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Does War Make Sense? Science and Religion on the Battlefield

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The Scientific Way of Warfare: Order and Chaos on the Battlefields of Modernity

Antoine J. Bousquet

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Warfare, for those willing to risk the denigration of so doing, can be described as a search for meaning. Soldiers stake their lives on a cosmic wager that what they undertake is equal to the ante. Commanders must orchestrate performances more compelling than theater and more sacred than peace, all the while inflicting as much damage as possible. The sum resources of a culture—its science, its religion, its poetry, its prejudice—mobilize in the service of that cause. These are as much the technologies of war as the weapons themselves.

At least since Carl von Clausewitz first spoke of the “fog of war” (an inevitable unknowing that reigns over every battlefield), the challenge of warfare has been to lend order to chaos. There is a war within every war, one pitting the ballet of orderly abstractions against the scrambling movements of armed and terrified human beings. Upon these abstractions hangs a fragile sense of sanity, one as crucial to any war effort as lead for bullets or the sex appeal of a man in uniform.

Antoine Bousquet’s recent study, *The Scientific Way of Warfare: Order and Chaos on the Battlefields of Modernity*, tells how military thinkers have sought to clear the fog of war, before Clausewitz and since. His analysis takes the form of genealogy: a succession of technoscientific paradigms, each promising to bring the melee of combat under the control of its sober-minded masters. The book leads us through a dazzling menagerie of historical gizmos, ingenious weapons, and pseudoscientific disciplines. Through them, he suggests that the preferred instruments of warfare express the whole meaning-making apparatus of the society from which they come.

The progression begins with the early modern world’s competing kingdoms and ends with the mess of the present, intransigent conflicts in Iraq and Afghanistan, where the most over-armed and over-theorized institution the world has ever seen struggles to defeat bands of insurgents and warlords. Insofar as science defines the modern worldview, Bousquet shows how science also sets the terms for how we

think about warfare. In the first chapter, he places his thinking in the Continental lineage of knowledge, representation, and power: Nietzsche, Heidegger, Foucault, Deleuze/Guattari, and DeLanda pop up in the footnotes. Their presence insists that warfare, in its way, is an act of philosophy.

Bousquet begins with the inception of modern science: the revolutions in knowledge of the 17th century. Newton's promise to describe the universe as a calculable clockwork seduced military thinkers as much it did astronomers. His mechanics not only offered equations for the course of a cannonball, it provided the vision for an ideal battlefield. By this logic, as Bousquet explains, the more that soldiers could be trained to operate like gears of a mechanism, the smoother their deadly work could run. The Prussian army's 1726 manual divided the process of loading and firing a musket into 76 separate stages. Commanders drilled such precision into their soldiers with minute efficiency, teaching them to march in geometric columns (at exactly 75 steps per minute) against the enemy's geometric fortifications. King Frederick the Great's army could fire sustained volleys with only three ranks of musketeers, compared to the ten ranks required by the state-of-the-art 150 years before. Frederick's mastery of clockwork warfare made Prussia a great power of the late 18th century and its army a model that rivals sought to emulate.

Thomas Kuhn famously explained the progress of science as a succession of paradigms; sets of theories that science clings to until they are so full of fissures and self-contradictions that a revolution becomes necessary, and a new paradigm takes the place of the old. Bousquet applies the same logic to the progress of scientific warfare. Over the course of the century between Napoleon and the First World War, a crop of new technologies and strategies outgrew the mechanistic battlefields on which they had been designed to fight. A second paradigm of scientific warfare emerged, which Bousquet calls the thermodynamic. No longer should a fighting force tick like a clock; it should put out energy like an engine. Napoleon, who began his military career in the artillery corps, conquered most of Europe by trusting overwhelming force more than geometry. Long-range cannons, whose capabilities the emperor knew so well, had collapsed the distances that the earlier paradigm depended on. This is why Clausewitz, writing in the years following Prussia's defeats against Napoleon, rejected mechanistic logic and turned instead to the new science of energy and force. He had come to understand war as an "explosion," guided more by probability than by laws of consequence; the precisely defined formations of earlier tacticians couldn't help but boil over with the heat of unexpected "friction."

By the 20th century, in Bousquet's account, machine guns, repeating rifles, and airplanes had turned soldiers into fuel for the engine of war. They spent the World War I huddling in trenches, charging enemy lines, and being slaughtered by the new machines. But the fullest expression of thermodynamic warfare came in World War II: blitzkriegs, tanks, bombing raids, and charnel houses. The apotheosis of the thermodynamic paradigm came with the fission bomb that exploded over Hiroshima on August 6, 1945, unleashing the force locked inside every atom. This obsession

with energy continued through the early years of the Cold War, as the superpowers raced to build the fastest fighter planes and pack the most megatons into their nukes. But soon this logic unraveled too, as it became clear that neither could fight a thermonuclear war without being destroyed in the process. The science of energy, Bousquet writes, with its promise of a comprehensible formula for the modern battlefield, had blown itself into absurdity.

As the push for greater firepower reached the point of mutually assured destruction, another tool, the computer, born of the Second World War came to prominence and with it Bousquet's third paradigm: cybernetic warfare. Computers offered strategists the hope of protecting the mushrooming nuclear arsenal from human error while also deploying conventional weapons with greater precision than ever before. War began to look like little more than a grand information-processing problem, solvable with the right programming and hardware. Cold War projects like SAGE (Semi-Automated Ground Environment)—which was more expensive than the Manhattan Project that built the first atom bomb—and WWMCSS (World Wide Military Command and Control System) sought to connect US military forces around the globe into a single, centralized computer system.

Arch-bureaucrat Robert McNamara, who served as secretary of defense between 1961 and 1968, was perhaps more responsible than anyone for making “systems analysis” into the Pentagon credo. “Don't give me your poetry,” he once retorted to a White House aide's dour assessment of the war in Vietnam. “Give me something I can put in the computer.” But cybernetics didn't do much good in a war where there was no clear line between enemy and friend. During a supposedly limited war, more bombs fell from American planes than in all of World War II. Bousquet also notes the irony that, according to a Nixon-era computer simulation of the conflict, the United States should have defeated the communists in 1964. The account of Vietnam occasions his most prophetic passages about the chronic shortcomings of scientific warfare. It was, he writes,

a misplaced faith in the technoscientific approach to war which gave the war planners an illusory sense of what could be achieved through only military means and caused them to pay insufficient attention to both their own political strategy and that of the North Vietnamese.

Mapping the clean lines of scientific theory onto government-sponsored bloodshed can provide (can *seem* to provide) not merely a recourse of last resort but a tool of ordinary statecraft. War becomes, as Clausewitz wrote, an extension of politics by other means. But cybernetics went further, promising, with the right data and sufficient processor power, to make obsolete the fog of war that Clausewitz warned about.

The 1991 Gulf War showed cybernetics at its most seductive. With a precision air-raid campaign and a hundred-hour ground war, the U.S.-led coalition beat back Saddam Hussein quickly and decisively. Minimal firepower was expended for

maximum, localized, effect. By then, though, the cybernetic paradigm's underpinnings in the technoscientific world-picture were beginning to erode. Moore's Law may have kept up its shocking pace, promising exponential growth in computer processor power, but in the decade that followed, the importance of that power nonetheless diminished. The new revolution came in networking. Processing information was not so important as sharing it. Talk of chaos theory and "complex adaptive systems," developed by a new generation of internet-savvy scientists, made its way into the Pentagon as the cyberneticists' promise of a single, all-knowing machine went unfulfilled. Out with the centralized structure of a cybernetic force; networks could facilitate self-organizing "swarms," units that would adapt to their environments while remaining in constant contact with their comrades. By the time Donald Rumsfeld took the helm at the Department of Defense, the words "network centric" were on every ambitious young officer's lips.

Bousquet names this fourth and final paradigm with the neologism "chaoplexic." He makes it a primary task of his book to show that the US military remains more cybernetic—and less chaoplexic—than it likes to think. The generals haven't given up their cybernetic right to micromanage. Intoxicated by the prospect of total situation awareness that the latest satellites and computer networks offer, they still insist on the possibility of running a war from thousands of miles away. Nowhere is this habit more evident than in the unmanned drones that chase the Taliban with Hellfire missiles, controlled by pilots safe and sound in the Nevada desert. With every headline about a village full of civilians pulverized by these machines comes a reminder that even the most high-tech awareness is far from total. Bousquet argues that only a fuller embrace of chaoplexity can face the fog of today's wars.

Nevertheless, the scientific way of warfare is much more than a set of tactics; it is a pattern of speech and a cipher of meaning. John Boyd, an ace Air Force pilot who became one of the Pentagon's leading strategists, helped set the groundwork for a chaoplexic approach to military challenges. A glance through one of his few writings, the 1976 essay "Destruction and Creation," offers an uncanny view of the scientific way of warfare at work. It is a treatise on decision-making in chaotic environments, where "Gödel, Heisenberg, and the Second Law of Thermodynamics" rest comfortably beside "the basic goal of individuals and societies"—as well as, by implication, soldiers. The direct relevance of the scientific ideas to his point is questionable, but they constantly poke through, as kernels of the twentieth century's metaphysical imagination. For Boyd, the legacy of these scientific ideas lends a habitable sense of order to his task, just as when Clausewitz turned to the new science of energy to help explain the success of Napoleon to his fellow Prussians.

"Science is not an activity separate from other contemporary social developments and intellectual trends," Bousquet insists. Neither is warfare. Combining the two, his book shows, comes naturally to the condition of modernity. The business of war-fighting fits into an organic relationship with the fixtures of ordinary life, from the essential gadgets to the favored gods.

Cosmic War

If science dictates the structures of military thought today, perhaps religion served a similar function in times before. One needn't look any further than the Psalms: "My refuge and my fortress; my God, in whom I trust... His faithfulness is a shield and buckler." Martial imagery pervades religious writings from around the world, even if interpretation over time often renders it "just" metaphorical. Bousquet rightly warns us not to belittle metaphors; they "constitute a means of ordering experience by imposing existing structures of meaning over the chaos and confusion produced by the eruption of novelty." While reading *The Scientific Way of Warfare*, one might think of it as the start of a much broader study of all the ways we've dressed up the chaos of combat in more orderly clothes. *The Cosmic Way of Warfare*, it might be called.

The same society that produced the psalm shows plenty of evidence of taking divine action seriously as a military mechanism. In the sixth chapter of the book of Joshua, the deity issues specific tactical orders to the Israelite army: a six-day program of horn-blowing, marching, and shouting. On the seventh day the walls of the city fall flat, leaving it naked for the slaughter of almost every man, woman, child, and animal within. The Hebraic tradition's Latin inheritors were prone to a similar tactical physics. The night before marching on Rome in the year 312, the pagan Constantine I had a dream and ordered the sign of the cross painted on the shields of his warriors. When Constantine's outnumbered force won a swift victory the next day against Maxentius (acting on divine prophecies of his own), he gave enough of the credit to Jesus that, within a few years, nascent Christianity was on its way to becoming the official cult of the empire.

It is common to think of religion as a primitive form of science, one that asks virtually the same questions and plays a commensurate role in the life of societies. To be sure, there is a vast religious prehistory to be written that would carry *The Cosmic Way of Warfare* farther back than Newton. But Newton—an alchemist obsessed with decoding prophecy—hardly spelled a definite break in which the religious transmuted into the scientific. And religious ways of warfare hardly disappeared as scientific ones arose. A fuller cosmology of warfare would embrace both. Religion and science each provide resources for thinking through the chaos of combat.

If, as Bousquet suggests, we are to take metaphors seriously, let's hear out General Tommy Franks' turn of phrase when Baghdad fell in 2003, quoted on the first page of the book: "I've died and gone to heaven and seen the first bit of net-centric warfare at work!" Or, more to the point, consider President Bush's remarks that year to several Palestinian dignitaries, whom he reportedly told, while speaking about the invasions of Iraq and Afghanistan, "I'm driven with a mission from God." From the commander-in-chief on down, militarized Christianity may be nearly as much a part of the US military's control structure as the chain of command. General David

Petraeus, who led the “surge” campaign in Iraq, caused controversy by recommending that an evangelical handbook “should be in every rucksack for those moments when soldiers need spiritual energy.” Revelations since 2005 and since showed that cadets and officers at the Air Force Academy were proselytizing to their subordinates and harassing non-Christians. Meanwhile, increasingly conservative military chaplains serve as moral engineers of the modern battlefield. Holy war theology has provided ideological infrastructure for the present wars as much as any cutting-edge science. Both contributed to the fatal mix of brash arrogance and blindness to politics on the ground that permitted the invasion of Iraq to take place and set the stage for a disastrous occupation.

Ironically, the terrorists and insurgents who have made the occupation so vicious appear to grasp the scientific ways of warfare without the benefit of the Pentagon’s billions. “This enemy is better networked than we are,” lamented General John Abizaid at a 2007 conference in Virginia Beach. Bousquet also quotes the 9/11 plotter Khalid Sheikh Mohammed boasting, “I know that the materialistic Western mind cannot grasp... how this works.” Such savvy, so removed from MIT or the complexity theorists at the Santa Fe Institute, runs in tension with Bousquet’s master narrative that links scientific war-making with elite scientific fads. But works like Olivier Roy’s *Globalized Islam* show how network-consciousness has infiltrated contemporary Muslim cultures through informal theology, preached from Jakarta to London in audio lectures and online forums. The traditional concept of the *ummah*, or community of believers, has become, in Roy’s words, a “virtual community,” linking alienated elements of the Muslim diaspora through cheap communications technology and easy air travel. Islamist military tactics (Web sites as command centers, commercial airplanes as weapons) developed not simply from Hollywood movies, as was so often claimed following the 2001 attacks, but from the experience that constitutes the Muslim sacred community. Khalid Sheikh Mohammed is therefore at least partly right in insisting that spiritual and not merely material forces are at play.

There is no use faulting Bousquet for neglecting a 1,000-page addendum on religion in his 250-page book about scientific warfare. But science was not the beginning of the quest for order on chaotic battlefields, nor is it the end. Take one startling passage, which he cites as a signal of thermodynamic thinking:

Witnessing Napoleon riding past after his victory at Jena in 1806, Hegel saw in the Emperor the “world-spirit,” the embodied march of History. No longer merely serving the ambitions of an aristocratic class, wars were now “engines” of history, crucial junctures at which nations, peoples, and classes revealed their true nature and purpose, fulfilling their historical destiny.

Clearly, the technoscientific side of Hegel’s impression is only part of the story. *The Weltgeist* was, quite explicitly, a concept through which Hegel sought to synthesize Christian metaphysics with a secular, scientific modernity. While Napoleon was

indeed an actor in the rational mechanics of history, he was no less a harbinger of the Holy Spirit. The religious valence of Hegel's political thought was precisely what made his vision so magisterial and so attractive to a society eager to square Christianity with Enlightenment values. The Prussian elite adopted this religioscientific philosophy to secure their own rational and divine right to rule and fight. Seeking their overthrow, after all, Hegel's most influential disciple wrote that the critique of religion is the beginning of all critique.

Embracing Complexity

Just as *The Scientific Way of Warfare* leaves out religion, it falls short on critique. The latest ambitions of modern militarism escape unscathed. To its credit, this means the book could be read as profitably at West Point as at the War Resisters League. Yet in the sequence of Bousquet's scientific regimes—from the mechanistic, to the thermodynamic, to the cybernetic, to the chaoplexic—no logic of warfare lives up to its promises, and each comes bearing terrible, unexpected consequences. The sensation of order each paradigm provides turns out to be a sham. Bousquet chronicles how clockwork tactics couldn't stop Napoleon's cannons, how thermodynamics brought on an age of assured nuclear destruction, and how cybernetics produced a Vietnam War fought in terms of bombing raids and body counts instead of human politics. The ways of scientific warfare (or religious, or cosmic warfare) make war comprehensible enough to be possible in the first place, but they also, as Bousquet's book shows, lull us into forgetting the intractable chaos that always accompanies battle, despite every effort to organize it.

After reading his account of the mechanistic, thermodynamic, and cybernetic paradigms, it is hard to imagine hearing their metaphors uncritically again. But Bousquet serves the chaoplexic no such fate. "This approach," he said in an interview with the *Complex Terrain Laboratory*, "is in my view more in tune with the nature of war and therefore more likely to be successful." War is complex and chaotic, so how better to fight than chaoplexically? For him, the error of the Pentagon is not its uncritical embrace of chaoplexic jargon, but its failure to embrace chaoplexity more fully.

If the pattern of the previous three paradigms is any guide, however, chaoplexity will license and unleash on the world a whole new species of militarism, less controllable than what has gone before. Its own metaphoric vocabulary offers some sense about what this new regime might look like. Chaoplexic discourse involves "swarms" of "runaway processes," "self-organizing" by way of positive feedback loops. Such a force should radically embed itself into the environment, even to the point of being inseparable from it.

Bousquet and the Pentagon agree that, in certain respects, the most chaoplexic fighters are the ones that we've been facing since 2001. Self-organizing, embedded, runaway swarms: check, check, check. So how did al Qaeda get so chaoplexic? A utopian religious ideology with no tolerance for subtlety. Guided by such single-

minded objectives, there's no need to bother with formal, centralized leadership. With access to drug money, oil wealth, cheap weapons, and consumer-grade digital toys, they don't have to worry that 93% of people in the Muslim world still refuse to condone the 9/11 attacks. No one can control them: not their communities, their politicians, their leading clerics, nor even their ostensible figurehead, bin Laden himself. When forced out of one area, the fighters re-create another in their own image, as we see now in northwest Pakistan, marrying local women and investing in communities. That's what a runaway process looks like. And by fostering a subculture of hardened "warriors" rather than of soldiers bearing ethical responsibilities, where homosexuality means expulsion and theocratic elements run rampant, the Pentagon has been following its enemies' lead.

Second-best to the terrorists in chaoplexity is the army of private contractors in Iraq and Afghanistan on the Pentagon's payroll. Often impervious to both military regulations and local laws, these companies have operated with tremendous latitude, forging business and security relationships on the ground that will make them very difficult to extract should the politicians ever want to. Already outnumbering the regular soldiers deployed in Iraq, this highly adaptable force blurs the lines between business and warfare, military and civilian. Contractors have taken part in human trafficking, accounting fraud, and murderous outbursts that usually escape prosecution. In place of religious fundamentalism, their way of warfare follows another kind of science: that of American big business, keeping profits high and accountability low.

In a conversation with Bousquet in London, architectural theorist Geoff Manaugh noted that, in the war on terrorism, "we find it increasingly difficult to distinguish between states of peace and war." Manaugh spoke of the Conquistadors as a model we should expect to see again in the chaoplexic age: self-organizing, entrepreneurial swarms licensed to do what they will, free from political constraints on their brutality. But documents like *The Memoirs of the Conquistador Bernal Diaz del Castillo*, who fought alongside Cortés, reveal how these Spanish privateers also came by chaoplexity through religion. After yet another battle against the natives, Castillo speculates that it was only his sins that prevented him from seeing, with his own eyes, the tactical assistance God had surely lent the Spaniards through the apostles James and Peter.

Bousquet may be right that going chaoplexic is the only way Western militaries can vanquish the terrorist villains. The much-touted surge in Iraq has had success by bringing soldiers out of their bases and into civilian communities, where they can embed and adapt to local conditions as fixtures of everyday life. But it has also made the prospect of a meaningful exit strategy ever more remote. The old American theology of manifest destiny has swelled to insist that our bases abroad are there by divinely-ordained right. We're now almost a decade into an Orwellian state of perpetual war-at-a-distance. Yet Bousquet writes that we are still only in the "birth pangs" of the chaoplexic paradigm. God save us from what this baby looks like when it's born; and from the belief systems that soldiers will need to entertain in

order to enact it.

The root of Bousquet's credulity regarding the chaoplexic may come from taking too seriously Clausewitz's axiom that war equals complexity. Beyond the foggy complexity, beyond the technoscientific order, beyond every religious mythification of warfare (past and present), there is a lurking simplicity in war as well, something from which all those contrivances serve to distract: horrific, unconscionable violence.

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