A case of battle fatigue

H. M. Collins

War in the Age of Intelligent Machines. By Manuel De Landa. *Zone Books: 1992. Pp. 271. £14.95, $22.95 (pbk); £29.75, $44.50 (hbk). Distributed by MIT Press.*

THE first half of this book is an intriguing history of control over warfare. De Landa questions whether the point of control over battles should lie in the centre, demanding a rigidly organized, unthinking, 'clockwork' soldiery. Or is war more successful when the centre determines the overall goal, with small but powerful platoon units deciding how best to attain their own objectives? De Landa shows that the appropriate answer depends on the economics, politics and technology of war.

What can be said in favour of centrally organized, closely coordinated bodies of troops? For one, desertion can be curbed with rigid plans of battle that keep troops close to one another and to the enemy. And inaccurate musketry requires volley fire if it is to be effective, again demanding central organization. On the other hand, the invention of the national army allows the replacement of scarce, expensive and potentially disloyal mercenaries with an endless reservoir of cheap patriots, thereby reducing the need for central control. And with the rifled barrel and the cone-shaped bullet comes improved accuracy, which lessens the importance of volley fire. Radio enables geographically dispersed and disparate units to coordinate their actions. With infantry working with artillery and aircraft, the blitzkrieg, as opposed to the organized set-piece confrontation, is the perfect form of war in the age of radio.

All this is fascinating, particularly as war can represent any organized human endeavour. But of course, nothing in real history is ever quite so straightforward. Was not the decisive Allied victory over the Germans at El Alamein in 1942 a set-piece victory in the age of blitzkrieg? The hard part of writing such a history is making sense of the interactions of humans with new technological developments. De Landa's view gives a fixed meaning to the barrel and the bullet, with generals either grasping the opportunities or failing to see them. This is all too simple; it is a view that comes with perfect hindsight.

De Landa's description of war planning after the Second World War pits Rand think-tank mathematicians against real soldiers. He emphasizes the 'friction' of battle, saying that "no plan survives contact with enemy". War games, he argues, deal with a dehumanized battlefield, the mathematical descriptions of weapons being determined not by experience in the hands of exhausted and terrified fighters but by exaggerated claims originating from interservice rivalry. Even in war games, it turns out that humans will not press the imaginary nuclear button. De Landa therefore argues that nuclear planning "takes the humans out of the loop", allowing computers to be pitted against one another in an effort to form a "rational" plan for the destruction of the planet. The removal of humans from the loop is the topic that drives the second half of the book. The process started with automated gunnery in the Second World War, has now moved to antiradar missiles that select and home onto their targets, and threatens to dispense with people entirely as artificial intelligence takes over.

Here De Landa's book is weak. Indeed, one gets the impression that the manuscript was dusted off in the aftermath of the Gulf War and given a sexy title that does not really fit its contents. Despite the promise on the back cover, the Gulf War is not mentioned and the discussion of artificial intelligence is dated. Neural networks receive no coverage, with expert systems, parallel processing and hypertext described as if they were the latest thing. Writing about artificial intelligence is a hazardous business. Everyone believes a version of the myth that "Hubert Dreyfus predicted that computers would never play chess and he was soon proved wrong" (this myth is not quite true, by the way) and authors are reluctant to be too critical of the 'latest developments', even when these developments have already had their day in terms of hype. Admittedly, De Landa seems to understand the problem of artificial intelligence. He knows that an autonomous battlefield robot with a licence to kill will have to make inductive generalizations, and he knows that if it is to induce as we do, it will have to know everything we know. But he does not seem sure whether this state of affairs is "just around the corner".

The second half of the book, then, loses its way. At the same time, the writing loses its style, becoming full of ambivalence, repetition, split infinitives and irrelevant overworked metaphors. Unfortunately, the subject of the second half is what the book is supposed to be all about. One could learn a lot about the history of warfare from the book, but nothing at all about war in the age of intelligent machines. □

H. M. Collins is in the School of Social Sciences, University of Bath, Claverton Down, Bath BA2 7AY, UK.

Astro-design

R. Hanbury Brown

Unusual Telescopes. By Peter L. Manly. *Cambridge University Press: 1992. Pp. 221. £19.95, $39.95.*

ONE of the things I like doing in museums, particularly motor museums, is looking at the variety of ways in which different designers have solved the same problem. In the struggle for survival of the fittest, only a few of the solutions ever reached conventional design: many were simply not the best way of doing the job, while some arrived before their time, only later being resurrected. It is the same with telescopes, and to read Peter Manly's book is the next best thing to going round a museum. The book is clearly written, well illustrated and both instructive and entertaining.

Most of the book is devoted to the principal problems that must be solved in building a telescope, including those of the optical system, mount, materials and drive. For each, we are told about some of the many ways in which the problems have been tackled, the emphasis being on unconventional solutions. Most, but not all, of the unconventional designs have been made by amateur astronomers; broadly speaking, these people build smaller equipment than the professionals, usually spend their own money and can take greater risks.

The longest chapter is on optics. Manly covers the problems of making mirrors out of all sorts of material, not just glass, which is not sufficiently unusual, but also rock, clay, metal, plastic, liquids, membranes, gases and so on. I particularly liked his well-illustrated discussion of optical systems with different numbers of optical elements. He tells us, for example, about many of the ingenious ways in which people have tackled the problem of collecting the light from a telescope without obstructing the primary mirror, examples of which are the schiefspiegler and off-axis Cassegrain telescopes.

There are also problems associated with mounting a telescope. Although most telescopes have two axes, there have been telescopes made from zero to four moving axes, as well as those that move freely in any direction. Manly gives examples of all of these, some of them being "blatantly odd", but others, such as the single-axis mount of the transit telescope at the US Naval Observatory, being conventional. The chapter called "Strange Drives" lives up to its name. The problems of driving a telescope smoothly and at the correct rate have been solved mainly by the use of ingenious gear technology, and Manly provides examples of makeshift drives