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The Transformation of War Revisited

MARTIN VAN CREVELD

To write a book is one thing, to criticize it another. For an author to criticize his own book is almost unheard of and may seem hubristic;[1] however, in view of the central place which *The Transformation of War* now occupies in the strategic debate, it is a task that cannot be avoided. In terms of world history, the ten years that have passed since the book first saw the light of day have been enormously eventful. In terms of military and strategic theory, those same ten years have witnessed a vast number of interesting contributions made by an equally vast number of capable people.

If only to clear my own mind concerning the nature of those theoretical and historical developments, asking what in *The Transformation of War*, was correct, what was wrong, and why seems a worth-while exercise. In doing so, I can only hope that the exercise will benefit a few people other than myself.

The Demise of Interstate War

At the time when *The Transformation of War* was written in 1988–89, the Soviet Union was still a functioning superpower. The Cold War was still raging, and the arms race – which had been fueled by President Reagan's vast increases to the defense budget – was assuming dimensions almost unprecedented in history until then. From the Arctic to the northern shores of the Adriatic Sea, on both sides of the Iron Curtain many hundreds of thousands of troops belonging to the mightiest armed forces in history stood guard and watched each other. Thousands of miles away in Korea a similar situation prevailed; and, at times, appeared even more menacing as border incidents led to war scares and war scares were accompanied by border incidents. In Washington DC, in London, in Paris, in Bonn, in Moscow, in Pyong Yang and Seoul and Taipei – to say nothing of Beijing – politicians, strategists and commanders spent sleepless nights asking themselves how those forces were going to fight each other, if they ever did.

A mere decade later, almost all of this has disappeared like snow under the sun. The Warsaw Pact no longer exists. With it went the Cold War and the fears that it inspired. For a time it looked as if large-scale conventional warfare might enjoy a revival in the Persian Gulf. In preparation for

Operation 'Desert Storm' large ground, air and sea forces belonging to many nations were assembled and put under a single command. The signal having been given, cruise missiles were launched and struck their targets deep inside Iraq. Fighter-bombers and bombers took off from their bases and flew thousands of missions. Finally, armored divisions broke loose and chased each other across the desert; engaging in maneuvers that pretended, though they did not quite succeed, to revive the kind of war that Guderian and Patton had waged in 1939–45.

In the event, it only took a few days to realize that Iraq had been greatly overrated. Far from possessing the world's fifth-largest armed forces as had been feared at the time, in reality it was a third rate opponent. Quantitatively as well as qualitatively, 17 million Iraqis, three million of whom were not even Iraqis, proved incapable of putting up a serious resistance to the mighty Coalition that confronted them. One result of this was that the total number of killed in action (KIA) suffered by the Coalition forces was under 200. Given that Iraqi dead were estimated at 35,000,[2] it could almost be said that this was not so much war as slaughter.

Above all, Iraq was a third rate opponent because, unlike several members of the Coalition by which it was faced, it did not have nuclear weapons in its arsenal. As a result, once the forces had been put into position and the Saudi oilfields secured against a possible attack, there was practically no way in which Saddam Hussein was capable of inflicting serious damage on any member of the Coalition. Those members, on their part, had it within their power to turn Iraq into a radioactive desert within a matter of hours; and do so, moreover, while using such a small fraction of their real military potential that it would have been difficult to express in percentage points.

What would have happened if Iraq *had* possessed nuclear weapons as well as the appropriate delivery vehicles is anything but easy to say. Almost certainly, though, the existence of even a small number of nuclear-tipped Scuds would have made Saudi Arabia and Turkey much more reluctant to let the Allies use their territories as a staging ground for the attack; if, indeed, they would have allowed them to do so at all. Had Iraq possessed missiles capable, say, of reaching Paris, then almost certainly the war would never have been started at all. Had it possessed missiles capable, say, of reaching London, then it is almost impossible to imagine the heavy bombers being allowed to use British airfields on their way to Iraqi targets. Nor did these facts escape the attention of those involved. It was the Indian chief of staff who said the war's main lesson was that one should not fight the US without nuclear weapons; in refusing to abandon his nuclear weapons program,[3] Saddam too shows he understands that lesson.

Skipping over the Kosovo campaign of 1999, what was true in 1990–91 was even more true in the autumn of 2001. This time the opponent was not

a state – by most criteria, Afghanistan simply *is* not a state – but two extremely loose organizations, the Taliban and Al-Qaeda. The most sophisticated weapons available to the Taliban were some 25-year-old Soviet tanks, aircraft, and anti-aircraft batteries left over from before the invasion of 1979 or else captured from the Red Army. Had it occurred to anyone to rank Afghanistan among the military powers of the world, surely it would have figured near the very bottom of the list; Afghanistan, moreover, was devastated by over two decades of near-continuous warfare the number of whose victims reached into the millions. Once again, cruise missiles were fired and the world's most advanced bombers and fighter-bombers took off. In the air alone the ratio of forces was perhaps a thousand to one, satellites not included. Suppose, though, the Taliban had somehow come into possession even of a single nuclear weapon and a delivery vehicle capable of reaching, say, Islamabad or the capital of Tajikistan? In that case, once again, no doubt the war would never have been started.

To generalize, the main thesis of *The Transformation of War*, namely that major armed conflict between major powers is on its way out, seems to have been borne out during the ten years since the book's publication. One would not want to completely rule out other factors that contributed to this: changing attitudes to war, the identification of nationality and territory which has made conquest unacceptable, growing international interdependence, and so on. Still, the main reason for the process is perfectly clear. It is the fact that any state capable of building even moderately sized, more or less modern, conventional armed forces is also capable of building nuclear weapons and will surely do so if it feels its vital interests, let alone existence, are threatened.

Judging by several examples, indeed, building nuclear weapons is actually easier than building conventional ones. Thus China exploded its first atomic bomb in 1964 and its first hydrogen device in 1967, years before it even considered building a modern fighter-bomber. Israel, at that time an underdeveloped and desperately poor country in the Middle East, also assembled its first nuclear weapon years before it set out to build sophisticated conventional ones. In the case of India and Pakistan the gap between nuclear and conventional capability is even larger. In terms of GNP per capita both countries are among the least developed on earth, to the point that most of their peoples do not even have access to clean running water. Both only have a very limited military-industrial infrastructure. What conventional weapons they possess are approaching obsolescence; some, indeed, were purchased precisely because they were obsolescent and, therefore, cheap. Nevertheless, both have possessed nuclear weapons for years and are steadily working to improve them and to develop new delivery vehicles for them.

As predicted in *The Transformation of War*, the world's conventional forces have been shrinking fast. Those of the US are down from 2,118,000 to 1,366,000, a decline of 35 per cent; of the remainder, only a small fraction are engaged against the Taliban or are likely to become so in the future. Those of the former Soviet Union are down from 4,000,000 to 1,004,000 Russian ones, plus whatever doubtful forces can be fielded by some of the successor states from the Baltic Sea to Central Asia.

Shifting our gaze to the West, there are now fewer than one quarter as many German troops left as, counting both Germanies, there were in 1989. The situation of the French, British, Italian and Spanish forces is scarcely any better. Some of NATO's smaller members, including not least its new former Eastern bloc members, are approaching the point where they scarcely any more have armed forces. Whereas those that they do have are capable of being used, if at all, only in conjunction with their larger neighbors.

As to qualitative improvements, in many cases they only exist on paper as procurement programs are cancelled, cut, or postponed and as the weapons that are available are so few in number and so expensive that their loss cannot be contemplated. Even in the Middle East, which for decades used to be the region with the most conventional wars, during the decade before the outbreak of the Second Palestinian Uprising, Israel was able to cut defense-spending from 14 to 9 per cent of GNP.[4] That region apart, only a few countries are still building or purchasing arms on any scale. Even if they do, the objective is usually not to expand their forces but to 'modernize' them, a sort of military way of keeping up with the Joneses and proving one is not yet moribund.

Some would argue that the death-knell of the armored knight was sounded at Crécy in 1346, yet it was only in the middle of the sixteenth century that the day of the fully armored cavalryman was finally over. A mere ten years after the end of the Cold War, it may be too early to announce the final demise of conventional wars and of the conventional armed forces that have been designed to fight them. As usual, the most dangerous flashpoint appears to be the Middle East and indeed it is not difficult to think of scenarios which will set the entire region aflame. One may, however, assume that the continuing proliferation of nuclear weapons and their delivery vehicles will sooner or later lead to a nuclear Iran, a nuclear Iraq, a nuclear Egypt, and possibly a nuclear Libya and Syria as well.[5] So long as this does not happen, then any war that may break out in the region will be comparatively harmless to anybody except the parties directly involved. If it does happen, then hopefully major warfare between major regional states will come to an end as it already has in most other places. On the other hand, the outcome may be a nuclear holocaust; the latter

possibility was clearly alluded to by the head of SHAVAK, General (res.) Ami Ayalon, when he said that, in case of attack, Israel might resort to an 'irrational' response.[6] Either way, we seem to have passed a point of no return. May thou rest in peace, major conventional war.

The Rise of Non-Trinitarian War

Whereas, during the last decade, major conventional wars between major states have been few and far between, wars against or between organizations other than states have proliferated and are proliferating. Among those which have proliferated but were brought to an end (sometimes more, sometimes less) are the ones in Algeria, Angola, East Timor, Egypt, Lebanon, Mozambique, Northern Ireland, Rwanda, Somalia, Turkish Kurdistan, and most of the regions comprising the former Yugoslavia.

Among those that have proliferated but do not seem to be under control are the ones in Afghanistan, Chechnya, Colombia, the Congo, Kashmir, Liberia, the Land of Israel, Macedonia, the Philippines, Sierra Leone, Spain, the Spanish Sahara, Sri Lanka, and the Sudan. From Indonesia to Pakistan, quite a number of countries seem to be on the brink of civil war if they have not crossed it already. To all this must be added what are surely the most spectacular acts of terrorism ever carried out by any organization at any time and place: those of Al-Qaeda against the Twin Towers in New York City and on the Pentagon across the Potomac from Washington DC.

In places where the tanks are still rolling and/or aircraft flying, perhaps the most outstanding fact is their inability to bring such wars under control. To use the example of my own country, the Lebanese border has been a focus of tension since the first katyusha rockets came howling across the border in 1968.[7] Between that date and the spring of 2000 scarcely a week passed without Israel Defense Forces (IDF) aircraft overflying the country; later they were joined by some of the most advanced attack helicopters in existence. Over the years they dropped hundreds of thousands of bombs and fired hundreds of thousands of missiles. Not content with this, several times they were joined by more or less massive ground forces.

The latter either invaded Lebanon (at one time they even occupied its capital) or else deployed such accurate firepower as has scarcely been seen in history until then. In point of sophistication, if not of scale, the Israeli effort could compare with that of the current American one in Afghanistan. Given the small area over which the IDF operated, in point of intensity it may well have been similar; all, as became clear when Israel finally withdrew, to no avail.

The wars in question are, of course, not all of the same kind. Some were much more intensive than others, involving hundreds of thousands and even

millions of casualties. Some could best be described as terrorism, others as guerrilla war, others still as more or less open struggles between competing militias, and others still as genocide pure and simple. While these categories are important as well as useful, they do not really go down to the bottom of the matter. In my view, that bottom consists of the fact that, unlike conventional wars, the conflicts in question were not trinitarian.

To Clausewitz, from whom I took the notion,[8] a trinitarian war is based on a clear division of labor between the government that wages and directs it, the armed forces that fight and die, and the people who pay and/or suffer; indeed so important were these distinctions that he used them even to analyze what he called 'popular war' (*Volkskrieg*). At the risk of committing sacrilege, I would like to suggest that he was wrong and that the most characteristic fact about the great majority of armed conflicts during the last decade or so is precisely that these distinctions did not exist in the same form. Sometimes they only applied to one side, and sometimes, as in Somalia and (before the current US intervention) Afghanistan, they did not apply at all. Which of course is one reason why some of these conflicts have been incomparably more bloody than the belligerents' military capabilities would lead us to expect.

Returning to the *Transformation of War*, the prediction that history is witnessing a major shift from trinitarian to non-trinitarian war seems to have fulfilled itself and is still fulfilling itself on an almost daily basis. Judging by the performance of the Israelis in Lebanon as well as many others, moreover, the regular armed forces of most states are hardly any closer to getting a grip on this kind of war than they were a decade ago.

Some are throwing everything they have at the country most suspected of harboring terrorism, to what avail remains to be seen. Many, particularly in Western Europe, seem to be putting their heads in the sand, pretending non-trinitarian war does not exist or does not concern them and trying to preserve their structure even as the economic resources at their disposal as well as their order of battle continue to shrink. Others simply pray that it will go away so they can heave a sigh of relief and return to 'real soldiering'. Others simply get angry, as once happened to this author when, as he was addressing the Israeli General Staff, one of the generals present started thumping the table and shouting that none of the above is true.

Information Warfare: A Joker in the Pack?

Since *The Transformation of War* first appeared, many other attempts have been made to guess what future war might be like. Very numerous new concepts have appeared out of nowhere and are being bandied about as in a game of squash with multiple players; everywhere one looks there are balls

being hit, returned, or else bouncing of walls in all kinds of expected and unexpected directions. One of the most brightly colored balls has the label the revolution in military affairs (RMA) attached to it. Others represent the system of systems, population war, environmental war, asymmetrical war, infrastructure war, non-lethal war, gray area war, informal war, information war (strategic and tactical), netwar, cyberwar, mediawar, neocortical war and postmodern war.

All these and many others have been jostling with each other while trying to gain acceptance both on the printed page – which, in spite of the Internet, remains the main medium where the debate is carried – on and in the offices where decisions are made and resources allocated. Just to prepare a list of them, let alone explain the significance of each, would require an entire volume.

As their names suggest, most of the new forms of war either seek to come to terms with the unprecedented rapid developments that are taking place in the field of computers and data processing or else to take advantage of those developments.[9] Sometimes it is merely a question of designing better means to identify targets and destroy them;[10] in other cases the talk is of information itself being used as a weapon either by ourselves or by our adversaries.

The former course is usually known as the revolution in military affairs and, its name notwithstanding, is clearly evolutionary as better communications, improved data processors, more stealthy weapon systems, and more precisely guided munitions take over. The latter is usually known as information warfare and may indeed have revolutionary potential. An observer looking back at *The Transformation of War* from the vantage point of 2001 might well argue that its greatest single shortcoming is the absence of any reference to information warfare. Taking the opportunity, it is a shortcoming which I would like to correct.

As just said, information war is the attempt to use information not just in order to better direct other weapons but as a weapon in itself. Conversely, the feasibility of information warfare – assuming, for the moment, that it is indeed feasible – arises from the fact that modern societies and their armed forces are extraordinarily dependent on information and becoming more so with each passing day.

Since the invention of the microprocessor in 1979 these devices have been incorporated in practically every technical, logistic, and administrative system underlying modern life; from those that regulate our water supply to those that make sure that taxes are paid and aircraft do not collide. Should any number of these devices cease to function then the resulting chaos is unimaginable. Some commentators have painted gruesome scenarios as faulty chips cause passenger aircraft to fall out of the sky, ATM machines to

start spewing out money indiscriminately, and telephone networks to either shut down or start misdirecting calls at random.[11] Others believe that stock markets could be made to crash or else that the electricity supplies of entire countries could be cut off for long periods of time, perhaps leading to the death of millions as the economies in question grind to a halt.

What makes defense against information warfare so extraordinarily difficult is, of course, the fact that so many of the computers in question have long ceased being isolated. With every passing day more of them are linked to each other; and in the vast majority of cases the medium that links them is the ordinary civilian telephone network. Though billions have been sunk and are still being sunk into the erection of firewalls whose purpose is to isolate any part of the net from any other, everyday experience shows that they are not perfect; in theory, and perhaps in practice as well, the only way to render a computer or group of computers hacker-proof is to take it or them off the net.

This solution is akin to setting up a railway line that only enables trains to run from point A to point B but which does not have any links with the remaining system. Clearly there are some circumstances in which the construction of such a line is warranted and where, indeed, it may be the only solution to certain problems. Clearly, too, the vast majority of lines will have to be linked with each other if they are to be cost effective and if, indeed, their technical potential is to be realized to the full.

Whether or not the worst scenarios that have been painted in regard to information warfare are capable of being realized is not at issue here and, if humanity is lucky, may never be known. Proceeding on the understanding it has *some* potential, however, the question is who stands to lose and who stands to gain. Our first assumption must be that the experts who try to protect the system and those who try to penetrate it are equally available, equally capable, and equally honest or corruptible.

Now it is a well known fact that computer experts, especially the younger ones among them, are among the most mobile of all professional groups. Perhaps starting as isolated hackers, they seldom have any strong feelings of loyalty towards any particular employer and very often they can be hired and fired at the drop of a hat. At different points in his career the same expert, using the same tools or very similar ones, may well be working now to penetrate a system, now to defend it, and now to manage systems that are charged with *both* offense and defense.[12] Hence the assumption that people on both sides are equally capable does not appear unwarranted.

In conventional warfare, the fact that an advance has to be made, supplies brought forward, ground occupied, and garrisons left behind tends to work against the attack and in favor of the defense; in so far as traversing territory takes time, the same is true of that factor.[13] In information warfare,

both geographical space and time are irrelevant. Attacks scarcely require a base. They do not demand that supplies be gathered first, and can be directed at any point from any other point regardless of distance. If properly executed, they may also erase their own traces even as they are carried out or shortly thereafter; indeed one of the main problems facing the defense is to distinguish deliberate attacks from technical problems of every kind. For all these reasons, such warfare would appear to be a leveler. Especially when compared with conventional war as it has developed between 1830 – what I have called, in another context, the 'Age of Systems'[14] – and 1945, it favors the small against the large.

The advantages that information warfare provides to the attacker would be even greater if he or she, (this field being one of the few where gender truly makes no difference) does not strike roots at any particular place but retains his mobility instead.[15] Rather than waiting for the government-sent SWAT team to find him and strike at him, he should be capable of easily packing up his equipment and going somewhere else. In theory if not in practice all he needs to take with him is a laptop. Sometimes even a laptop may be superfluous; arriving at the new location, our hacker may simply buy another one and feed it with programs that are kept on a disk or downloaded from the Internet. In reality all that is needed is access to a telephone link. As computer technology converges with that of cellular phones, soon he will not need even that.

Next, the question of cost. At the beginning of the twenty-first century, building up first rate conventional armed forces will take years, involve many tens if not hundreds of thousands of people, and cost tens if not hundreds of billions of dollars. At the beginning of the twenty-first century, penetrating the information system of such forces and rendering those forces wholly or partly inoperable can be achieved – assuming it can be achieved at all – at a very small fraction of that cost. To be sure, scenarios that tell of a lonely Indian hacker working for Mr Putin, sitting at the North Pole and using a laptop in order to single handedly bring down the strategic information infrastructure of a big power are wildly exaggerated. Still, as experience has shown, in the absence of adequate defenses even the damage that a lonely hacker working his laptop through a telephone link located at the North Pole can do may be enormous. Provided it is aimed at the right target and in the right manner, it could even be catastrophic.

Thus, whichever way one looks at it, information warfare seems to act as an equalizer.[16] To be sure, imagining scenarios under which it may be directed by one state against another is not impossible and such scenarios have already been realized on some occasions. For example, mainland Chinese hackers are said to have caused a flag on Taiwan's parliament to be lowered. During the 1999 Kosovo campaign their Serb colleagues

apparently tried to disrupt the operations of Munich international airport. On the whole, however, it is much more likely to be used by non-state organizations, even if some of those organizations themselves work on behalf of states.

In resorting to information warfare, such organizations have the advantage of being more mobile and less strongly bound to one place. Unlike states they do not have an extensive infrastructure to protect; instead they make use of whatever is available at the place where they happen to be located at the moment. In this way, the advent of information warfare is probably one more reason behind the ongoing historical shift away form major war between major states towards the non-trinitarian world of future conflict.

Clausewitz Revisited

Though critics may blame *The Transformation of War* for not having dealt with information warfare as perhaps it should have, on the other hand the term information warfare itself is only a few years old. What was born yesterday may well die tomorrow; in other words, whether information warfare is really as important as has been claimed remains to be seen. Meanwhile, very few critics have taken up the book's second major theme as, in my view, they should have.[17] That theme is that the nature of war is widely misunderstood. And that this misunderstanding, far from being superficial or accidental, goes back directly to no less a person than Carl von Clausewitz.[18]

To some, inquiries concerning the nature of war may well appear academic, even superfluous. In fact it is the most important question of all; given that the nature of a thing goes very far to dictate what we can or can not do in, to, and with it. According to the most famous sentence that Clausewitz, himself a Prussian staff officer sworn to carry out his superiors' orders, ever wrote, war is the continuation of policy by other means. As a prescription of the way things should be the truth of the dictum is undeniable. As a description of the way things are it is very often anything but correct. The lower down the war-making hierarchy we proceed, the less true it becomes.

Undoubtedly, the World War I French and German soldiers described by Ilya Ehrenburg in *Thirteen Pipes* were not the only ones who fought 'for iron, or coal, or honor, or the devil knows what'. Consider also the example of *The Good Soldier Schweik*. Though Schweik believed that Austria was going to fight with the French against the Germans ('low scum') this did not prevent him from cheering the outbreak of World War I as loudly as anyone else; when it turned out he had been wrong and the alliances were reversed,

he *still* cheered. At Schweik's level, to speak of war as the continuation of policy may be so false as to be almost comic. Yet it is at this level that war is very often decided by the readiness, or lack of it, of people to fight and risk their lives.

In *The Transformation of War* I argued that war is not so much a continuation of policy as a form of sport such as football or chess. Like football, it is very often not a means to an end but an end in itself. Much more than football, it is an activity in which players very often *surrender* their tiny share of 'policy', that is, their personal interests. Rather than let themselves be guided by interest they lay down their lives for something they feel is greater, or more important, or more valuable, than themselves, be it king or country or freedom or anything else; currently the most successful candidate seems to be Allah, who considering the way He can inspire people to commit suicide for him must be Akhbar indeed. This is true even to the point where war becomes the most sublime human activity of all. As poets from Homer to Nietzsche knew, real freedom can only exist where people fear nothing and expect nothing.

Still proceeding with the same analogy: like football, war is a two-sided activity where opposing teams clash. As in football, each of the teams is constrained by circumstances but is nevertheless to a large extent free to do as it sees fit. As in football, the objective is to inflict as much damage (score goals) on the enemy as possible while suffering as little damage as possible oneself. As in football, the way to achieve this goal is by means of teamwork relying on a practiced combination of skill, force and guile. As in football, high motivation is absolutely essential although, admittedly, not so powerful as to render all other factors irrelevant. Finally, as in football, a match is only possible where it does not consist of a single blow; in case a single blow suffices (e.g. Iraq over-running Kuwait in 1990) war is neither necessary nor possible.

Finally, as in football, the question arises what will happen if the strength of the opposing teams is skewed; in other words, in a situation where one side is *much* stronger than the other yet obliged by circumstances to play against the other repeatedly and for a long time. In Chapter 6.3 of *The Transformation of War* I dealt with this question at length. My conclusion was that the logic of football will operate and that, both in point of skill and in point of motivation, war is a mutual learning process. This means that the stronger side, by the very process of 'fighting' the weak, will almost certainly end up by becoming weak himself; whereas the weaker side, provided only he can gain sufficient time, will almost certainly end up by becoming strong.

At the theoretical level, *The Transformation of War* used the analogy of sport in order to try and provide a non-Clausewitzian, non-strategic,

understanding of war and the logic on which it operates. At the practical level, this dynamic is almost certainly *the* best explanation as to why, over the last decades, so many of the most powerful, best organized, best equipped, forces that ever existed have been defeated by groups of men and women who, as is currently the case in Afghanistan, literally went barefoot and could not even read. I would suggest that, to the extent that critics have not taken up this theme in *The Transformation of War* and are still clinging to a view of armed conflict as a rational activity directed towards rational ends, they do so at their peril; let those who have ears to listen, listen!

Conclusions

Ten years after *The Transformation of War* was published, and in spite of the momentous changes in the geo-strategic environment that have taken place since, it is becoming only all too clear that the picture it painted of future war was broadly correct. So, notwithstanding all attempts to blow new life into them and modernize them, was its vision of the way the conventional forces which are designed for it would develop, or rather implode; watching America's most powerful and most advanced bombers and fighters pound Afghanistan, sometimes one does not know whether to laugh or to cry. Ten years after the book was published, it is also easier to see some of the things which it did *not* mention. Probably the most important one is information warfare. Even though, if truth to be said, the real significance of that concept remains to be seen.

Above all, ten years after the book was published most people have not yet taken a fresh look at the real nature of war and the logic on which it operates. Instead of returning to the basics and asking what makes men fight, they continue to parrot Clausewitz on war being the continuation of politics by other means. Instead of coming to terms with war as a messy, bloody clash in which people are bound to be injured and killed, they send in bombers and cruise missiles in the hope that technology may obviate the deaths and make the injuries unnecessary. As the attack on the Twin Towers and the Pentagon showed, today more than ever those who stick their heads in the sand may very well end up by being kicked in the butt.

NOTES

1. I can call, however, on the example of Aldous Huxley in *Brave New World Revisited* (New York, NY: Bantam 1958); also on that of Friedrich Nietzsche, *Ecce Homo* (Harmondsworth, Middlesex: Penguin 1988) [1888].
2. L. Freedman and E. Karsh, *The Gulf Conflict* (London: Faber 1993) p.408.
3. See Testimony of Paul Leventahl, Nuclear Control Institute, before the senate Foreign Relations Subcommittee on near Eastern and South Asian Affairs, 22 March 2000,

<www.nci.org/iraq322.htm>.

4. Data from International Institute of Strategic Studies, *The Military Balance, 1990–91* (London: IISS 1990) pp.17, 33, 49, 83, 63, 71, 78, 106; International Institute of Strategic Studies, *The Military Balance, 2000–1* (London: IISS 2000) pp.25, 20, 61, 80–1, 58, 67, 75, 142.
5. See, most recently, Gerald Steinberg, 'Israel Looks over the Horizon: Responding to the Threats of Weapons Proliferation', 1 July 2001, <www.jcpa.org/jl/vp457.htm>.
6. Israel Radio, news bulletin, 1400 hours, 4 Dec. 2001.
7. An overview of the war may be found in M. van Creveld, *The Sword and the Olive; a Critical History of the Israel Defense Force* (New York, NY: Public Affairs 1998) pp.285–306.
8. Carl von Clausewitz, *On War* (Princeton UP 1976) p.89.
9. One of the most recent attempts is Ralph Peters, 'The Plague of Ideas', *Parameters* 30/4 (Winter 2000–1) pp.4–20.
10. See on this for example B. Owens, *Lifting the Fog of War* (New York, NY: Farrar, Strauss & Giroux 2000).
11. See e.g. R. G. Molander and others, *Strategic Information Warfare* (Santa Monica, CA: RAND 1996) pp.xiii, 6–9.
12. See on this Gregory J. Rattray, 'The Cyberterrorism Threat', in James E. Smith and William C. Thomas (eds.), *The Terrorism Threat and U.S Government Response: Operational and Organizational Factors* (Colorado Springs: USAF Academy 2001) pp.98–9.
13. Carl von Clausewitz, *On War* (note 8) pp.357–69.
14. Martin van Creveld, *Technology and War, 2000 B.C to the Present* (New York, NY: Free Press 1989) pp.156–73.
15. See on this for example William Schwartau, *Cyber Terrorism: Protecting Your Personal Security in the Electronic Age* (New York, NY: Thunder Mouth 1996) especially pp.543–4.
16. See on this James E. Smith and William C. Thomas, 'The Terrorist Threat in Strategic Context', in idem (eds.), *The Terrorism Threat and US Government Response: Operational and Organizational Factors* (Colorado Springs: USAF Academy 2001) pp.27–8.
17. One of the few exceptions is T. von Trotha, 'Zur Typologie Kriegeriescher Aktionsmacht', in S. Neckel and M. Schwab-Trapp (eds.), *Ordnungen der Gewalt* (Opladen, Leske: 1999) pp.71–96.
18. See on this Martin van Creveld, *The Transformation of War* (New York, NY: The Free Press 1991) pp.335, 124–6.