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The New Face of War

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That medical technology saves lives is a commonplace observation; that military technology saves lives is not. It is, of course, the direct purpose of medicine to save life, and that of war, generally speaking, to "snuff" it out (though of course death is not war's ultimate end, certainly not in wars justly fought). Yet recent U.S. military action has been remarkable for the use of technologies—including offensive weapons—that minimize the loss of life by design. From satellites to laser-guided missiles to unmanned aircraft to a panoply of portable devices, the gadgets of the new conventional warfare seem intended to make killing as safe as possible, both for the American soldiers who fight and the bystanders whose "collateral" destruction was once an accepted fact of modern warfare.

This extraordinary development teaches several important lessons about the potent and sometimes surprising brew of technology, politics, and war. The first is that military technology is not self-implementing. The weapons we develop are not the inevitable fruits of progress; they come into being in large part because of the victory of certain political ideas—not just military doctrine, but the triumph of one political worldview over another and the changes in national purpose that follow. Second, by making war distinctly less hellish, the United States has, even if just temporarily, undermined an age-old assumption about war in the popular imagination. The new conventional warfare—which involves killing with more deliberation and greater precision—answers several of the classic complaints against war that have long formed the basis of popular antiwar sentiment.

Of course, scientific discoveries have on several historic occasions been thought to promise a great boon for the causes of peace and life, only to result in unprecedented destruction and death. Richard J. Gatling reportedly believed his gun would bring an end to the Civil War. So lethal was his invention, Gatling supposed, that North and South would be forced to negotiate a settlement. Alfred Nobel, whose name is universally linked with the cause of peace, was also the inventor of dynamite: He believed his research might one day yield a technology so dangerous that warfare would be avoided.

As a second, more significant caveat, it should be observed that the triumphs of the new conventional warfare may be short-lived, and the American example may prove to be an isolated one. In war, fighting *not* to kill any more people than minimally necessary is a luxury open only to the very powerful. Should the

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United States find itself embroiled in a large-scale war, where the survival of its own regime is at stake, much of this technologically-enabled military restraint might go out the window. Moreover, it would be utopian to imagine that the American example of restraint would be copied far and wide, especially by belligerent regimes or terrorist networks—the very regimes and terrorists that are most likely to make war or provoke it. All that said, something new is afoot in the way America fights, and it is worth trying to sort out how we got here and how the new ways of fighting will change what the nation thinks about the meaning of warfare.

The Politics of Military Technology

In a recent interview with *Vanity Fair*, Deputy Defense Secretary Paul Wolfowitz tipped his hat to a 1988 government report, written by the Commission of Integrated Long-Term Strategy, entitled "Discriminate Deterrence." The report was authored by Wolfowitz's mentor, the late Albert Wohlstetter, and provides an excellent example of how political ideas can direct technological developments.

While "Discriminate Deterrence" is relatively famous for its prediction that China would likely become a great military power, Wolfowitz cited the report for its prescient recognition that the era of nuclear deterrence was coming to an end. The report's overriding argument was that U.S. military policy should focus on the broader range of smaller-scale scenarios that were increasingly more likely than World War III, scenarios not unlike Desert Storm or the current war and postwar operations in Iraq.

In short, "Discriminate Deterrence" signaled that those responsible for developing and implementing America's military strategy lacked the will to engage in the indiscriminate destruction of nuclear weaponry. This was not only an important step for American military policy, but a key advance in the morality of American military thinking.

This philosophical shift is apparent in the report's critique of nuclear deterrence, which makes two key arguments. First, by focusing on "the extreme threats"—such as "an unrestrained Soviet nuclear attack" on the United States—America's "apocalyptic" preoccupations were diverting "America's defense planners from trying to deal with many important and far more plausible situations in which threats of nuclear annihilation would not be credible." Second, the report complained that "the extreme contingencies also warp decisions at a deeper level." The philosophy of nuclear deterrence resulted in an ultimately empty threat to respond by nuclear strike in situations where only a conventional response would even be contemplated.

Like the Gatling gun and other previous breakthroughs in military weaponry, though on a vastly wider scale, nuclear technology was supposed to have made

war unthinkable by its sheer destructive power. This was the logic of nuclear deterrence. By abandoning this utopian premise, American policymakers found a way to anticipate, rather than rule out, likely forms of military conflict, and to face them in the future with greater effectiveness and greater humanity than was otherwise conceivable within the nuclear mindset. (Being the product of Cold War hawks, the report did not emphasize—indeed, it scarcely mentioned—the humanitarian gains to be had by such a strategic and philosophical shift.)

After recommending that American strategy refocus its strategic sights on scenarios involving less than a global showdown, "Discriminate Deterrence" lays out an alternative approach to national defense: "We must diversify and strengthen our ability to bring discriminating, non-nuclear force to bear where needed in time to defeat aggression. To this end, we and our allies need to exploit emerging technologies of precision, control, and intelligence that can provide our conventional forces with more selective and more effective capabilities for destroying military targets." The report warned that technological conservatism and bureaucratic small-mindedness were the enemies of sound long-term strategy.

Ironically, it is in the Soviet context that "Discriminate Deterrence" first observes the importance of fundamental improvements in the accuracy of our weapons—ironic because the Soviet Union was about to crumble, and because the report's lasting contribution would be helping to shape a new defense policy for the post-Soviet world. The Soviet threat is also used to argue for increased investment in technological innovation generally: "The underlying trends are disturbing. In a growing number of basic technologies with important military applications, the United States may lose its superiority over the Soviet Union." The programs that should receive the highest priority were those promoting the "controlled, discriminate use of force" and greater flexibility in American military response.

The New Weapons of War

"Discriminate Deterrence" singled out four examples of developing technologies that promised surgical force and greater flexibility: stealth systems, smart weapons, ballistic missile defense, and space systems or satellites. All except ballistic missile defense have become staples of the new conventional warfare and have played important roles in America's two wars in Iraq. Yet, we are just beginning to see the new weapons of war at work, and to see how they change both the way we fight and our attitudes about warfare.

A. Stealth Technology: The importance of stealth was first established in 1991 during Operation Desert Storm. To read the official Air Force history of the 37th Tactical Fighter Wing (TFW), the only stealth unit at the time, is to follow a story of virtually unopposed military triumph. Although the 37th TFW

represented just 2.5 percent of Air Force assets, it covered and hit 40 percent of Iraqi targets attacked in the first three days of the war. As the report recounts: "Twenty-nine Stealth fighters hit 26 high value targets on the first night alone." Moreover: "The F-117As were so effective that the Iraqi air defense system practically collapsed. Iraq's command, control, and communications network never recovered." Judging from the 37th TFW's mission log, the only thing that really slowed these fighters down was bad weather.

Stealth technology also played a prominent role in the recent invasion. The F-117A returned to Iraq in the famous opening strike on Saddam Hussein and his sons, the first so-called "target of opportunity." This time around, however, the stealth bomber's load was "enhanced," so that its attack could be guided by laser and satellite, to minimize collateral damage. But the F-117A is just one part of the aerial arsenal. Perhaps the aircraft to gain the most attention in the recent Iraqi war was the Predator, a low-altitude surveillance aircraft that reduces risk to pilots by leaving them on the ground. From invisible aircraft to unmanned aircraft, technological innovation has dramatically reduced or altogether eliminated the mortal dangers faced by American pilots.

B. Precision-Weapons Technology: The ongoing revolution in accuracy was the second innovation highlighted in "Discriminate Deterrence" as exemplifying the kind of research that should receive continued federal funding. As the report described: "Current technology makes it possible to attack fixed targets at any range with accuracies within one to three meters. These accuracies and modern munitions give us a high probability of destroying a wide variety of point and area targets with one or a few shots without using nuclear warheads." This new conventional weaponry, made potent by technological advances, not only obviates the unbounded destruction of a nuclear attack, but minimizes the potentially massive collateral damage associated with the old conventional warfare.

Precision-guided missiles accounted for only nine percent of the munitions dropped in the first Gulf War—a point of complaint for human rights organizations and activists. This time around, as Col. Gary L. Crowder described at a March 19, 2003, briefing, "Every combat aircraft in theater has the capability of precisely striking multiple targets, and most of them can do it simultaneously." In other words, instead of needing many aircraft and many strikes to hit one target, one aircraft can now hit many targets. Such gains in precision trigger a whole host of virtuous effects: aircraft can release missiles from safer heights; less destructive munitions can be used, since a much smaller margin of targeting error has been achieved; fewer sorties are needed, because each one is more effective; fewer escort planes are needed on each sortie, because planes need not get as close as they used to; and unnecessary destruction to both life and property is minimized, because less destructive munitions are being used.

The military rule of thumb for demonstrating these impressive gains in precision goes like this: In World War II, it took about 3,000 sorties to destroy a major target; by the first Gulf War, that number was down to about 10; today, as Crowder made clear, it is possible for one sortie to hit several targets. But this only begins to capture the humanitarian achievement, since precision-weapons technology now makes it possible to disable targets without destroying them, leaving infrastructure intact and ready to be brought back online once the fighting is over. In his briefing, Crowder used the example of an electrical grid, which can be crippled by precision bombing without obliterating it, thus removing the problem of having to rebuild the entire grid afterwards. This way hospitals, homes, police offices, courts, schools, and businesses can receive power again after minimal repairs.

C. Satellite Technology: Central to these improvements in the way we fight is the introduction of satellite technology into the American arsenal. Originally, U.S. military satellites were designed primarily for peacetime usage or to warn of the outbreak of war. In the first Gulf War, the United States deployed 15 GPS satellites, 4 communications satellites, 2 weather satellites, and a classified number of missile defense satellites. Declassified reports from U.S. Space Command in July 1991 reveal that satellites provided 80 percent of communications in the first Gulf War, though unit-to-unit communications still took place primarily over field phones. They also supplied critically needed weather reports and accurate navigation information, making night missions possible.

Since then, our satellite bandwidth has increased tenfold. According to General Lance W. Lord, head of U.S. Space Command, "during the Gulf War, milspace was in its formative stages" and military space capability was only "rudimentary." In the recent war in Iraq, the United States made use of over 50 satellites. These included many communications satellites, satellites supporting global positioning systems (over one in nine soldiers had a GPS device in the recent invasion, up from about one per battalion in the first Gulf War); and satellites that do everything from guide smart bombs to intercept cell-phone communications to support the massive communication infrastructure of the U.S.-led military coalition.

A sign of the times: *Wired* magazine sent a reporter to cover the story of America's high-tech war. In the resulting article, one of the military techies presented a typical scenario: "A special forces unit in northern Iraq attacks an Iraqi irregular unit. The firefight is recorded with digital video, which is uploaded to GCCS [Global Command and Control System] via secure satellite. JOC [Joint Operations Center] intelligence officers fire up the Warfighting Web, click through to the 'Latest Intelligence,' watch the fight, write a summary, and post follow-up orders to the unit. The soldiers either download the orders directly or

receive them by radio from the nearest Tactical Operations Center, the most forward command post on the network."

Out of the Fog

It is too early to know exactly which technologies proved most useful in the recent war in Iraq. And surely, new tools create new problems. High-tech equipment has become so abundant that our troops, even though well-trained to use the new devices, are clamoring for a more streamlined system of communications. One Marine officer quoted in a Marine Corps Systems Command field report complains of information overload: "Marines were overwhelmed with the high number of various communications equipment they were expected to use … Commanders want one box that provides multiple capabilities and that is simple and easy to use."

But the overall effect of all this technology—which would be useless without the political and military vision to exploit it—is to reduce the "fog of war" and to make casualties avoidable to an unprecedented extent. This is not to say that war is no longer horrible or dangerous on the frontlines—for it surely is, as the daily reports of lost American soldiers confirms. But these daily losses, so far, are in the single digits, not the hundreds or thousands. And while it is often said sarcastically that the public expects war to be fought with almost no casualties, military or civilian, it is truly amazing how much progress the United States has made toward this seemingly utopian goal.

In Vietnam, over 58,000 U.S. troops perished, leaving America firmly in the grip of a syndrome that was supposed to prevent us from ever pursuing such a far-flung, large-scale war again. In Desert Storm and the recent war to achieve regime change in Iraq, American and allied casualties were and remain in the low hundreds. And in both Gulf Wars, civilian casualties were and remain in the low thousands—many of whom were killed, accidentally or not, by Saddam Hussein's own forces.

One also has to consider the second-wave benefits of the new conventional warfare. The massive destruction of World War II-style bombing can have deleterious effects lasting for years, if not decades, on the economy, public health, and political order. Increases in disease brought on by malnutrition; malnutrition brought on by a devastated agricultural system or economy; food shortages and hyperinflation brought on by the destruction of indiscriminate bombing: These are the causal chains of old-fashioned war. By contrast, the destruction in Baghdad and around Iraq does not even approach the devastation usually wrought by a war that removes a regime and installs an occupying force.

This may, of course, be a temporary reality, and the current optimism about high-tech war may one day seem, in its own way, as silly as the Silicon Valley optimism of the 1990s. It is unlikely that we have ended, once and for all, the hor-

ror and misery of being attacked by our enemies. But we have greatly reduced the horror, at least for now, of attacking our enemies; and we have reduced, if far from eliminated, the hell of the frontlines. One result of this transformation is a changing public perception of warfare.

The Fading Image of War

The most important postwar literature, television, and movies of the twentieth century, at least those that became famous for their political message, were anti-war. World War I gave us *All Quiet on the Western Front*. World War II gave us *Slaughterhouse-Five* and *Catch-22*. The Korean War gave us the sitcom "M*A*S*H," while Vietnam became a proving ground for the most prominent filmmakers around: Oliver Stone, Francis Ford Coppola, Stanley Kubrick, and others. In popular culture, most of what one surveys on the subject of war leaves a taste of profound horror and regret.

This is definitely true of *Disturbing the Universe*, a superb example of post-World War II literature on the subject of technology and warfare. First published in 1979, it is a memoir of the physicist Freeman Dyson. Although not as famous as *Slaughterhouse-Five*, Kurt Vonnegut's still-impressive polemical take on the firebombing of Dresden, Dyson's memoir provides a fascinating look at how leadership and technology, for better and for worse, can add up to lives lost or lives saved. Dyson himself, however, is less practical and more tragic: "In the end it is how you fight, as much as why you fight, that makes your cause good or bad. And the more technological the war becomes, the more disastrously a bad choice of means will change a good cause into evil."

Dyson tells illuminating stories about his experience as a civilian scientist working for Britain's Bomber Command, whose military efforts were doing nothing, in his mind, to further the goal of defeating Germany while killing a lot of British air crews in the process. Compiling a study of whether a crew's level of experience improved their chances of not being shot down, Dyson discovered that despite examples of experienced crews heroically making it home in the most dire circumstances, "the total effect of all the skill and dedication of the experienced crews was statistically undetectable." The one isolated variable that explained fluctuations in loss of crews was the ability of German fighters to discover and target the bombers. Dyson and his colleagues believed it might improve the bombers' survival rate if the planes were lighter and could thus move faster. They recommended reducing the crew from seven to five and tearing out the planes' two gun turrets and all related parts and ammunition. "An extra fifty miles an hour might have made an enormous difference." As Dyson explains:

> This was not the kind of suggestion our commander in chief liked to hear, and therefore our chief did not like it either. To push the idea of ripping out gun turrets, against the official mythology of the gallant gunner defending his

> crewmates, and against the massive bureaucratic inertia of the Command, would have involved our chief in a major political battle. Perhaps it was a battle he could not have hoped to win. In any case, the instinct of a career civil servant told him to avoid such battles. The gun turrets remained in the bombers, and the gunners continued to die uselessly until the end of the war.

Another interesting story Dyson tells concerns a colleague of his who discovered that the escape hatch on Britain's newest bombers was causing a significant decrease in the number of pilots who successfully escaped while their aircraft was being shot down. Reversing a two-inch difference in the size of the hatch could result in thousands of lives being spared. It took Dyson's colleague months of research to document the discrepancy; then more time and patience and willpower to force the command to officially recognize the problem; and yet more time and energy to lobby the aircraft company to redesign the escape hatch. Only as the war was coming to an end did the new model of plane with a larger escape hatch find its way into the British air fleet.

From these episodes, Dyson does not draw the practical lessons that might guide the statesmen and generals of the future—such as the need for a change in military culture or the fact that war-fighting should take greater account of research findings and not let itself motor along, fueled only by the romantic assumptions of more primitive eras. Instead, his critique is a full-scale indictment of technology itself for enslaving human beings to its mechanistic demands. Inventions take on lives of their own, Dyson argues, and begin shaping the lives of everyone around them: "Otto Hahn and Fritz Strassman amuse themselves with analytic radiochemistry and—boom!—a hundred thousand people in Hiroshima are dead."

And yet, the new conventional warfare suggests quite a different progression of technologies: Space exploration in the 1960s leads to the proliferation of satellites which leads to a new level of precision in missile guidance. The result: thousands of people are *not* dead when the United States bombs the one building in all of Baghdad where it believes Saddam Hussein is holed up. Research into radar technology leads to aeronautical designs that can escape detection, protecting pilots who fly planes in war. Laser technology leads to guidance systems for military weapons, and eventually allows for so much control over speed, angle, and the moment of detonation that increasingly less lethal munitions can be used. Technology does saddle us with new and ever deadlier possibilities, which will likely cross the stage of human events. But it also gives us new ways to avoid or prevent some of these awful burdens, if only intelligent leadership will recognize such opportunities and pursue them.

Dyson's memoir presents all the familiar elements of twentieth-century war drama: the entrenched bureaucracy, the courageous individual, and the misery and injustice of war itself. Dyson, like Vonnegut and every other writer and

director listed above, hates war—and not without reason. For he remembers a war as senseless as it was heroic. The firebombing of Dresden, though not as infamous as the atom-bombing of Hiroshima and Nagasaki, probably killed more people (around 100,000) than either of those attacks. And unlike the bombing of Japan, the burning of Dresden did not achieve any important strategic objective. Although famously a just war with a just goal, World War II entailed enough indiscriminate destruction to sicken generations.

The New Face of War

Looking back, it is no wonder that World War II produced literature like *Slaughterhouse-Five*, a late twentieth-century *Candide* in which Panglossian optimism is steamrolled by man's universal and ultimately world-ending sadism. Its signature line, "So it goes," tagged onto every report of death and atrocity in the story, gave American culture a perverse mantra of helplessness before the onslaught of human violence and war-making. The novel, along with many others, prosecuted patriotism as the habit of blowhards too moronic to notice the moral bankruptcy of American foreign policy and the murderousness of all military action.

The major tropes of the cultural animus against military action include war's indiscriminate killing, the inhumanity of military leadership, the utter stupidity of communal effort, the degradation of one's self, and the wickedness of technology. In the recent war in Iraq, however, little of this applies. There was no indiscriminate killing; targeting has become a hugely deliberative enterprise, with many levels of consultation before any structure becomes a target for bombing. The new American military has the technology to land munitions within an error margin of feet; the capacity to account for every bomb or missile it drops; and in the near future, the capacity to produce instant damage reports from every explosion. Systems are in place to help American soldiers identify one another and enemy combatants, reducing friendly fire incidents.

What of the inhumanity of military leadership? In the recent war in Iraq, computer networks and mobile communication devices enabled military leaders to involve themselves in frontline decisions in a way simply not possible in the past. Chatrooms at headquarters became head-scratching venues for military commanders to debate possible solutions to problems in the field; the cool separation of aloof and imperious leadership from mired-down grunts has been shrunk to a quick series of high-tech relay messages. How about the stupidity of communal endeavor? The technological capacity to effect changes in strategy on short notice allowed the United States military to fight with unprecedented coordination and flexibility. All the parts are connected, and are going to become even more connected, to the same "brain" of military command. The degradation of one's self? In *Slaughterhouse-Five*, the main character Billy Pilgrim is by the

end of the war walking around Dresden in a lady's mink stole, wearing glittering boots he took from the set of an improvised military production of Cinderella, and dopily meandering among the charred ruins of a once beautiful city. He has been robbed of all dignity. Today's highly trained professional soldier may complain of the psychic and physical strain of twenty-four-hour, high-tech, high-performance warfare, but he is unlikely to return home a moral, social, or political outcast.

As a thought experiment, try to imagine what kind of memoir, novel, or movie might come from the recent wars in Afghanistan or Iraq, one that would ring true and find resonance in the culture at large. Whatever one imagines, such an artistic byproduct is not likely to soar to public notice on the strength of its unvarnished fatalism or its withering distrust of military and political authority. History seems to have passed by, at least for now, the notion of a military command indifferent to the deaths of soldiers and civilians, as well as the absurd disconnect between everyday life and the world-ending, Strangelovian ratiocinations of nuclear deterrence.

So far, public opinion has responded to America's increased use of force since September 11 with aplomb. And the emerging picture of an American military command competently using technological advances to topple dangerous regimes has, if anything, confirmed public trust in the American military. Such trust can of course be lost very quickly—and political mistakes can do great damage to public confidence in the military as a force for good. But for now, one notes a public enthusiasm for the whiz-bang technology of the U.S. military that is almost boyish.

In the end, such boyishness gives way, or should give way, to a certain sobriety. For it is precisely the threat of proliferation—the threat of weapons of mass destruction in the hands of otherwise small powers—that makes such technical improvements in America's conventional war-making capacity most essential. We need to kill precisely before our enemies kill indiscriminately, and such preemptive attacks can withstand moral scrutiny only if they do not result in the massive, uncontrollable death of innocents.