilled civilian populations. It is hard to see messy human problems like ethnic cleansing or waves of refugees being handled in future by robots or electronic duelling in cyberspace, instead of by more traditional and flexible military forces. If such forces are to be deployed, especially in an expeditionary capacity, it is hard to see them doing without the potent combination of mobility, protection and firepower which weapons platforms such as armoured vehicles, warships and combat aircraft currently provide.

All these reservations suggest that the face of future war is unlikely to be transformed quite as radically by technological developments as the more extreme images of micro-chip dominance might imply. Instead, mini-robots and information warfare are likely to evolve in parallel with existing weapons platforms, adding yet more layers to the already complex and integrated pattern of modern warfare rather than changing the pattern altogether.

What one can safely predict about the technological future is that the options available to antagonists will continue to expand. On the one hand, states and even sub-state groups will become more able to threaten or inflict widespread mayhem, as NBC weaponry becomes more accessible and as more mundane weapons (like recent terrorist bombs) or other actions such as environmental pollution become more devastating. At the other extreme, the capacity to exert force discriminately will also increase, through further development of precision guided munitions (PGMs) and of the new range of 'non-lethal weapons'.[11]

Traditional struggles for territorial control between opposing ground forces have already become just one of the options available to antagonists in the event of conflict. In future, there seems likely to be even greater potential to resort to alternative approaches such as long-range air or missile

bombardment, terrorist or special forces action, or the use of computer or biological viruses specially tailored to attack the enemy from within. Which of these proliferating options are adopted in any particular case will depend not just on technological opportunities and vulnerabilities, but also on the human decisions which will continue to dominate the shape of warfare in the future as in the past.

The Human Dimension

Human factors dominate war at every level. They determine whether the war is fought, between which groups, over what issues, and with what level of commitment and self-sacrifice. They also determine the degree of strategic and tactical skill with which weapons are used, which recent experience has shown makes all the difference as to their military effectiveness.[12]

One of the most pernicious influences of the prominence of complex weapons systems is that it can lead planners to 'simplify out' this unquantifiable human dimension, and to model war as a sterile duel between opposing machines. Hence, Western defence experts became fixated during the Cold War on the technicalities of nuclear missile exchanges and of armoured assaults on NATO's Central Front, leaving them ill-equipped to respond to real developments such as the war in Vietnam and the eventual political collapse of the Soviet bloc.[13]

Israeli scholar Martin van Creveld has become something of a personal crusader against this tendency to neglect the human context of strategic affairs. Van Creveld argues that what he calls the 'make believe war' represented in most visions of future conflict is a chimera produced by marrying the post-1648 pattern of state vs state conflict with current military technology. He feels that 'real war' is already focused very heavily at the sub-state level, and will become even more so in future, leaving the high-tech kit designed for 'make believe war' redundant.[14] In his words:

> So expensive, fast, indiscriminate, big, unmaneuverable, and powerful have modern weapons become that they are steadily pushing contemporary war under the carpet, as it were; that is, into environments where those weapons do not work, and where men can therefore fight to their hearts' contents.[15]

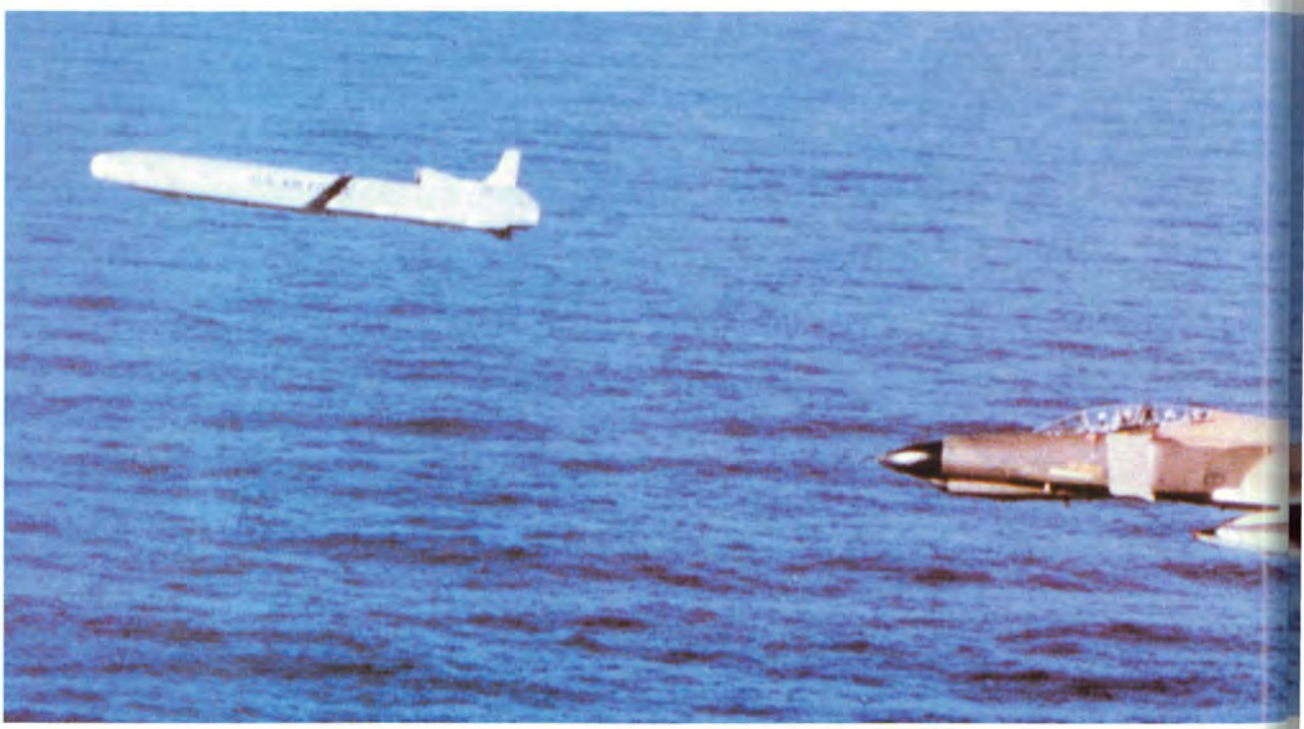
Van Creveld thus reaches the same conclusion as some US technologists about the obsolescence of modern weapons platforms, but from a very different perspective. He sees such platforms as being undermined not by exploitation of the micro-chip, but by a collapse of the state and a descent into tribal anarchy among intertwined ethnic and religious factions. In his view, the real determinant of the security of a country in the future lies not in the size and quality of its military forces relative to those of its neighbours, but rather in its ethnic homogeneity and freedom from internal disaffections and societal tensions which could set its people quite literally at each other's throats.[16]

Van Creveld's argument is obviously based very heavily on the recent searing experiences of his own nation in Lebanon and with the Palestinian intifada. His case finds strong support in the fact

that the vast majority of wars throughout the world since 1945 have been civil wars. Recent conflicts in places like Bosnia, Somalia, Rwanda, Chechenia and Algeria do indeed bear precious little resemblance to the sterile duels between advanced weapons envisaged in so much combat modelling. However, there are other considerations which suggest that Van Creveld, like the prophets of robot battles or information warfare, may be giving an insufficiently balanced view of the prospects for future conflict.

Some think that costly manned combat aircraft will progressively be displaced by smaller robot systems - Cruise missile with Phantom chase plane.

For one thing, there have also been plenty of more 'conventional' inter-state wars fought with the latest technology since 1945, especially in the Middle East. Van Creveld's seminal book *On Future War* was written at the very time that the Gulf War was taking place. It is true that few states, having seen what happened to Iraq in 1991, will be keen in future to take on the USA in



open combat. However, given the conventional arms race in East Asia, and the recurrent crises in various regions including Korea, South Asia and the Persian Gulf, it would be a brave man indeed who would suggest that the historical pattern has been broken altogether and that there will be no more high intensity, high technology wars in the decades to come.

Van Creveld bases his logic partly on the idea that nuclear proliferation will in future make even conventional wars between states too risky to contemplate, as happened in Europe during the great power stand-off of the Cold War.[17] However, there were many other reasons for the 'long peace' in Europe, which do not necessarily apply to other parts of the world. Far from promoting stability, the threatened acquisition of NBC weapons by 'rogue states' such as Iraq, Libya or North Korea may actually provoke military confrontations with other powers, as has happened several times over the past 20 years.

Even if not used in actual conflict, advanced conventional weapons systems in the hands of Western powers seem likely to retain an important deterrent and coercive role vis-a-vis hostile states, arguably even more so than Western nuclear weapons given current political sensitivities. Indeed, the attributes of modern PGMs, as demonstrated in the Gulf War and in Bosnia, run precisely counter to Van Creveld's blanket condemnation of high tech weapons as blundering and indiscriminate.

Despite the shift towards 'low intensity' operations, capable weapon platforms like the Warrior infantry fighting vehicle, continue to prove invaluable - *IFOR operated Warrior in Bosnia.*

The various punitive strikes launched by Israel and the USA over the last two decades suggest that the willingness to use these weapons against other states may actually be growing rather than declining, now that air and missile technology seems to offer the prospect of swift, clean and one-sided campaigns without the costs and risks of an intervention by surface forces.

Nor do the civil wars on which Van Creveld focuses necessarily depend on as primitive weapons as he implies. In Vietnam, the conflict developed from a classic guerrilla struggle into a full scale conventional war with tanks, artillery, air defences and so on. A somewhat similar process occurred in Bosnia as the factions became better trained and equipped. Western intervention forces in Bosnia have certainly not found high technology kit such as Warrior IFVs, combat aircraft and sophisticated electronic equipment redundant; on the contrary, these have been invaluable tools enabling the intervention forces to achieve their mission with minimum casualties.[18]

Here too, then, we need to take a more balanced view of the prospects for future warfare. Van Creveld's vision of a succession of tangled inter-communal conflicts like the Palestinian intifada does offer a very useful corrective to the excessively technology-dominated visions of future war put forward by writers like Bernstein. However, although both schools of thought suggest that current weapons platforms are becoming obsolete, their arguments are not mutually reinforcing but if anything mutually destructive. Each tends to undermine the assumptions of the other, in a way that weakens them both.

Antiseptic images of robot war or electronic duels in cyberspace are critically flawed not least because they lack sufficient linkage to the real human passions and primitive conflict environments which Van Creveld highlights. Van Creveld's own image of high tech weapons becoming too blundering and indiscriminate to be employed is, in turn, undermined by the directly contrary possibilities opened up by military exploitation of the micro-chip. We must integrate our understanding of technological possibilities and of enduring human characteristics if we are to attain a less one-sided and simplistic vision of the face of future war.

An Integrated Perspective

As I stated at the outset, the only thing certain about the future is that it will not be as we expect. Recent experience in the Falklands, the Gulf and Bosnia shows that we cannot even predict the kind of wars we are likely to be involved in when they are about to happen, let alone decades in advance. However, we cannot escape the need to make defence plans that far ahead, especially for the procurement and operation of major weapons platforms. Hence, we must do what we can to see through the murk and to make at least some half-educated guesses about what kind of challenges the future might hold in store.

Possibilities for global security a generation hence range all the way from a new era of global peace and harmony as technology brings comfort and salvation, to a nightmare vision of escalating ethnic religious and nationalist conflict as overpopulation and resource depletion tear the world apart. The

reality will probably turn out to lie somewhere between these two extremes, and those conflicts which do occur seem likely to have two dominant characteristics, spanning both the human and the technological dimensions:

> Asymmetry. Now that the Cold War is over, the world is split into a patchwork of states of widely varying size, resources, economic development, technological capability and internal cohesion. Wars between or within these states are therefore likely to be much more asymmetric than the fairly balanced inter-state wars of the past, with the combatants differing not only in size and technology but also in objectives, constraints and interests at stake. The resulting contests may still be fairly balanced, but it will most probably be an indirect balance of offsetting asymmetries. One side may well be much more powerful, but also more constrained or sensitive to losses, thereby giving its less potent antagonist a chance of prevailing 'against the odds' (as in the classic instances of recent American traumas in Vietnam, Lebanon and Somalia).
>
> Blurring of the Conflict Spectrum. Previous neat distinctions between different levels of operations such as aid to the civil power, peacekeeping, low intensity conflict, conventional war and nuclear war are already proving very hard to sustain in conflicts such as Bosnia and Chechenia, and this blurring seems likely to become even greater in the future. Terrorism, ethnic unrest, refugee movement and organised crime now have both an inter-state and an intra-state dimension, and this will become even more tangled as power leaches progressively from nation states themselves. Punitive air and missile strikes will further blur the boundary between war and peace, 'cyberwar' will challenge the adequacy of previous definitions of armed aggression, and the proliferation of advanced weapons will give more and more conflicts at least a potential NBC dimension, which will profoundly affect strategic calculations even if the capabilities concerned are not actually employed.

Francois Heisbourg recently produced an interesting study of future warfare, in which he went beyond these generalised observations and developed several illustrative scenarios of what conflicts over the next twenty-five years might be like. His scenarios included an attack by US cyber-anarchists in 2000 to coincide with the 'millennium bug', the sinking of a US fleet off Taiwan by Chinese PGMs in 2007, the bloody ethnic fragmentation of India in 2010 and a confrontation with a septuagenarian Colonel Gaddafi in Libya two years later (both ending in regional nuclear exchanges), and finally a six-week conventional war over oil and gas in the South China Sea in 2020.[19] Although vivid and thought-provoking, these scenarios may well turn out to bear not much greater resemblance to reality than did the 'future histories' of a possible Third World War in Europe produced by similar strategic commentators twenty years ago.[20]

The key point is that, whatever the details of the wars and confrontations which actually occur, the combination of asymmetry and a blurring of the conflict spectrum means that superior armed forces

like those in the Western world are likely to be faced with challenges far tougher than simply 'winning' a set battle against another fairly evenly-matched state. They may be drawn into policing functions or internal upheavals within their own or another country. They may be called upon to perform complex and demanding operations such as the discriminate disarming of another state's NBC capability. They may be expected to provide a comprehensive shield against a wider and wider range of possible challenges, ranging from drugs shipments and waves of refugees to 'cyberwar', terrorist outrages or ballistic missile attack. All of this will require considerable adaptability and strategic skill, as well as maximum exploitation of the high quality human and technological assets available.

It will be far from easy to structure forces which will be sufficiently flexible and adaptable to meet the variety of challenges which may appear. Advanced combat aircraft and submarines may remain dominant in high intensity warfare through their combination of stealth and striking power, but they will continue to have grave deficiencies in dealing independently with lesser tasks. Surface ships and infantry-heavy land forces will remain much better at interaction and discrimination, but seem likely to become increasingly vulnerable at higher levels of threat. Heavy armoured forces fall somewhere in the middle, and therefore suffer to some extent from both types of disadvantages, as well as not being well suited for rapid strategic redeployment.

Non-Western armed forces face a nightmarish dilemma, since on top of the tensions which I have just outlined they know that, whatever weapons platforms they field, their forces are likely to remain subject to asymmetric suppression and annihilation by electronically and tactically superior Western adversaries. They may therefore be tempted to shift to a wholly asymmetric strategy, and to eschew traditional weapons platforms such as tanks, ships and aircraft altogether in favour of unmanned systems, NBC terror weapons and other forms of unconventional warfare.

The trouble with this approach is partly that it could in itself provoke Western hostility, and partly that it would deprive the state concerned of key conventional military capabilities for use against more traditional opponents such as regional rivals or internal rebels. The dilemma is epitomised by Iraq's experience over the past 20 years, when the very weapons which enabled the Iraqis to hold out against their larger but less well-armed Iranian adversary proved sitting-ducks in the war against the US-led Coalition, but then once again came into their own against the Shia and Kurdish rebels. Even the former superpower, Russia, finds itself in a cleft stick over force planning, having seen what Western technology can do to Soviet equipment in Afghanistan and the Gulf War.

The dilemma facing Western defence planners is less acute, but more subtle and pernicious. By working very hard to maintain their technological and tactical edge, Western armed forces should be able to maintain a fair degree of survivability in most of their traditional combat arms, even in the face of such new weapons as other states are able to acquire. The trouble is that, since the only way to cover the full spectrum from low to high intensity challenges seems to be to retain this balanced mix of combat arms, the cost of the qualitative measures needed to keep casualties to an absolute minimum in all the different force elements will escalate alarmingly.

With defence resources so constrained now that the Cold War is over, the risk is obviously that the money for other projects will be squeezed by the growing cost of maintaining so many traditional

combat arms. This has implications for the ability of Western armed forces to get the most out of electronic support systems, to exploit whatever new technological opportunities may arise, and to guard against new challenges ranging from NBC terrorism and electronic infiltration to ballistic missile attack.

In short, the problem lies in striking the right balance between the old and the new. Neither micro-chip warfare nor unconventional warfare will soon make traditional weapons systems obsolete, but they nevertheless introduce important threats and opportunities which need to be addressed. There may be a danger of Western armed forces jeopardising their capacity for adaptation and radical innovation in these areas because so many of their resources are tied up maintaining the viability of existing programmes in the changing environment. Overcoming this inertia without unduly compromising the flexibility of their existing force structures will be perhaps the most important challenge facing Western defence planners in the years and decades to come.

Notes.

[1] See Lawrence Freedman & Efraim Karsh, *The Gulf Conflict, 1990-1991* (London: Faber & Faber, 1993) ch.20.

[2] On popular visions of future war, see I F Clarke, *Voices Prophesying War, 1763-1984* (London: Oxford University Press, 1966), and my own book on *The Third World War Scare in Britain* (London: Macmillan, 1986).

[3] Michael Howard, 'Military Science in an Age of Peace', *RUSI Journal*, March 1974, p.7.

[4] For a useful survey of the debate, see Colin Gray, *The American Revolution in Military Affairs: an Interim Assessment* (Camberley: SCSI Occasional paper 28, 1997).

[5] See Peter Emmett's chapter in S Peach (ed.), *Perspectives on Air Power* (London: The Stationary Office, 1998).

[6] Alvin Bernstein, 'Conflict and Technology: The Next Generation', in Gordon Wilson (ed.), *British Security 2010*, Proceedings of a Conference held by the MoD at Church House, Westminster, November 1995, p.185.

[7] George Stein, 'Information warfare', *Airpower Journal*, Spring 1995, p.39.

[8] A good summary of this debate may be found in *Strategic Survey, 1995/96* (London: IISS, 1996), pp. 29-40. For a more detailed set of perspectives on the issue, see Robert Pfaltzgraff & Richard Shultz (eds.), *War in the Information Age: New Challenges for US Security* (London: Brassey's, 1997).

[9] See the illustrations in Clarke (op cit).

[10] See Michael Armitage & Tony Mason, *Air Power in the Nuclear Age*, 1945-84 (London: Macmillan, 2nd ed., 1985), ch.5.

[11] On PGMs, see Richard Hallion, 'Precision Air Attack in the Modern Era', in Richard Hallion (ed.), *Air Power Confronts an Unstable World* (London: Brassey's, 1997). On non-lethal weapons, see *Strategic Survey 1995/96*, pp. 40-48.

[12] See S Biddle & R Zirkle, 'Technology, Civil-Military Relations and Warfare in the Developing World', *Journal of Strategic Studies*, June 1996.

[13] See, for example, P Bobbitt, L Freedman & G Treverton (eds,), *US Nuclear Strategy: A Reader* (London: Macmillan, 1989), and the Report of the European Security Study, *Strengthening Conventional Deterrence in Europe* (London: Macmillan, 1983).

[14] See Martin van Creveld, *Technology and War* (New York: Free Press, 1989), chs. 19-20

[15] Martin van Creveld, *On Future War* (London: Brassey's, 1991), p.32.

[16] See Martin van Creveld, 'The Fate of the State', *Parameters*, Spring 1996.

[17] See Martin van Creveld, *Nuclear Proliferation and the Future of Conflict* (New York: Free Press, 1993).

[18] See Christopher Bellamy, 'If You Can't Stand the Heat...New concepts of conflict intensity', *RUSI Journal*, Feb. 1998.

[19] Francois Heisbourg, *The Future of Warfare* (London: Phoenix 'Predictions', vol. 2, 1997), ch.2.

[20] See John Hackett et al, *The Third World War: August 1985* (London: Sidgwick & Jackson, 1978), and Shelford Bidwell et al, *World War 3* (London: Hamlyn, 1978).