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"Friction in the Gulf War"

Barry D. Watts

Gordon, Michael R. and Trainor, Bernard E. *The Generals' War: The Inside Story of the Conflict in the Gulf.* Boston: Little, Brown, 1995. 551pp. $27.95

What really happened in the 1991 Persian Gulf War? How was the campaign planned and how was it conducted? Did the "fog and friction" of war play a significant role? What do we know today that we did not know when Desert Storm ended, and has our overall understanding of the war changed in light of such knowledge?

This essay will attempt to shed light on these questions by examining a recent addition to the growing literature on the Gulf war: *The Generals' War*, by Michael Gordon and retired Marine Corps lieutenant general Bernard Trainor. In this reviewer's judgment, their book constitutes the first comprehensive analysis of the war's planning and conduct. However, before jumping into Gordon and Trainor's analysis, some preliminary observations concerning our evolving understanding of Desert Storm may help to place the book in a broader historical context.

Seemingly ubiquitous television coverage of the Gulf war created the impression that the conflict was transparent to those watching it. Having "seen" the war on the Cable News Network (CNN), most observers presumed they "knew" more or less what had happened. Perhaps the most riveting images conveyed by CNN were the cockpit video of laser-guided bombs striking their targets with apparently unerring accuracy, and General H. Norman Schwarzkopf's briefing (live from Riyadh on the evening of 27 February 1991) of the dazzling, hundred-hour, desert blitzkrieg that routed Iraq's occupying army and liberated Kuwait with miraculously few friendly

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Eliot A. Cohen, Thomas A. Keaney, Wayne W. Thompson, Hank Malcom, Kenneth M. Pollack, Colonel Rich King, and Theodor Galdi all offered constructive criticism on substantive issues in this essay; they also clarified a number of factual issues. While any errors that may remain are the author's, preparing this essay (Mr. Watts notes) reiterated just how hard it is to nail down even the simplest historical facts.

casualties. Judged on the basis of such images, Operation Desert Storm constituted an unprecedented military triumph orchestrated by near-perfect generals deftly employing state-of-the-art weaponry. Even the traditional frictions of war, by which Carl von Clausewitz meant the various factors that distinguish real war from war on paper (including war's intense physical demands, its mortal danger, pervasive uncertainties, and the impact of chance), appeared to have been banished—at least for the U.S.-led coalition.[1] As Jeffrey Record said less than three weeks after the fighting officially ended, Desert Storm "was probably the most frictionless war that we have ever fought."[2]

Although less than five years now separate us from those events, perceptions of the war have already undergone tectonic changes relative to the initial impressions conveyed by CNN and the rest of the media. Regardless of what observers and participants may have thought at the time, television coverage did not render the war transparent. Instead, as Eliot Cohen has observed, the "thinness of television coverage, not its ubiquity, stands out in retrospect."[3] As for Clausewitzian friction, not only did it pervade every level of the campaign—tactical, operational, and strategic—but it now appears to lie at the very heart of why coalition political leaders and military commanders failed, in the war's final hours and immediate aftermath, to reap the political benefits of the coalition's marvelous military performance.

These changes in our understanding of the 1991 Persian Gulf War stem from many things, such as the distance and additional perspective provided by the passage of time; the emergence into the public domain of vast amounts of information concerning the planning and conduct of Desert Storm; the realization that some of the fundamental propositions accepted as fact during the war, even by senior participants, were not so; and such subsequent developments as Iraq's stubborn efforts after 1 March 1991 to prevent the destruction by United Nations inspectors of its nuclear weapons program.

Especially crucial to changes in our understanding of Desert Storm are "facts" that turned out to be either inaccurate or hard (or impossible) to have known at the time. When the coalition's ground offensive began on 24 February 1991, General Schwarzkopf believed that he faced some 545,000 Iraqi troops, who outnumbered his own by "3 to 2."[4] In reality, Iraqi troops in the Kuwait Theater of Operations (KTO) numbered 325,000–350,000 men on 24 February and were themselves outnumbered (although one should not read too much into the initial ratio of troops).[5] Similarly, Schwarzkopf, the airmen who ran his air campaign, and Defense Intelligence Agency analysts in Washington all believed during the last days of the conflict that Iraq's nuclear program had been largely destroyed.[6] Again, however, the truth was quite different, so much so that David Kay—who led several of the early International Atomic Energy Agency teams charged under

UN resolution 687 with finding and destroying Iraq's nuclear program—was able to state by the summer of 1992 that UN inspectors had "identified and destroyed more of the Iraqi nuclear and missile programmes than Coalition intelligence or military power did before the cease fire."[7] In the case of the Iraqi nuclear effort, the bombing had stopped work and destroyed elements of the few known facilities, but the bulk of the program, while dispersed and hidden, remained intact—a fact that was unknown until after the war.

Beyond such changes in our appreciation of the facts of the campaign, there is also a conceptual threshold that must be crossed in order to begin placing the war in historical context: one must decide what overarching measures to use to judge it. Arguably, Paul Wolfowitz, who served as the Pentagon's Under Secretary for Policy during the Gulf war, has offered the most penetrating insights of anyone on this particular issue: "By and large, wars are not constructive acts and are best judged by what they prevent rather than by what they accomplish. The Gulf war prevented something truly terrible, as we now know even more clearly from post-war revelations about Saddam's nuclear program. It seems virtually certain that—if this program had not been stopped—he would have controlled the entire Arabian peninsula and would have turned his nuclear arsenal against either Iran or Israel, if not both countries in succession. To have prevented a nuclear war by a tyrant in control of most of the energy supplies that are the lifeblood of the industrialized democracies of the world was no mean accomplishment."[8]

From the moment Desert Storm ended, then, there were numerous reasons for anticipating that as time went on our understanding of the Persian Gulf War—for outside observers and inside participants alike—would undergo change, potentially substantial change. To cite an obvious example from an earlier era, consider how much our understanding of the Allies' victory over the German U-boat threat to Atlantic shipping during the second half of 1941 has changed since the 1970s, when details began to emerge about British code breaking at Bletchley Park and the ULTRA intelligence it produced.[9]

Instinctively, those who covered the war knew that much had occurred behind the scenes that had not been revealed to the public by the administration, official military briefings from the Pentagon or Riyadh, television coverage (including CNN from Baghdad), or other reporting. There are books that have aspired to add to the record by revealing insiders' views of the war. Unfortunately they have provided precious little synthesis and no analysis of the campaign beyond piecing together into a single narrative the recollections of particular events from various participants.

Gordon and Trainor's *The Generals' War: The Inside Story of the Conflict in the Gulf* may appear, on the basis of its subtitle, to be more of the same. In fact, however, it offers considerably more than behind-the-scenes war stories and

tales out of school. Over three years in gestation, *The Generals' War* balances its interviews of Bush administration officials, diplomats, U.S. and allied military officers, members of the intelligence community, and Iraqi Shiite refugees with extensive use of documentary sources. Its interviews start at the top with George Bush and include extensive discussions with General Schwarzkopf as well as with virtually all of his top ground commanders. Most importantly, the authors integrate documentary evidence and interviews into a comprehensive account of what occurred at the level of high command and subject the reconstruction of events to analysis.

Consequently, Gordon and Trainor offer the first overarching analysis of the war from the viewpoint of the principal American civilian and military actors. Of course, this book will not be the last word on the issue; as yet the public record on the Gulf war contains little on how Arab allies saw the war, and even less on the view from the Iraqi side of the hill.[10] Indeed, the lack of American interest in Iraqi perspectives and goals before, during, and after Desert Storm reveals a weakness in U.S. military culture that can be traced back at least to World War II.[11] Nonetheless, *The Generals' War* will probably stand the test of time as the point of departure for future historical analyses of the conflict's planning and conduct—especially of the ground campaign and the prickly issue of war termination.

The argument that lies at the heart of the book centers on four main issues: the implications of Khafji battles for the planning of the coalition's ground campaign; the effects of the air campaign on the Iraqi field army in the KTO by 24 February 1991 (G-Day), when the coalition's ground offensive began; the rapid loss of "situation awareness" that affected decisions in both Washington and Riyadh concerning when, and under what circumstances, to end the ground campaign; and, the lack of any coherent concept or plan for war termination.

To take these issues in order, Gordon and Trainor maintain that a major oversight in Desert Storm was the failure of Central Command (CENTCOM) to adjust plans for the ground campaign in light of what the Khafji battles at the end of January 1991 revealed about the Iraqi army: "CENTCOM never recognized the enormity of the Iraqi defeat in the January border battles. The command did not see the whole of the operation for what it was: a well-planned major offensive involving three heavy divisions from two corps, designed to humiliate the Saudi army, start the ground war, and begin to bleed the Americans.[12] Those on the ground saw only the tip of the iceberg because most of the Iraqi troops committed to the battle never made it to the front [having been decimated enroute by coalition air power]. And the ground generals who controlled the war—Schwarzkopf and [General Colin] Powell—were not inclined to accept the notion that an invading army could be destroyed from the

air. Confounded by Khafji, CENTCOM did not make a single substantive change in its plan for a land offensive as a result of the battle.[13] The consequences of the failure to appreciate the lessons of Khafji would lead to an incomplete victory weeks later" (p. 268).

Gordon and Trainor insist that, by contrast, the Marines under Lieutenant General Walt Boomer who encountered the Iraqis firsthand during the Khafji battles did learn from the experience. Boomer concluded in early February that the Iraqis could not move, shoot, and communicate at the same time, nor would they stand and fight once they had been bloodied (p. 295). Based on this judgment, he accepted the suggestion of Major General Bill Keys, one of his division commanders, that the original plan for the two Marine divisions to attack sequentially through a single breach be scrapped for a more aggressive approach in which both divisions would attack simultaneously, each making its own breach (p. 296). Thus by the eve of the ground campaign the Marines had put their attack plan in "fast-forward," believing that they could reach Kuwait City within three days, while the Army's two-corps "left hook" from the west stuck with its original timetable, starting the main attack a day after the Marines and requiring seven to ten days to destroy the Republican Guard (pp. 303–5 and 376).

Turning to the thirty-eight days of unrelenting air attack that preceded the coalition's hundred-hour ground campaign, Gordon and Trainor offer the following assessment: "The air war . . . confirmed the Air Force's growing ability to destroy targets deep in the enemy heartland and on . . . battlefields. By late February . . . airpower's success in crippling Iraq had not led to a political success comparable to its military success. . . . But while the air-war commanders had not won the war in downtown Baghdad, they [had] devastated the Iraqi army. By depriving it of any help from the Iraqi air force, forcing it to dig in, eliminating the prospect of a mobile defense, and knocking out much of the Iraqi armor and artillery, the air campaign had all but won the war" (p. 331). Going back to September 1990, Army offensive planners led by Lieutenant Colonel Joe Purvis had struck an agreement with Air Force planner Brigadier General Buster Glosson that the air campaign was to reduce the combat effectiveness of the Iraqi field army by 50 percent prior to the beginning of the ground campaign.[14] This criterion quickly came to be understood as entailing 50 percent attrition of the Iraqi tanks, armored personnel carriers, and artillery throughout the KTO prior to beginning the ground campaign, and this goal was carried forward into the CENTCOM operations plan for Desert Storm.[15]

Particularly against the Republican Guard heavy divisions (Tawakalna, Medina, and Hammurabi), the desired levels of equipment attrition were not achieved by G-Day.[16] But as the authors emphasize, the effects of the bombing had done the job insofar as Iraqi combat effectiveness was concerned: the first

and second echelons of the Iraqi army had become a hollow force, and even the Republican Guard units in the third echelon were pinned down and degraded (p. 354). Coalition air power also accomplished something else. The achievement of air superiority virtually from the outset of the campaign blinded the Iraqis to the coalition's massive redeployment of two full corps, VII Corps and XVIII Airborne, far to the west to form Schwarzkopf's "left hook."

As for the length and muddled ending of the ground campaign, Schwarzkopf states in his postwar autobiography that a radio message from the Kuwaiti resistance (received just before noon on 24 February) indicating that the Iraqis were pulling out of Kuwait City prompted him to order the main attack from the west moved up from the 25th to the 24th.[17] The heavy forces of XVIII Airborne Corps on the left (the 24th Mechanized Infantry Division and the 3rd Armored Cavalry Regiment, or ACR) and VII Corps on the right were to begin their planned attacks by 1500 hours on the 24th.[18]

However, Clausewitzian friction began to affect VII Corps almost at once. Its commander, Lieutenant General Frederick Franks, beginning his attack some fifteen hours ahead of schedule, was confronted almost immediately with his first critical command decision—whether to push ahead during the night or wait until morning (pp. 379–80). Desiring to keep his corps' scheme of maneuver synchronized, and disinclined to accept the high risk of fratricide that pressing on would have entailed, Franks chose to halt his entire attack until the next morning.[19] The heavy units from XVIII Airborne Corps, which, like VII Corps were basically unopposed, continued moving through the night.

The lost time proved impossible for VII Corps to make up. The weather along the border had been far from perfect on the morning of 24 February. Early morning rain showers and patches of fog were followed by blowing sand that reduced visibility to as little as two hundred meters during the day.[20] The morning of the 25th brought even worse weather, with episodes of *Shamal* (a mixture of rain and blowing sand) that heavily obscured the battlefield over the next thirty-six hours. Worse, Franks's command concluded from Joint Surveillance Targeting and Reconnaissance System (JSTARS) imagery that the Iraqis had identified VII Corps as the main coalition attack and were reacting to it in force—an inference that evidently led one of Franks's divisions to slow the whole corps' attack on the 25th by taking the time to reduce the small Iraqi force at Al Busayyah rather than bypassing it (pp. 384–86).

Iraqi decisions at this stage of the campaign further complicated the ground situation. By midnight (Riyadh time) of the 25th, JSTARS was showing heavy traffic moving north from Kuwait City toward Basra. At 0135 hours on the 26th (1735 hours, 25 February in Washington, D.C.), Baghdad radio announced an Iraqi withdrawal from Kuwait, and by morning, coalition intelligence in the theater was reporting a mass exodus led by the Iraqi III Corps in the east.[21]

Later on the 26th, VII Corps' 2nd ACR finally engaged the Republican Guard's Tawakalna Division at 73 Easting (a longitudinal line on Army maps west of the Wadi al-Batin); blowing sand and clouds kept the regiment's aviation squadron on the ground about half the time, and during the six-minute engagement itself visibility was less than one thousand meters.[22] This brief fight involving 2nd ACR was followed by a series of meeting engagements that by day's end had involved VII Corps' 1st Armored, 3rd Armored, and 1st Mechanized Infantry divisions. These battles, which were planned and fought as a single operation by VII Corps, all occurred in poor weather, and some of the fighting took place at night.[23] In such conditions it was impossible for either side to have a clear picture of the battlefield—although the coalition's picture was certainly less muddled than the Iraqis'. After the engagements along 73 Easting, VII Corps continued groping its way forward toward the rest of the Iraqi heavy forces. But not until the afternoon of the 27th did VII Corps' 1st Armored Division engage the Republican Guard's Medina Division and other Iraqi mechanized units.[24]

By midday of the 26th, the Marines had captured Kuwait International Airport, repelled a second Iraqi armored counterattack, and cleared the way for the liberation of Kuwait City by Arab forces; soon thereafter the U.S. Army's "Tiger Brigade," operating with the Marines, cut the main road between Kuwait City and Basra.[25] By 27 February most of the remaining Iraqi forces were retreating toward Basra, but only toward the end of the day did elements of XVIII Airborne Corps finally reach positions from which they planned to leap the next day, far enough east to "close the gate" north of Basra and prevent any additional Iraqi forces from escaping the theater (pp. 406–8).

In these dynamic and far-from-transparent circumstances, it should not be surprising then that on the 27th, when General Powell discussed with Schwarzkopf the possibility of quickly shutting down the war to avoid even the impression that the United States was "piling on" a defeated enemy or engaging in "wanton killing," neither general had an accurate picture of the battlefield.[26] Gordon and Trainor are probably correct in suggesting that Powell's decision to recommend that the president end the ground war after only one hundred hours was more a political judgment than a military one (pp.viii–x, 415, 423, and 470). Even if Powell had not by then actually seen media coverage of the so-called "Highway of Death," he had surely begun to anticipate that the damage inflicted by CENTCOM's forces on the retreating Iraqis might produce adverse publicity.[27] Furthermore, because Schwarzkopf himself did not have a precise idea of where his own units were or the status of the Republican Guard, and because he did not consult his subordinate commanders in the field, he had no obvious reason for resisting Powell.[28] Schwarzkopf's own account of his last two phone conversations with the Chairman on when to stop the war indicate

that he realized that some heavy equipment, including "several dozen top-of-the-line T-72s" belonging to the Guard, might escape destruction.[29] However, to avoid negative publicity and any further loss of friendly lives, he was willing to accept this seemingly minor untidiness concerning the destruction of the Republican Guard, the very force that had been identified by his own command as a "strategic center of gravity" of Saddam Hussein's brutal regime.[30]

Implicit in Gordon and Trainor's emphasis on the political nature of General Powell's role in stopping the war at one hundred hours is the judgment that the Chairman should have restricted himself to purely military matters. However, the authors' underlying presumption—that at war's highest level a clear division between things political and things military can be maintained—is at least open to debate. Clausewitz himself ridiculed this proposition as senseless.[31] More to the point, the 1986 Goldwater-Nichols Defense Reorganization Act implicitly agreed with Clausewitz, in specifying that the Chairman, in his strengthened role as the *principal* military adviser, could (subject to the direction of the president) "attend and participate in meetings of the National Security Council."[32] This change to Section 101 of the 1947 National Security Act surely opened the door to a strong chairman providing the sort of political-military advice that Clausewitz believed was unavoidable at the highest level of war. General Powell was certainly not a weak chairman.

Last but not least, Gordon and Trainor argue that those who planned and ran Desert Storm neglected to think through the military "end-game" and ensure that it encouraged the desired postwar political outcome.[33] That the outcome should perhaps have gone beyond ejecting the Iraqis from Kuwait and limiting Iraq's threat to the region, to entertain Saddam Hussein's removal from power, does not seem to have been seriously contemplated by the Bush administration. In the closing hours of the war, senior administration officials began to worry that using military force to effect Saddam's overthrow might fragment Iraq or lead to a lengthy occupation. Consequently, the matter of Saddam's fate was left to the Iraqis themselves. There was a vague hope among Washington officials that a leader or group might remove the Iraqi tyrant, but the administration was not prepared to take the matter into its own hands.

The prospects for this "hoped for" outcome were quickly reduced to the vanishing point by American inattention to war termination. Even before the coalition's cessation of offensive operations in the morning of 28 February, Schwarzkopf announced to the world, including Saddam Hussein, that coalition ground forces harbored no intention of going to Baghdad.[34] Then, having neither asked for nor received any political guidance, Schwarzkopf met with the Iraqis at the Safwan airfield on 3 March to negotiate a military cease-fire. There he assured the Iraqi delegation that coalition forces would depart their territory as quickly as possible and granted them the right to fly armed military helicopters

over Iraq without coalition interference (pp. 446–7). With the ambiguity of American military intentions removed and enough surviving military capability to reimpose his rule on Iraq, Saddam Hussein first suppressed the Shiite uprisings in the south and then contained the Kurds in the north.

This ragged and untidy ending forms the crux of Gordon and Trainor's critique of Desert Storm's planning and conduct. Having decided to go to war and delineated the campaign's political objectives, President Bush and other senior civilian leaders decided, in light of the perceived "mistakes" of Vietnam, to let the generals achieve the specified objectives more or less as they saw fit. Even setting aside Franks's cautious and methodical handling of VII Corps, Generals Powell and Schwarzkopf let some fairly large items slip through the cracks. In Gordon and Trainor's judgment, the Iraqis' willingness to stand and fight was misread. Khafji was ignored by all but the Marines, and the impact of the air campaign on the Iraqi army in the KTO was underestimated by Powell and Schwarzkopf, who simply could not bring themselves to believe that air power alone had largely shattered their foe's willingness and capability to fight. The left hook, especially its main attack, was not synchronized with the Marines' drive into Kuwait on the right; thus while enough Republican Guard and other Iraqi forces escaped destruction to enable Saddam Hussein to regain his grip on Iraq after Safwan. Last but not least, war termination was carried out in a political vacuum.

How justified are these criticisms? The physical facts on the ground at the end of the campaign remain matters for debate, if not confusion.[35] At his televised press briefing on the evening of 27 February, General Schwarzkopf claimed that the "gate" to the KTO had been closed as far as Iraq's military machine was concerned (p. 417).[36] While XVIII Airborne Corps' easternmost units were not by then on the ground north of Basra, or even approaching the city's outskirts from the west, most of the surviving elements of the Iraqi army were rapidly becoming trapped within a crescent oriented east-west and about thirty miles across, whose easternmost "horn" ran through Basra to the Shatt al-Arab waterway. Postwar analysis of U.S. reconnaissance photography reveals that on 1 March 1991 "the main concentration of surviving Iraqi equipment stretched from west of Az Zubayr, through Al Basrah, to the Shatt al Arab. Numerous smaller concentrations were scattered within Al Basrah and Az Zubayr, and in Iraqi-held territory along the roadways south of Az Zubayr. . . . The surviving Iraqi equipment included 842 tanks, at least 365 of which were RG [Republican Guard] T-72s; 1,412 other armored vehicles (mostly APCs [armored personnel carriers]); and 279 pieces of artillery of various types."[37] To be crystal clear on one contentious point, these surviving Iraqi forces had not been "pushed out the back door" of the KTO; instead they had been trapped against a door at the

theater's rear that was, for the most part, shut. Also worth noting is the fact that the ambiguous manner in which the decision to cease offensive operations at 0800 hours on February 28th was conveyed to CENTCOM ground forces led VII Corps to stop "in place by 0130."[38]

Whether these facts support or refute the claim that the American VII Corps' objective of "destroying" the Republican Guard was achieved by the morning of the 28th has also continued to be disputed. The U.S. Army's published account of its participation in Desert Storm asserts that the Republican Guard was "destroyed" but adds in the same paragraph that as many as one-third of the Guard's T-72s "made it out of the KTO," as did about one-third of the tanks in other Iraqi units.[39] Schwarzkopf himself has stated that his intent was to inflict such destruction on the Guard in particular, and the Iraqi army as a whole, that neither could any longer pose "a threat to any other nation."[40] Yet in October 1994 Saddam Hussein used forces, including armor that had escaped destruction during Desert Storm, to threaten Kuwait seriously enough to precipitate the redeployment of American forces, including ground troops, back to the Gulf.[41] This development alone, though it occurred over three years after Desert Storm officially ended, seems sufficient to refute once and for all the contention that the Republican Guard was "destroyed" in the sense of the coalition's political and military objectives.

Again, how legitimate are Gordon and Trainor's criticisms? Powell appears to have been the pivotal figure in the decision to stop the campaign at the round number of one hundred hours. At the same time, Schwarzkopf's actions before, during, and after the Safwan meeting—starting with his 27 February assurance that the coalition was not going to Baghdad—certainly went far toward preserving Saddam Hussein's regime long after President Bush left office. So the generals must share some of the blame for the timing and incoherence of the campaign's ragged ending. Yet it is far from obvious that ending the war in such a way as to ensure that military operations furthered political aims should have been left in their hands. War termination entails political nuances and judgments that presidents and secretaries of defense cannot reasonably expect of theater commanders in a democracy as fervently committed to civilian control as the United States. In this particular instance, the posture of U.S. forces at the end of the campaign mattered politically, as did American expectations for the behavior of Iraqi forces south of the Euphrates and Shatt al-Arab after offensive operations were suspended.[42] That the president and Secretary of Defense left these matters wholly in the hands of two generals without offering any political guidance to speak of seems, even in hindsight, nothing short of astonishing.

What about the planning and conduct of Desert Storm as a military campaign? Here the answer is more complex. Undeniably, the generals let some important things go astray, but to fault them unconditionally is to embrace the one

significant conceptual weakness of *The Generals' War*. Gordon and Trainor's inclination is to construe friction (as so many readers of Clausewitz's unfinished manuscript *On War* have done) as no more than a tactical phenomenon. Even though *The Generals' War* contains a chapter entitled "Friction," the notion is principally applied to "snafus," such as the malfunctioning of F-117 avionics or bomb-bay doors, geodetic map discrepancies in B-52 bombing computers, or the targeting of the Al Firdos bunker in the Ameriyya section of Baghdad when it was evidently sheltering civilians (pp. 207, 215, 318, 325, and 409). However, what Clausewitz termed the "unified concept of a general friction" (*Gesamtbegriff einer allgemeinen Friktion*) embraces considerably more, including the profound difficulties combatants face trying to function in the immediate presence of death or mutilation, the extraordinary physical demands combat can impose on participants of all ranks, the uncertainties of the information on which actions in war are based, and the whole range of unforeseeable difficulties that render the apparently easy so incredibly difficult in war.[43]

A common thread in these diverse constituents of general friction is that they can, singly or in combination, degrade or shatter "situation awareness." Fear of imminent death, coupled with combat's physical demands, can dramatically degrade the capacity of participants to retain composure, rationality, or anything approaching "the big picture." Being compelled by the pace of combat operations to make potentially life-and-death decisions in "real time" using fragmentary information of uncertain reliability only compounds these difficulties. Also, chance developments and unforeseen problems, including the unpredictability of interaction with the enemy, further complicate situation awareness.[44]

It is but a small step from recognizing this common thread to the realization that its effects cannot be limited to tactical glitches in the sense of balky equipment or unlucky targeting choices. As the authors' own analysis of the ground campaign confirms, misimpressions as subtle as the presumption by individuals that the Iraqis would stand and fight had a large and lasting impact on Desert Storm, as did the loss of "global" situation awareness by Powell and Schwarzkopf during the ground campaign. Viewed simply as mistakes or errors, in and of themselves, most of these specific frictional manifestations appear almost inconsequential, but, especially in their postwar consequences, they had unforeseen, if not unforeseeable, political and strategic effects.

In many fields today, including mathematics and physics, processes that exhibit this kind of "extreme sensitivity to perturbations in current or initial conditions" are termed *nonlinear*.[45] A structural feature of such systems is that their long-term, detailed behavior is formally unpredictable; very small differences in initial or current conditions are iteratively magnified through feedback until, at least in the so-called "chaotic" regions, they eventually dominate overall

behavior. Neither gathering more or better data nor processing it more efficiently can eliminate the long-term unpredictability of such systems.[46]

A related point is that since Clausewitz died in 1831 we have (unfortunately) accumulated much experience with war and combat processes. For example, postwar analysis of the performance of American F-86 pilots who flew in air-to-air combat during the Korean War revealed that among pilots having fifteen or more encounters with the enemy in a lead position, some performed vastly better than others—the top pilots in this group were more than three hundred times as likely to convert an encounter into a kill as pilots near the bottom in performance.[47] We also know from more contemporary sets of data (like those generated by the late 1970s Air Combat Evaluation flown on an instrumented range in Nevada, and by the Advanced Medium-Range Air-to-Air Missile operational-utility evaluation conducted in simulators during the early 1980s) that differences in human interactions outweigh those inherent in weapons, avionics, and platforms. In both these tests, situation awareness—meaning (in an air-to-air context) the *relative* ability of opposing pilots to visualize the current and near-term dispositions of both friendly and enemy aircraft—proved to be statistically "the single most important factor affecting engagement outcomes," regardless of aircraft type, avionics, or any other test variable.[48] Thus there is impressive empirical evidence that combat results even in an area as technology-intensive as air-to-air combat turn on relatively subtle differences in the ability of aircrews to retain a complete picture of what is occurring around them. Combat dynamics, in short, exhibit the telltale hallmarks of nonlinear systems.

Setting aside the unanswerable question of what Clausewitz himself "really meant" by general friction, it is but a modest step from twentieth-century empirical data of this sort to four interrelated realizations. First, human factors (like the conceptual assumptions combatants carry with them into battle, and their situation awareness once operations are underway) have, to this point in history, dominated combat outcomes. Second, a twentieth-century updating of Clausewitz's original concept would construe general friction as the inverse, or reciprocal, of situation awareness: high levels of friction entail low situation awareness, and vice versa. Third, while friction's dominance of combat results may not be as statistically quantifiable at the operational and strategic levels of war as in tactical engagements, Desert Storm's rocky end-game certainly confirms that the loss of situation awareness by high-level commanders and political leaders can dominate overall effects. Fourth, Desert Storm also provides strong empirical confirmation that friction can have highly nonlinear and unpredictable effects on the course and outcome of combat.

This late-twentieth-century "reconstruction" of Clausewitz's early-nineteenth-century notion of general friction suggests an important sense in

which Gordon and Trainor's criticisms of Desert Storm's planning and conduct are misguided. With the aid of hindsight and much additional information, they were able to highlight virtually every significant misstep, however tiny or seemingly innocuous at the time, by the generals who ran the war. Their unstated but implicit criticism is that these missteps could and should have been avoided. This presumption is especially evident in their contention that in late July 1990 the Bush administration should have heeded the minority intelligence assessment of the CIA's National Intelligence Officer for Warning, Charlie Allen, that there was a 60-percent chance that Saddam Hussein would seize Kuwait, and accordingly taken steps to deter the invasion (p. 16). What this conclusion overlooks is that everyone involved faced vast uncertainties prior to the event—the invasion was *unexpected*. Similarly, if combat processes themselves are inherently nonlinear, then expecting error-free, frictionless performance in the planning and conduct of war is unrealistic.

To come back to a point made at the outset, the impression conveyed by CNN that Desert Storm was relatively free of friction—if just on the coalition's side—was profoundly misleading. Even at the strategic level of the campaign, the American generals who orchestrated the operation encountered appreciable levels of friction, both in planning and prosecuting the war. As Gordon and Trainor document, the U.S. Air Force, Army, and Marine Corps tended "to go their separate ways" in planning and execution, notwithstanding the rhetoric of jointness that accompanied the campaign (p. 473). In this regard, it seems relevant to recall that Clausewitz himself first used the term "friction" to describe the chaotic Prussian command relationships—*three* commanders in chief and *two* chiefs of staff—that preceded Prussia's 1806 defeat by Napoleon at the twin battles of Jena and Auerstädt.[49] Granted, in Desert Storm the Iraqis generally experienced far higher levels of friction than did the coalition, an observation that goes far to explain why the military results were so one-sided. Coalition air planners, for instance, structured their initial efforts against at least three, and possibly four, Iraqi target systems with the explicit purpose of driving up enemy friction.[50] But to imply that there should have been no coalition missteps whatsoever ignores altogether the nonlinear nature of combat processes of war itself. At each "misstep," the key actors of the coalition faced enormous uncertainties as well as numerous alternatives, many of which would have been far worse than the ones they chose. For instance, the "ground-truth" information on which they would, in theory, have based their actions in a frictionless universe was obscured by a blizzard of misleading and false data filtered through the conceptual "blinders" that mere mortals can never entirely escape. Also, the onward rush of events left the participants with far less time to analyze and

second-guess their decisions than the more than three years Gordon and Trainor devoted to writing *The Generals' War.*

The standard of error-free performance by which Gordon and Trainor implicitly judged the generals who ran the war, then, is misguided. More penetrating and useful questions would have been: How well did Powell, Schwarzkopf, Franks, and other senior officers anticipate or deal with the frictions that could have been expected in the desert? Did either the generals who ran the war or their political masters take adequately into account the inherent difficulties of using military means to achieve positive political ends within the context of a limited war for limited objectives?[51] Obviously these questions are very different from the ones Gordon and Trainor chose to address.

That said, the argument that Gordon and Trainor's criticisms of the war's planning and conduct implicitly held the participants to the wrong standard should not obscure the considerable accomplishment their book represents. At this juncture in our evolving understanding of Desert Storm, *The Generals' War* is, by a good margin, the best strategic analysis of the campaign's overall planning and conduct to date. Indeed, given the strong American cultural proclivity to eschew studying past wars, one suspects that many of the war's participants might themselves well learn a few things from a reflective reading of *The Generals' War.*

Notes

1. Carl von Clausewitz, *On War,* trans. Peter Paret and Michael Howard (Princeton, N.J.: Princeton Univ. Press, 1976), pp. 104, 119, and 122.

2. Neil Munro, "Jeffrey Record: Defense Analyst," *Defense News,* 18 March 1991, p. 46.

3. Eliot A. Cohen, "Tales of the Desert: Searching for Context for the Persian Gulf War," *Foreign Affairs,* May/June 1994, p. 142. Eliot Cohen was the director of the Gulf War Air Power Survey (GWAPS). Commissioned on 22 August 1991 by Secretary of the Air Force Donald Rice, it endeavored to provide an analytical and evidentiary point of departure for future studies of the conflict, particularly of the air campaign at the operational level of war. The present reviewer oversaw GWAPS work on operations and effects.

4. "Excerpts from Schwarzkopf News Conference on Gulf War," *The New York Times,* 28 February 1991, p. A8; H. Norman Schwarzkopf with Peter Petre, *The Autobiography: It Doesn't Take a Hero* (New York: Bantam Books, 1992), p. 408.

5. Alexander S. Cochran et al., *Part I: Planning in Gulf War Air Power Survey:* vol. I, *Planning and Command and Control* (Washington: U.S. Govt. Print. Off. [hereafter GPO], 1993), pp. 203-5; and Barry D. Watts and Thomas A. Keaney, *Part II: Effects and Effectiveness in Gulf War Air Power Survey:* vol. II, *Operations and Effects and Effectiveness* (Washington: GPO, 1993), p. 220. The figure of 325,000–350,000 Iraqi soldiers in the KTO on G-Day is based on total deployment of 51 divisions, not the 43 that has been widely reported since the war; see, for example, Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress Pursuant to Title V of the Persian Gulf Conflict Supplemental Authorization and Personnel Benefits Act of 1991* (Washington: GPO, April 1992), pp. 254–5. The 325,000–350,000 figure also takes into account eight corps headquarters as well as various independent brigades and battalions.

6. Schwarzkopf with Petre, p. 499; and Watts and Keaney, p. 328.

7. David A. Kay, "Arms Inspections in Iraq: Lessons for Arms Control," unpublished paper, 12 August 1992, p. 5. For further details see David A. Kay, "Denial and Deception Practices of WMD Proliferators: Iraq and Beyond," *The Washington Quarterly,* Winter 1995, pp. 86–8 and 97–9.

8. Paul D. Wolfowitz, "Managing the Schwarzkopf Account: Atkinson as Crusader," *Joint Force Quarterly,* Winter 1993–94, p. 124.

9. F.H. Hinsley and Alan Stripp, eds. *Codebreakers: The Inside Story of Bletchley Park* (Oxford: Oxford Univ. Press, 1993), pp. 6 and 44. Hinsley states that the first victory over the U-boats in the second half of

1941 was "achieved entirely on the basis of Ultra," which made possible a six-month decline in sinkings due to "evasive routing of convoys."

10. For one of the few public comments by a high-level Saudi participant, see General Khalid Bin Sultan, "Schwarzkopf Did Not Win War Alone," *Defense News*, 26 October-1 November 1992, pp. 19–20.

11. Ken Pollack deserves credit for stressing this important insight.

12. Gordon and Trainor's wording in this passage implies that the Iraqis committed entire divisions in the Khafji battles. The five cross-border penetrations that the Iraqis attempted between the evening of 29 January 1991 and sunrise the next day were carried out by units considerably smaller than divisions—for the most part by battalions; see Watts and Keaney, pp. 234–5; also, Brigadier General Robert H. Scales, Jr., *Certain Victory: The U.S. Army in the Gulf War* (Washington: Office of the Chief of Staff, 1993) p. 190. As for the elements of the Iraqi 3rd Armored and 5th Mechanized Divisions that were decimated by coalition air power on the night of 30–31 January while trying to move south, information is sketchy, but the best guess is that the units involved were brigades rather than divisions. While JSTARS imagery of these events still exists, the in-depth review of these tapes that would be needed to reduce uncertainties about the forces involved had still not been attempted as of early 1995.

13. Scales's discussion of the Khafji battles indicates that the VII Corps commander did subsequently direct that increased efforts be made by coalition air power to destroy the Iraqi 52nd Armored Brigade prior to 24 February in order to protect the corps' right flank; see Scales, pp. 191–2.

14. Cochran et al., p. 170.

15. Watts and Keaney, pp. 82 and 94–5; and Scales, p. 187.

16. In the case of the three heavy Republican Guard divisions, overall attrition of tanks, APCs, and artillery was 25.5 percent by G-Day; Central Intelligence Agency, Office of Imagery Analysis, "Operation Desert Storm: A Snapshot of the Battlefield," IA 93-10022 (Washington: September 1993). The theaterwide figure is about 38 percent; Watts and Keaney, pp. 213 and 219.

17. Schwarzkopf with Petre, pp. 453–4. Schwarzkopf alerted both U.S. corps through Lieutenant General John Yeesock, as well as the multinational ground forces through Lieutenant General Khalid Bin Sultan, by midmorning (local time) on 24 February 1991 of the possibility that he might move up the timing of the coalition's main attack.

18. The other three units in XVIII Airborne Corps—the U.S. 82nd and 101st Airborne Divisions and the French 6th Division—started well to the west of the 24th Mechanized Division and began attacking on the morning of 24 February 1991.

19. Richard M. Swain, *"Lucky War": Third Army in Desert Storm* (Fort Leavenworth, Kans.: U.S. Army Command and General Staff College Press, 1994), pp. 236–7 and 248.

20. *Ibid.*, p. 229.

21. Swain, p. 250; also, author's recollections from a 1995 Air Staff review of JSTARS tapes for the night of 25–26 February 1991.

22. Swain, p. 390; and Scales, pp. 261–2.

23. Scales, pp. 261–2 and 265–6. The U.S. Army refers to 2nd ACR's encounter battle on 26 February alone as the "Battle of 73 Easting"; the encounter battles that followed, which saw VII Corps' 1st and 3rd Armored Divisions and 1st Mechanized Division attack defensive lines manned by the Iraqi Tawakalna Division and one brigade of 12th Armor roughly along the 73 Easting, are usually called "The Battle of Wadi al-Batin." As Ken Pollack has pointed out, these encounter battles, *not* the Battle of Medina Ridge on the following day, constituted the largest armored engagement of Desert Storm.

24. Scales, pp. 292 and 296. At the Battle of Medina Ridge five battalions of the U.S. 1st Armored Division engaged the Medina Armored Division's 2d Brigade plus a part of a brigade from the Adnan Division. Other elements of 1st Armored engaged brigades of the Iraqis' 10th and 12th Armored Divisions around the same time as the Battle of Medina Ridge.

25. Swain, p. 254.

26. Schwarzkopf with Petre, p. 468.

27. Eliot A. Cohen and Thomas A. Keaney, *Gulf War Air Power Survey: Summary Report* (Washington: GPO, 1993), pp. 250–1. While television coverage on 28 February left many viewers with the impression that most or all of the roughly sixty-five miles of north-south highway between Al Jahrah (just west of Kuwait City) and Az Zubayr (about twenty miles southwest of Basra) was littered with vehicles destroyed by coalition aircraft, the concentration of some 1,400 vehicles (mostly cars and trucks) that produced the "Highway of Death" scenes actually covered just the two kilometers heading north from Al Jahrah to Mutlah Ridge.

28. Swain, p. 247. Swain argues that as early as 25 February the use of imprecise language by VII Corps and Third Army in communicating their intentions to Schwarzkopf's headquarters in Riyadh caused a gap between the theater commander's perception and that of his subordinate field commanders.

29. Schwarzkopf with Petre, pp. 471–2.

30. Watts and Keaney, p. 85.

31. Clausewitz, pp. 607–8.

32. Goldwater-Nichols Department of Defense Reorganization Act of 1986, Public Law 99-433, approved by the president 1 October 1986, Section 203.

33. Fred Charles Ikle, *Every War Must End* (New York: Columbia Univ. Press, 1971), pp. v and 108. After the ground war started, Ikle had some ideas on war termination; he pulled them together and sent them through Wolfowitz to Cheney, but by then it was too late to affect events in the theater.

34. Excerpts from Schwarzkopf News Conference, p. A8.

35. See, for example, the June 1993 U.S. Naval Institute *Proceedings* [hereafter *USNIP*] article by Colonel James Burton, "Pushing Them Out the Back Door," pp. 37-42. *Proceedings* published a special section in August 1993 containing rebuttals to some of Burton's more sensational charges of Army ineptness during the ground campaign by such officers as Lieutenant General Ronald Griffith, who commanded the 1st Armored Division, VII Corps, during Desert Storm. Burton responded in the November 1993 issue of the *Proceedings* (pp. 19–25); the dispute continued into 1994. Much of the hear was generated by criticisms of Army commanders and doctrine.

36. Excerpts from Schwarzkopf News Conference, p. A8.

37. Central Intelligence Agency, Office of Imagery Analysis. Of the totals cited, at least thirty-nine tanks and fifty-two other armored vehicles belonging to the Hammurabi Division were destroyed in the early morning hours of 2 March 1991 by the American 24th Mechanized Infantry Division as the Iraqis attempted to reach the Hawr al Hammar causeway and escape northward.

38. Swain, p. 290.

39. Scales, pp. 301 and 314–5. The U.S. Army view is that by the evening of 27 February "VII Corps had broken five Iraqi heavy divisions: Tawakalna, Medina, 10th Armored, 12th Armored, and 52d Armored." General Griffith has taken the same position (see "Mission Accomplished—In Full," *USNIP*, August 1993, pp. 64–5). It is possible, however, that the use of rhe word "destroyed" in reporting from VII Corps units at this stage meant only that the enemy forces so described had been rendered combat-ineffective, whereas Schwarzkopf may have been inclined to interpret the word more strongly.

40. Schwarzkopf with Petre, pp. 384, 465, and 499.

41. See Michael R. Gordon and Bernard E. Trainor, "How Iraq Escaped to Threaten Kuwait Again," *The New York Times*, 23 October 1994, pp. 1 and 6.

42. Swain, p. 280. The coalition officially suspended offensive operations at 0800 hours (local) on 28 February 1991. A military cease-fire between the two sides was negotiated at Safwan on 2 March.

43. Clausewitz, pp. 113–23; also Carl von Clausewitz, *Vom Kriege*, ed. Werner Hahlweg (Bonn: Dummler, 1980 and 1991), p. 265.

44. Clausewitz, p. 139. Clausewitz did observe that "the very nature of interaction with the enemy is bound to make it unpredictable." However, few readers of his manuscript have linked this unpredictability with chance or the unified concept of general friction.

45. J.A. Dewar et al., "Non-Monotonicity, Chaos, and Combat Models," RAND Report R-3995-RC (Santa Monica, Calif.: 1991), p. 2.

46. James P. Crutchfield et al., "Chaos," *Scientific American*, December 1986, p. 46; also Heinz-Otto Peitgen, Hartmut Jurgens, and Dietmar Saupe, *Chaos and Fractals: New Frontier of Science* (New York: Springer, 1992), p. 10.

47. Dennis Strawbridge and Nannette Kahn, "Fighter Pilot Performance in Korea," Institute for Air Weapons Research (IAWR), IAWR Report 55-10 (Univ. of Chicago: 15 November 1955), p. 71. Some of the sixty-nine 4th Fighter Interceptor Wing pilots (out of a total population of 520) with fifteen or more encounters had been able to convert 70–80 percent of these opportunities into firing passes and 60–70 percent of their firing passes into kills, whereas others had converted as few as 15 percent of their encounters into firing passes and as few as from zero to 10 percent of those firing passes into kills.

48. Veda, Inc., "AMRAAM OUE Red Lessons Learned Briefing (U)," 29 January 1982; S.R. "Shad" Dvorchak, "Man-in-the-Loop Lessons Learned," 1985, vugraph 1; and S. R. Dvorchak, "On the Measurement of Fog," symposium presentation, Military Operations Research Society, Washington, June 1986, vugraph 7. The AMRAAM OUE, which utilized line combat-ready pilots from Tactical Air Command to keep the human dimension in the loop, generated the equivalent of some twenty-thousand air-to-air sorties, vugraph 9.

49. Peter Paret, *Clausewitz and the State: The Man, His Theories, and His Times* (Princeton, N.J.: Princeton Univ. Press, 1976), p. 124.

50. The targets involved were the "Kari" system, which formed the heart of Iraq's strategic air defenses; national-level telecommunications and command and control; leadership facilities used by Saddam Hussein's regime; and Iraqi electric power.

51. Swain, p. 280. Swain argues that the tendency to separate wartime miliary matters from peacetime political issues is a "fundamental weakness" in the traditional attitude of American soldiers toward civil-military relations.

Ψ

The World War II Commemorative Flag

The Department of Defense World War II Commemoration Committee was established in 1990 primarily to thank and honor the veterans of the war, their families, and those who served on the home front, and also to educate Americans about World War II. As a designated Commemorative Community, the Naval War College flies this blue, gold, red, and white flag under the national ensign.