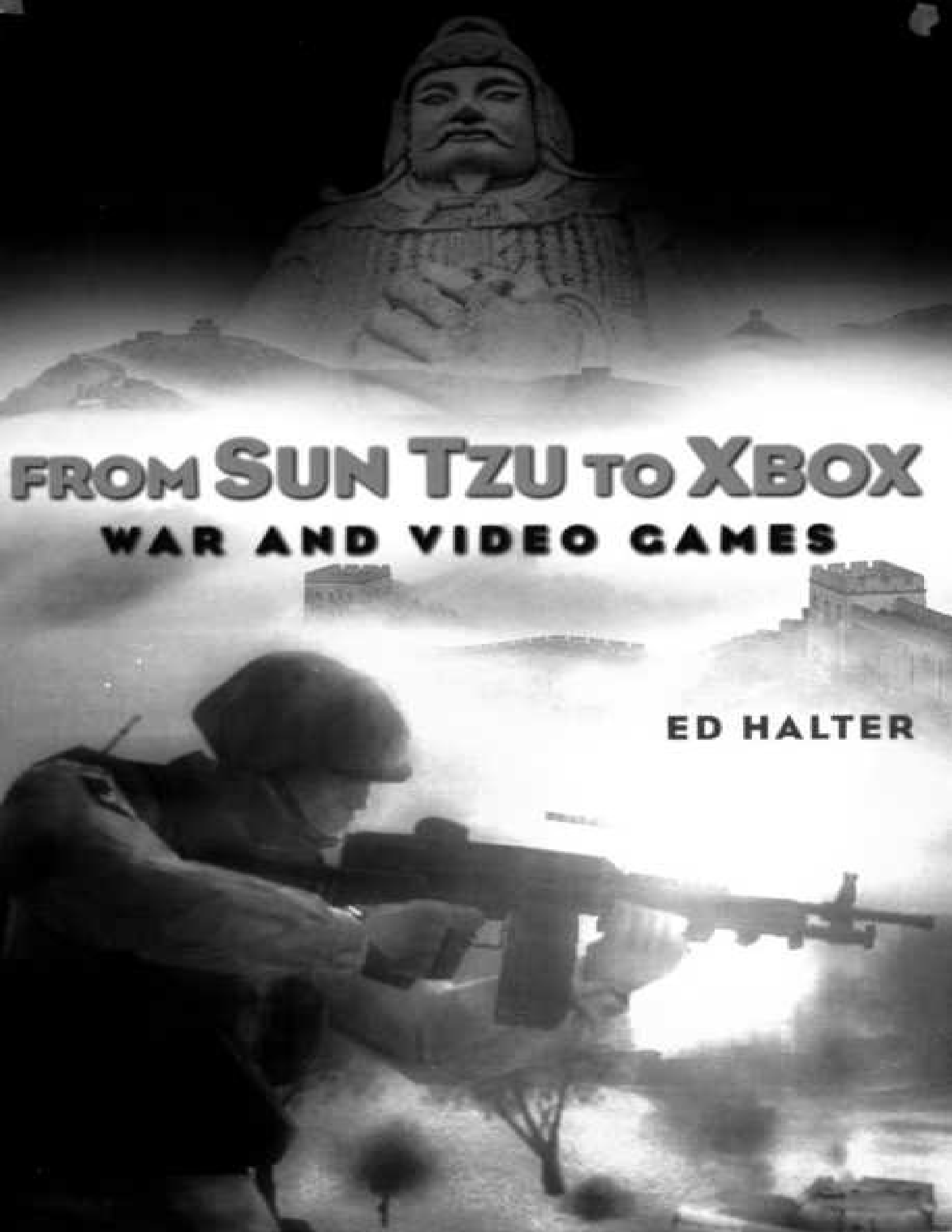
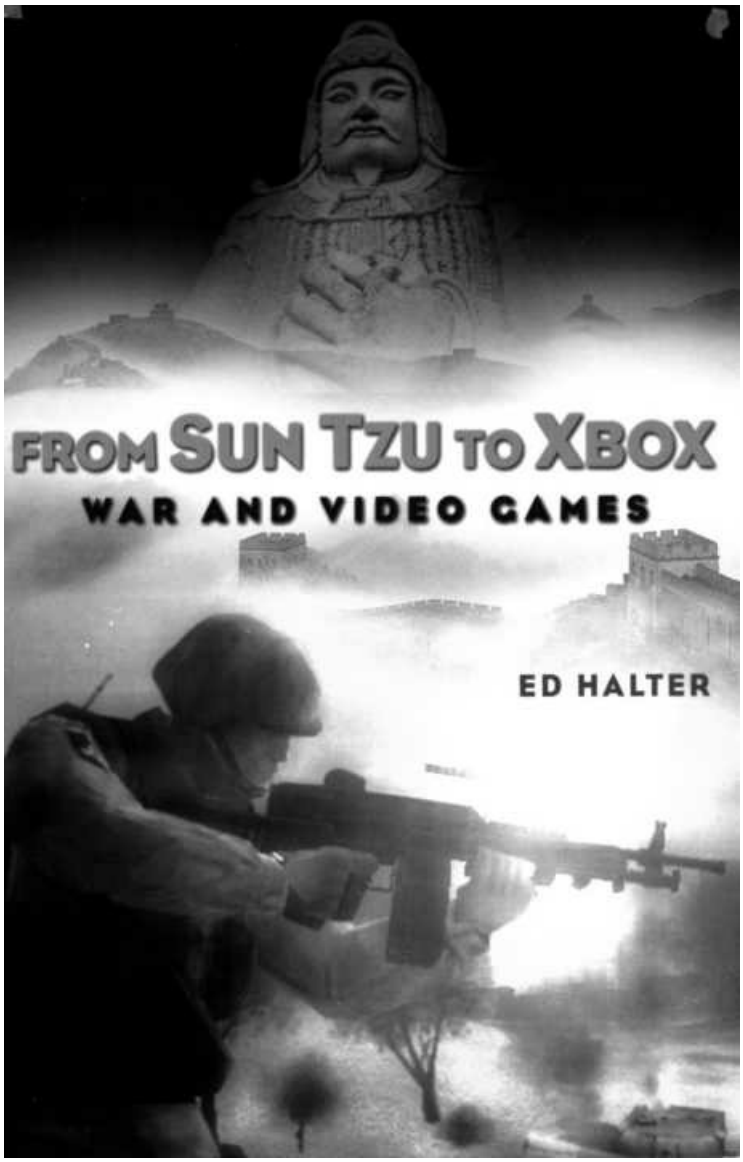


FROM SUN TZU TO XBOX

WAR AND VIDEO GAMES

ED HALTER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For Garrett Scott, who brought clarity to chaos.

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INTRODUCTION

AMERICAS ARMY GOES TO WAR

IN THE MIDDLE of May 2003, American troops invaded Los Angeles. Major media largely overlooked this particular action, though it was part of a wider campaign that had achieved a persistent presence in the news. Chopping through a clear blue California sky, a cluster of Black Hawk helicopters swept over downtown, then hovered above the glass-curtained main complex of the Los Angeles Convention Center as pedestrians glanced upward in surprise. U.S. Special Forces, clad in green camouflage and clutching machine guns, descended from the copters onto a building's roof, rappelled down its wall to the ground, then stormed the Center's entrance. Traffic halted on Pico Boulevard as some civilians rubbernecked in disbelief, while others cautiously fled-no doubt wondering whether the troops were here to tackle an anthrax scare, dirty bomb, sleeper cell, or some other impending threat to Western culture by Those Who Hate Us. A mere two weeks after President Bush had declared the end of major combat operations in Iraq, had the war on terror found its new front, right in the heart of the global entertainment industry?

Well, yes and no.

After all, this was Los Angeles, so surely a few of the of the more steadfast lunchtime crowd were media-savvy enough to notice that seemingly unworried camera crews accompanied the soldiers, tracking their advance into the Convention Center. Or that one helicopter had chosen to position itself directly above a building that sported a large-scale fabric advertising banner, emblazoned with a photograph of a soldier's face, the Army's logo, and the slogan "Empower Yourself. Defend Freedom." Looking past the banner's left, passersby would have noted that some more gargantuan signage likewise draped the Convention Center's entrance, with a different, but no less familiar logo: the classic tripartite-swish icon of Atari.

The Army wasn't here for reasons of homeland security-at least, not directly. These Special Forces had been ordered to invade the Electronic Entertainment Expo, or E3, the burgeoning video game industry's major annual showcase and convention. Their mission was to promote the latest version of Americae Army, a cutting-edge computer game created by U.S. military itself as a recruitment aid, which had so far met with remarkable success from players, critics, and game industry professionals. A cunningly designed first-person tactical shooter (the same genre as the globally popular online antiterrorist fantasy game Counter-Strike) Americas Army had been launched about a year earlier, made available to download for free from GoArmy.com, the branch's official recruiting Web site, on July 4, 2oo2. Those interested in playing could also visit their local Army recruiting center, and pick up a smartly packaged game disk, or find one in a number of different gaming magazines.

Downloaded over 2.5 million times in its first two months, Americas Army quickly became a phenomenon in gaming circles, where carpal-tunneled true-believers chattered avidly about it for weeks, causing precipitous zigzags to descend down the message forums of innumerable Internet gamer haunts. No fewer than eight gaming publications bestowed best-of-show awards upon Americas Army following its prerelease unveiling at E3 2002. One, the popular and snarky

game-culture cartoon site Penny Arcade, declared it the "Best Misappropriation of Taxpayer Dollars Ever." "More than one million garners have the Army to thank for a killer free video game," raved nerdcasters TechTV. By 2005, the number of registered users for Americas Army exceeded five million. Suddenly, the Army was wicked cool. And indeed, the Army spent over $7 million developing the game-so good a thing it was at the very least getting some decent PR out of it.

Like the traditional Army swag of T-shirts and bumper stickers-but much, much hipper-the game functioned as an innovative means of extending brand awareness, delivered in a highly detailed, highly addictive package. "What this means," Major Chris Chambers, Deputy Director of the Army Games Project, explained to a reporter for The Mac ObAerver, "is that we make connections with Americans who might not have had a connection with the Army. We use the video game to make that connection. We know we've got a great game but the game is also great in terms of the story it tells about the soldiers that are in the Army and why they do things the way they do." These connections included involvement in "grassroots" America:e Army tournaments held at gaming cafes, loft LAN parties (where garners rig their computers together to create a small local network), conventions, and other locales, where the Army might send a recruiter to hang with the garners, complete with an Army-logoed Hummer full of recruitment-related brochures and freebies in tow.

Traditional publicity stunts at E3 involve costumed characters, celebrity-geek lectures, giveaways, and "booth babes," those female actress-models hired to staff displays for a typically estrogen-challenged crowd. In order to highlight the upcoming release of America:e Army: OperationA, then the latest update to their already famous image product, the Army staged a maneuver called a "Battlefield Casualty Evacuation" on the convention floor of E3 2003. Around a theatrical mock-up of a Middle Eastern urban setting, a team of soldiers rappelled from the ceiling onto the convention floor, picked up a uniformed mannequin from one part of the floor, and escorted it into the entrance of the fake building. The building displayed the red, white, and blue America;e Army logo at its top; an artful smattering of blood-colored paint on its left leg represented the dummy's injury, along with some rips in its olive jumpsuit. Soldiers barked orders to one another in the course of the maneuver. "More bad guys, let's roll it!" exhorted one as a team of six men carried the dummy off to imaginary safety, surround by the sounds of fake firefighting.

Bad guy. Today, the term has become standard soldierly slang for enemy combatants. It's no doubt linguistically useful to have one short Anglo-Saxon name to encompass the confusing range of possible antagonists in a situation as complicated as the insurgency in Iraq, the ongoing conflict in Afghanistan, and the greater war on terror. Bad guy could be Al Qaeda terrorists, Iraqi insurgents, urban looters, Taliban warlords, or the resisting elements of wherever else U.S. troops get dropped. Hearing it uttered in the context of E3, one can't help but speculate whether this flexible appellation's etymology springs from video games. For a generation of soldiers who came of age slaying a monstrous array of "bad guys" in Doom, Tomb Raider, Reeident Evil, or Halo, such a transposition of terms from aliens to Iraqis would be natural, even subliminally comforting, in its simplicity, and puts a new spin on the concept of "demonizing" the enemy. Depending on your point of view, it's a use of language that's either part of the horrors of war, or just a means to get the job done.

Americana Army itself employs the more official military lingo OPFOR (Opposing Forces) to designate enemies in the game. "OPFOR" works in much the same way as "bad guys," quickly dehumanizing human targets with a bureaucratic-scientism, though without the boyish conceit. When networked teams fight one another inside American Army, an interesting thing occurs. Your opponents' team appears as OPFOR to you (slightly swarthier than U.S. troops, and sometimes mustached), but your team in turn appears to be OPFORs from your opponents' perspective. Thus players can only fight as members of the U.S. Army, or in later versions of the game, as non-American "indigenous forces." In Americans Army, you always play on the right side.

Indeed, thanks to its Internet presence, many of those who joined up in Americans Army weren't Americans. On one of the Frequently Asked Questions lists on the Americans Army Web site, a hypothetical reader inquires, "I am not in the United States, can I still play the game?" The provided answer: "Yes, we have official servers in Europe as well! There are no restrictions on who can play Americas Army. We want the whole world to know how great the U.S. Army is."

Keeping It Real

Of course, at E3 that day, there were no bad guys at all. Temporarily blurring the lines between real and imaginary, live and virtual, was what Americas Army's E3 stunt was all about. The Army created a fake battlefield with actual soldiers, who saved a mannequin by performing authentic maneuvers, all staged for cameras and journalists. The PR message was to convey the theme of Americae Army's "realism"-a concept that had become a buzzword in post- 200o game design, as much for the Army as for Microsoft, Rockstar, Electronic Arts, or any other commercial game designer or publisher. Like the most successful selling points, "realism" was a slippery term. It could refer to the increasingly cinematic qualities showcased in games for next-gen console systems like the Playstation 2 and Xbox, whose images boasted better graphics and more fluid movement than ever before available to a consumer product. It could be about how savvy and responsive the game's Al wasmeaning the intelligence-simulating programming that controls a player's computerized opponents. Or it might concern all the myriad of artistic details that appeared to correlate to the sensorial clutter of nondigital existence: the background hum of traffic, garbage in the streets, or the muttered comments of Al-controlled supporting players.

For war games especially, it could refer to the veracity of any number of real-life elements: geographical environments based on real locations, accurate depictions of weapons that could only fire a certain amount of rounds before reloading, or ballistics that caused missiles to travel in arcs that replicated realworld physics. America:a Army offered all these components, with an added hook lifted from the war in Afghanistan. At a time when images of this conflict were rare, Americas Army offered privileged glimpses from the front lines, in the manner of oldtime newsreels. Some of the backgrounds in the game were lifted from video footage of Afghan landscapes. Early in the game's history, its official site included a "Stories of Afghanistan" blog by an actual American soldier who, as the site stated after its launch in 2oo2, "is also capturing ideas, facts, and footage that may be used in future iterations of the Americas Army game." All this at a time when news footage and images from Afghanistan were notably scarce in mainstream media; minds hungry for information about the war could be satisfied by virtual re-creations of reality, albeit reshaped according to the Army's PR objectives into an anonymous, vaguely central Asian theater of operations.

Stressing Americans Army:e connection to the real soldiers of the U.S. Army remained an important facet of the game. In later versions, Americae Army offered a special online perk to real soldiers who played. If they entered in a valid military e-mail address, the players could have their online avatars wear the Army's yellow star logo, thus announcing to other players that they were actual U.S. soldiers. By early zoos, according to an Army Public Affairs Office press release, more than six thousand soldiers bore the star inside the Americane Army world, where they could "provide actual Soldier stories to other gamers through an integrated player-chat too]."

In promotional trailers screened at E3 and distributed online, the designers of American Army stressed how closely they worked with the real America's Army. Video montages showed how training grounds in the game had been closely modeled from real Army training grounds; in some shots, it is difficult to see the difference between the two. An important feature of the game is that players need to follow the Army's official Rules of Engagement. Shoot a fellow soldier, for example, and your character ends up in a tiny jail cell for a ten-minute stretch, unable to continue the game, as a woeful, mocking harmonica plays the blues in the background.

So, whether by grand intention or not, the Army was indeed fighting a strategic element of President Bush's War on Terror: the PR front, looking to win the hearts and minds of Americans. Though Americae Army had essentially been concocted in-house by the military-graduate students and researchers at the Modeling, Virtual Environments, and Simulation (MOVES) Institute at the Naval Postgraduate School in Monterey, California, had created it from the Unreal Engine, the basic programming guts inside many major commercial game franchises, from Tom Clancy to Harry Potter-its implementation was overseen by global advertising giant Leo Burnett Worldwide of Chicago, who also creates campaigns for such well-known brands as Nintendo, Philip Morris, Kellogg's, Heinz, Disney, and McDonald's. Leo Burnett had introduced the "Army of One" campaign in zooo, and beefed up the branch's Internet presence through an enhanced recruitment Web site, online ads, and a reality-TV-style Webbased series about the one recruit's journey through boot camp. "If you're ready to stop playing games," read one of Leo Burnett's Web ads for the Army, atop an animated video game character, "we're ready for you." By 2005, the Army contracted Burnett for over $2oo million a year-the largest advertising contract for any American government agency.

Americana Army became part of a number of national recruitment outreach efforts, including the Army College Tour, the GameRiot gaming tent at summer music festival Lollapalooza, and the Army's Takin' It To The Streets campaign, or "TTTS." According to the Pentagon's Defense Contracting Command site, TTTS was "designed to educate and inform African-American high school, college and workforce prospects about the U.S. Army and its many career opportunities" by touring a trickedout Hummer to schools, malls, and events. Potential AfricanAmerican recruits could sample Americans Army in the TTTS "interactive arena," or shoot hoops with an actual basketball net soldered to the back of the customized military vehicle.

The Target Shoots First

The rationale behind American Army preceded 9/11, however. In 1999, the Army's recruitment figures were at a three-decade low. In response, the Pentagon increased recruitment budgets to an unprecedented $2.2 billion a year, and Congress called for "aggressive, innovative experiments"

to increase enrollment. That same year, Lieutenant Colonel E. Casey Wardynski, an economics professor at West Point, suggested to the Army's Deputy Chief of Staff for Personnel and its Deputy Assistant Secretary of the Army for Military Manpower that a video game could be an effective means to reach the new Gen-Y pool of potential soldiers. Wardynski became the head of the Army Games Project, which led to the creation of Americae Army.

If recruitment seemed important during the economic boom time of the Clinton years, when the Army had to compete with a healthy job market, it became an even more pressing issue after the 9/11 attacks. In 2003, when the Army rolled out its latest video game to the welcoming crowds at E3, the Bush administration and political analysts still predicted a worldwide conflict with no clear end in sight, and American forces were already occupying two far-flung nations. Never before had the U.S. fought a modern conflict of this scale without a draft. But somebody had to fight the global war on terror, and connecting the Army's image to something high-tech, fun, and hip could only help. Too messageless to be called propaganda, Americane Army was simply any client's dream of a successful marketing campaign. It succeeded with one of the primary purposes of brand marketing: get the brand name out there. With millions of players registered worldwide, Americana Army was certainly getting its eponymous underwriter's identity to the gaming world.

Before 2002, only a minority of gamers would have much paid attention to the goings-on of the real U.S. Army-at best, they might maneuver their camo-clad fantasy counterparts through the latest computer-based spy thriller. But now, with the success of America's Army, the real America's Army had, for a moment, become video-game industry rock stars, at a time when that industry itself had taken a quantum leap into the mainstream consciousness and entertainment business credibility.

In 2002, video and computer games raked in a recordbreaking $28 billion in global sales, according to the Interactive Digital Software Association. As frequently noted in the subsequent slew of news items on the rise of the gaming industry, the Hollywood global box office earned less than $21 billion that same year. The comparison may be slightly specious-any Entertainment Weekly reader knows that twenty-first-century movie studios make the bulk of their income on ancillaries like television, DVDs, and merchandise, not at ticket booths of attendance-dwindling theaters-but the potent symbolism of those figures proved more compelling than the cogency of their number-crunching. Video games had leaped up a level from juvenile, nerdy subculture to cool, happenin' mass culture, thanks to new generation of console games, the continued spread of PC titles, and a growing population of both younger and older garners. As the kids who played Atari and Nintendo during the Reagan days grew up, they kept playing the newer games; their Gen-Y younger cousins were raised with the Internet and taught with software in elementary school, so they took to games even more easily.

Playing the media was nothing new for the American military, of course. For nearly a century, the Army and other U.S. service branches had worked with the major film, television, and radio corporations on projects to help boost the military image. The first Hollywood film to win Best Picture, a sky romance called Winge, was made with the cooperation of the Army's Air Corps. Top Gun, the 1986 Tom Cruise aerial vehicleproduced with the assistance of the Navy-reportedly increased enrollment by a ridiculous 400 percent; the Navy even set up recruiter tables at movie theaters once they realized what was happening. But America :a Army was something

different: this game had been almost completely developed and produced within the military itself, not by a corporate partner. It was as if, in 1920, the Army had marched into the small but booming town of Hollywood, set up its own studio, and produced one of the topgrossing motion pictures of the year. (And by fall of 2005, America :& Army ultimately became a commercial product itself, when French game developers Ubisoft released a for-sale console version for Playstation 2 and Xbox.)

But this online blockbuster wasn't produced to sell tickets or DVDs. Because of the Bush administration's timing, Americae Army was working to sell the concept of signing up one's life to be a part of a very real, and deadly war, one that the American public increasingly perceived as rife with moral and political complications, and initiated on questionable presumptions. So surely there were some pangs of concern in reaction to all the nifty news coverage Americas Army was getting-a bit of panic on the part of parents, perhaps. Weren't video games, well, bad for you? Didn't the news tell us, only months earlier, that the 9/11 terrorists used Micro.eoft Flight Simulator, a popular offthe-shelf PC game, to train for their deadly deeds? Wasn't the D.C. sniper a big fan of "one shot, one kill" video games like Counter-Strike? Didn't the kids who perpetrated the Columbine massacre practice countless times earlier by slaughtering enemies in Doom? For decades, parents and congressmen had wrung their hands over the ideas that video games were teaching our kids to kill. Now, the government appeared to promote that same fact in the cause of national security.

A "Parents' Info" section of the Americas Army site offers an attempt to assuage such concerns. "With the passage of time," it calmly explains, "elimination of the draft and reductions in the size of the Army have resulted in a marked decrease in the number of Americans who have served in the Army and from whom young adults can gain vicarious insights into the challenges and rewards of Soldiering and national service. Therefore, the game is designed to substitute virtual experiences for vicarious insights." Long after the days of World War II and universal service, the military experience was no longer a shared cultural experience for Americans, and the generations raised post-Vietnam could just as well have parents who rejected military culture wholesale, or at best ignored its existence. Americas Army was a means to reinvade American popular culture, using a form of media that was likely to bypass parents altogether.

Special Forces at Work

America:e Army came at a time when the real Army, and all the branches of the U.S. armed forces, were undergoing Transformation. "Transformation" was the buzzword for a full-scale rethinking of the entire American military: an extreme technological upgrade for the twenty-first century. Key concepts were "jointness," or the cooperation across different branches of the military, and "networking," which referred to the need to connect all forces by advanced communications and information systems. Military leaders wanted America's armed forces to become more mobile, lightweight, and flexible, able to be deployed at a moment's notice anywhere on the globe.

As a philosophical vision, transformation coincided with a new geopolitical reality. Gone was the old dyadic Cold War clash of the superpowers, in which the American military trained to anticipate such conventional hypothetical scenarios as Soviet tanks rolling into California or MiGs blitzing Boston. In an imminent future of rogue states and terrorist operatives,

"asymmetrical warfare" between forces with widely different capabilities would become the norm. For this new global scenario, the military needed quick-thinking, adaptable war fighters. These wars would be fought block by block in city streets; for the most part, there would be no front lines, and electronic networks could provide the cohesive chain of command with more scattered groups of soldiers.

Quick-thinking individuals who effortlessly operated inside high-tech communications systems? Sounds like your average video game player might be a match.

After 9/11, as American culture shifted into new arrangements of patriotism, paranoia, and anxiety, the country's military and political power became central topics of debate and consternation in ways they had not been before. From live embedded reporting, to digital photography at Abu Ghraib, to Web sites displaying the caskets of American casualties, the question of how new media fit into the new world order became an important and contested element of how this war would be seen Stateside.

An October 2oo2 feature on Americae Army by Salon.com columnist Wagner James Au is illustrative of this debate. Lauding Americana Army as an important and necessary means to battle terrorism, he compares the game to Frank Capra's Why We Fight series of government films produced during World War II. For the war on terror-"which," Au writes, "if we parse out the diplomatic niceties, really means a war on Islamist militants, and the nations who back them (beginning with Saddam's Iraq)"-Americas Army is "Why We Fight for the digital generation." Inspired by hawkish thinkers like Christopher Hitchens, Au waxes poetic on the potentials that Americana Army embodies-how the future of American policy can merge an aggressive global military stance with the needs of homeland security, all predicated on the country's redoubtable technological prowess. You can see them in the field, in subsequent years," Au writes, "dedicated young men and women, their weapons merged into an information network that enables them to cut out with surgical precision the cancer that threatens us allheat-packing humanitarians who leave the innocent unscathed, and full of renewed hope. In their wake, democracy, literacy and an Arab world restored to full flower, as it deserves to be, an equal in a burgeoning global culture, defended on all fronts by the best of the digital generation."

This paradoxical vision of "heat-packing humanitarians" is shared by Americae Armye marketing. In 2003, the Department of Defense wanted to increase the number of Special Forces soldiers. Subsequently, America:e Army: Special Forcee was released to help with this recruiting mission. A promotional video for Americas Army: Special Forcee, made available on its Web site and distributed to online gaming publications, verges on being in itself a recruitment ad. Mixing real-life video footage of Special Forces soldiers with images from the new edition of Americae Army, the spot displays a series of titles that concatenate into a patriotic hymn of adver-poetry, set to a booming orchestral score. Like much marketing copy, whether designed to sell a soft drink, an election, or a war, it is filled with emotional, empty language, what Sinclair Lewis called "noble but slippery abstractions." Each line holds at least two meanings: does it refer to the real world, the game world, or maybe both?

As long as there are forces that threaten the promise of freedom
America's Army stands ready
And in the vanguard you will find
Special Forces
The Army's quiet professionals
Qualified for independent action
Experts in unconventional warfare
Help liberate the oppressed
Become one of America's Green Berets
And subdue the enemies of freedom
America's Army
Special Forces
Empower Yourself
Defend Freedom

Understanding the Game

Americas Army is an utterly contemporary phenomenon: a cutting-edge technological artifact, resonant with the sociopolitical debates surrounding the War on Terror, in a form of pop culture that has just hit its tipping point. It is part of a larger process of how American military culture has been merging with entertainment, even as the geopolitical events subsequent to September ii have reintroduced the question of American military power back into everyday conversation. And it's not alone in portraying contemporary war through a game: in the last five years, games based on real wars have become bigger than ever before.

MIT's Henry Jenkins, who had studied the effects of video games for over a decade, has observed that video games have taken on a peculiarly resonant role in how we are thinking about war now. "The political importance of games has been demonstrated again and again as groups struggle over how-and whether-the Iraq War should be represented through games," he writes. "The military uses games to recruit and train soldiers; the antiwar movement uses games to express the futility of the current conflict; the pro-war movement uses games to express its anger against the terrorists; the news media use games to explain military strategy; and the commercial games industry wants to test the waters to see if we are going to play war games the same way other generations watched war movies."

What does it mean to see war as a video game? Like other forms of art and entertainment, video games engage us by providing fantasies about the world. In a time of real war, games based on military themes begin to take on a more serious aura. For many, creating or even playing a game that promises a realistic experience of war verges on an inconsiderate lack of respect at best, or a manipulative attempt at propaganda at worst. Indeed, the very notion that war might be played as a game can offend, regardless of political import. "The severe discrepancy in

the scale of consequence makes the comparison of war and gaming nearly obscene," Elaine Scarry observes in The Body in Pain, "the analogy either trivializing the one or, conversely, attributing to the other a weight of motive and consequence it cannot bear." Indeed, as America:a Army gave way to a crowd of commercial video games based on real conflicts, journalistic and academic essays on what it all meant became familiar features in newspapers, journals, and online publications.

But this twenty-first-century phenomenon connects to a deeper history of how games and war have been linked since the dawn of recorded time. For Scarry also notes that "even in a relatively confined war the events are happening on a scale far beyond visual or sensory experience and thus routinely necessitate the invocation of models, maps, and analogues," and furthermore attests to "the existence of the descriptive convention, richly elaborated by strategists, historians, political philosophers, and perhaps all who have occasion to speak about war, of conceiving of two national armed forces as two colossal single combatants." Despite any squeamishness moderns may feel at the connections between war and games, links between the two concepts and practices run far back into the oldest records of civilization.

Long before video games existed, there were ancient games that simulated war, with fantasies and legends surrounding them of how these games might be used to wage real battle. In the dawn of the modern age, these fantasies became true, as a new emphasis on the logic of strategy transformed the waging of wars. In turn, the merger of technological developments with strategic and tactical needs inspired the birth of the computer. Videogames arose within the new hacker cultures surrounding the computer, when they were still heavily subsidized by military funds. Once video games became an industry of their own, they in turn fed innovations back into the world of defense. Lately, this sporadic, even accidental interplay between video games and war has been encouraged and fostered in a deliberate manner, by a new generation of visionary thinkers from the worlds of technology, entertainment, and the military.

At the same time, since 9/11, commercial game designers are churning out a new generation of realistic games based on historical wars. Now garners can go to their local store, pick up a virtual reenactment of the Vietnam War, World War II, the Gulf War, or even something that approximates the current wars in Iraq and Afghanistan. Unsatisfied with the versions of history that these commercial games invoke, artists, hobbyists, and activists are building their own games in response, creating a new means of cultural critique via gaming.

This book is an attempt to tell this story: to show how the development of video games has at many points in its history intersected with the American military needs, including a chunk of history that is being written right now. Consider this book a history of warfare told through video games, or a history of video games told through war. In many ways it is a history of ideas and fantasies, but dreams that became real through play. It is about how video games are accidental products of war, but have in turn become ways to think about war. In many ways it is a story unique to our time, but as history shows, we have played this game before.

PART ONE

TOY SOLDIERS

WAR AND GAMES BEFORE COMPUTERS

A board of three feet square Becomes a battle field Lay out the massed infantry And let the two enemies engage

-Ma Rong (A.D. 76-166)

Microsoft's Age of Empires II, a popular and addictive strategy game released in 2ooi, begins with an animated intro sequence, set in a darkened castle. In it, two medieval kings sit at a table, playing chess, close to a blazing fire. One king wears robes of red; the other, green. The king in red moves forward a pawn; it is squat and lozenge-shaped, carved with gothic curlicues. As the pawn clicks onto a new square, the movie cuts to a parallel shot of a single mounted warrior galloping through a woodland clearing. In turn, the green king moves his knight, and the movie shifts to several knights in armor galloping toward a target. Though the kings' faces are cold with the Botox-animatronics typical of turn-of-the-millennium game animations, they indicate the mounting tensions of the chess match with mechanical eyebrow-lifts and pendular head-tips. When the green king captures a pawn with his knight, a party of knights clops past a group of workers building a siege weapon, severing the construction's support lines with their swords. Scenes of escalating warfare ensue, filled with the clanging of metal armaments and a valiant, blockbuster score. Soon the battlefield turns silent. The imaginary camera tracks back to reveal a meadow laden with the meticulously rendered corpses of fallen warriors.

Anyone who has played the Age of Empires series knows that the experience of the game is, in fact, nothing like this. As is often the case in video games, the intro sequence is a dramatic fantasy of what the game is meant to represent-or perhaps what its developers dream it could be in a near-future world of greater processing power. In the Age of Empire games, you assume the godlike role of the developer of a tiny kingdom, building temples, garrisons, universities, harbors, and other such structures onto a bare map. Eventually, your kingdom can raise tiny armies, depicted by minuscule figures not much larger than a typical cursor, and head off to war with other kingdoms. In contemporary gaming parlance, Age of Empire' and its relatives-Sid

Meyer" Civilization, Command and Conquer, and so on-are known as turn-based strategy games, the digital descendants of old strategy board games like Ri'k and Stratego, updated with the logic and graphics of modern simulation games like SimCity.

What's clever here, however, is how this little movie encapsulates the genealogy of the game it introduces. Not only is chess an apt medieval stand-in for the Age of Empire' II, it is in fact its direct ancestor. But this lineage from chess to PC game is more complex than one might at first assume. For not only does a game like Age of Empire' engage the theme of war; it owes its very existence to war. Through many twists and turns, a bestselling time-waster like Age of Empire' I/ was made possible through centuries of interaction between the practice of war and the practice of leisure. Games made for entertainment inspired professional games made to teach and wage war; these new, deadly serious games in turn influenced novel innovations in games for pleasure.

Gametime and wartime have never been far removed. As long has humans have waged war, they have also played it; the relationship extends back to the beginnings of civilization, and no doubt before. The earliest cultural records of China, India, the Middle East, the Americas, and Europe all reveal evidence of games of skill and chance that take the form of abstracted battle-miniature metaphors for war, primitive board games composed of props made from stone or wood, clay or porcelain: the glory and horror of warfare shrunk down to toy-sized makebelieve. Cultures around the world have shaped games to represent war, and in turn have used this theme of war to enhance the experience of playing games.

How far back does this evidence go? In ancient sites in Mesopotamia and Egypt, archaeologists have uncovered small sculptures of warriors that may have been used as game pieces. We can only imagine the tiny wars that might have been played with these figures; in a sense, they may have been a part of the very first military simulations. Perhaps generals who went to battle under a king or pharaoh returned to tell the tales of their exploits, using the sculptures to describe their movements, or maybe priests acted out the melees of gods and heroes, manipulating their tiny tokens like antediluvian action figures.

Such speculation may be nothing more than modern fancy. But there are many other well-documented examples of warthemed games of distant antiquity, some of which even continue to be played up to today. Though the goals and rules of each game may differ, they share a similar form. Each requires the use of a set of game pieces-typically of different colors-that represent soldiers in an army, and a game-board grid that may be thought of as a miniature battlefield. In each game, two players employ a series of prescribed movements to outdo the other player's army, whether by surrounding his or her pieces, capturing, or removing them from the board, or controlling space on the imagined war-grounds. Western chess and the Asian game of go are only two of the most widespread and influential of these games. While some of these games may have developed out of others, the idea of a war-themed strategy game has developed independently in numerous cultures at different points of history.

Old School Emulators

In the realm of video games, ancient history begins with Pong, not papyrus. Most histories of the form reach back no further than the i96os, with the invention of the first systems created to play games on early graphical display monitors or television sets. Assiduously archaeological

histories might mention the invention of the digital computer in the 1940s, or early nongraphical games of chess and tic-tac-toe programmed in the i95os as logic exercises. So why begin a book on video games with a discourse on war-themed games of thousands of years ago?

Videogames have given us a new way to look at this history: these very old pursuits can be seen as the conceptual ancestors of today's digital time-killers. Board games are the earliest attempts to create play inside a simulated environment-albeit one crafted from a hardware of clay, stone, or wood, and organized by a software of traditionbound rules of play. This differs from sports, which requires the use of the whole human body within real space, or literature, which simulates a world through language but does not allow the kind of operative actions of gaming. Thus when today's gamer moves her character through some elaborately designed three-dimensional realm, at a certain level she acts out a technologically enhanced update of the Renaissance aristocrat shifting his pawns on a chess board. Obviously, much has changed. The chess player plots exclusively against a human opponent; the gamer's rival may be nothing but a piece of software. The modern experience involves cinematic graphics, an increased emphasis on immediate reaction time, real-time remote maneuvering in virtual spaces, and complex frame-stories, while chess functions almost as pure strategy. But not entirely so: we all recognize that chess is meant, on some level, to represent battle, in a highly stylized manner. Even a game as prosaic as checkers is laid out like two sets of opposing troops.

Competitive athletics developed out of the physical needs of combat (archery and javelin-throwing being two of the more obvious examples), but board games evoke a way to think about war. If sports symbolized the physical activities of foot soldiers-the skills of hand-to-hand combat and "game-time" team survival tactics-then board games mimicked the strategizing of kings and commanders, who needed to make mental pictures of war, workable schemas, plans, and abstracts. Games can be seen as representations of an ideal, of warfare stripped down to what its practitioners might believe to be its essence. Games, in short, can be seen as simulations of warfare. (In contemporary military parlance, models and eimulatione bear distinct meanings. To today's Pentagon, a model is a physical, logical, and/or mathematical representation of a system or process; a .imulation adds to this the dimension of representing change over time. Chessmen may roughly serve as a model of an army, but it is the game play that is theAimulation a battle.)

But these simulations meant different things to different societies and in different eras. Games could be tools for teaching strategy, or they could be ways to reenact a battle for study. They could be ritualized memorials to fallen comrades. In simulating the reality of battle, some legends imagined, they might even be seen as replacements for war-something heads of state might do instead of sending their people to kill one another.

"Ever since words existed for fighting and playing, men have been wont to call war a game," writes Johan Huizinga in one of the first philosophical studies of gaming, Homo Ludene. "The two ideas often seem to blend absolutely in the archaic mind. Indeed, all fighting that is bound by rules bears the formal characteristics of play by that very limitation. We can call it the most intense, the most energetic form of play and at the same time the most palpable and primitive." For much of human history, the conduct of war was bound by rules and customs that closely resembled sport and games, and even overlapped with them: consider the practice of courtly war in the Middle Ages, or the highly estheticized "flower battles" of the Aztecs and their neighboring states, in which it was decided beforehand which warriors would be captured by the

other side.

Homo LudenA was first published in 1938, and revised in 1944; its Dutch author composed these lines with the bloodshed of World War I in mind, and perhaps, later, the brutality of Nazi aggression still fresh in his consciousness. For he also felt that the advent of modern war had tipped humanity's propensity for mass destruction into a realm beyond the ritualized strictures of play. "Until recently the 'law of nations' was generally held to constitute such a system of limitation, recognizing as it did the ideal of a community of mankind with rights and claims for all, and expressly separating the state of war-by declaring it-from peace on the one hand and criminal violence on the other. It remained for the theory of `total war' to banish war's cultural function and extinguish the last vestige of the play-element."

French scholar Roger Callois, who followed and critiqued Huizinga, argued that play was more separate from the activities of culture as a whole, but agreed that modern warfare had transgressed beyond its gamelike origins. "If the individual remains inhibited by fear of the law or public opinion, it nonetheless seems permissible, if not meritorious, for nations to wage unlimited ruthless warfare," Callois writes in 1958. "Various restrictions on violence fall into disuse. Operations are no longer limited to frontier provinces, strongholds, and military objectives. They are no longer conducted according to a strategy that once made war itself resemble a game. War is far removed from the tournament or duel, i.e. from regulated combat in an enclosure, and now finds its fulfillment in massive destruction and the massacre of entire populations."

The paradox of this observation is that even as practice of modern warfare began to break down social and moral limits once honored, games became increasingly important to the planning behind such events. Starting with modifications of chess, games went from being aesthetic metaphors for war, or a means for mental exercise, to becoming very real and effective tools for winning battles. Cultivated by military needs and desires, the idea of the war game would develop into not just an instrument, but influence a whole way of thinking about strategy and tactics through mathematics that would eventually result the development of computers. This militarization of gaming continues up until the current era, and worms its way through the story of video games in some unexpected ways.

Classic Gaming

In the tombs at Beni-Hassan in Egypt, dating from around 2000 B.C., a mural depicts two pairs of men each seated around low tables. Each table holds similar sets of small black-and-white sculptures that suggest tiny human figures-finger-high pillars topped with head-bulbs. The seated men curl their forefingers and thumbs around the heads of pieces near them, as if readying to move them to other places on the board. To a modern viewer, they appear to be playing something like chess. Scholars today interpret the mural as depicting two different games, called Aenet and tau. Though the exact rules of either game remain unknown, scholars believe Aenet to be a race game, that is, a game in which one player's men must advance upon the board to a determined destination before the other player's men can do so-in the same class as some very old games like Parcheesi, or modern inventions like Sorry! The second game depicted, tau, is very likely an early war game; the game's name literally means "robbers" or "mercenaries." This may be the earliest known game with battle as its theme. In his marvelously titled study A

Hi.etory of Board GameA Other Than CheAA, scholar H. J. R. Murray argues that the positioning of the groups of pieces resemble the "armies" found in other war-themed games, corroborated by depictions of t 'au in various mythological illustrations from The Book of the Dead, which show, among other things, Pharaoh Ramses III playing a game against Isis, and a lion playing a game against an antelope. The lion, Murray notes, appears to be winning.

From the fifth century B.C. onward, ancient Greeks enjoyed a battle-themed gamed called petteia (from the word for pebbles, or game-pieces), which had a popular variant called "poleia" ("cities"). The game was played with stones of black and white on a grid of squares; players determined the movement of their pieces through strategy, rather than a roll of the dice, with the goal to surround and capture the other player's men. The "cities" may have referred to either the board as a whole-the political landscape in which the agon took place-or to the identity of each person's team. Either would be a fitting metaphor for the age in which the armies of Sparta might battle those of Thebes, and a man's identity was deeply intertwined with that of his polie. Although the game appears to have been widespread, like many aspects of ancient life, only fragmentary records of its existence and societal usage remain-a few images, a handful of literary references, and a few ambiguous artifacts.

For example, a number of Attic vases depict Trojan War heroes Ajax and Achilles hunched over a small table, playing Petteia while wearing full battle armor. Some sources believe this to refer to a passage from an epic poem, now lost, in which the warriors become so absorbed in their game that they forget to join a real battle that was already under way. On some of the vases, Athena appears between them, alerting them of the raging war, but the two men continue to stare intently at the board, as fixated as a pair of slackers at an Xbox.

According to the accounts of philosophers, skill at petteia was held in high esteem. Sophocles attributes the creation of the game to the legendarily wise Palamedes, hero of the Trojan War. Plato offers that petteia, along with mathematics, geometry, and astronomy, originated in Egypt as inventions of Thoth, the Egyptian god of wisdom. In the Republic, he uses the development of petteia expertise as an illustration of the process of learning in general, including training for combat.

"Is it so easy that a man who is cultivating the soil will be at the same time a solider and one who is practicing cobbling or any other trade," Socrates asks, "though no man in the world could make himself a competent expert at petteia or the dice who did not practice that and nothing else from childhood but treated it as an occasional business? And are we to believe that a man who takes in hand a shield or any other instrument of war springs up on that very day a competent combatant in heavy armor or in any other form of warfare-though no other tool will make a man be an artist or athlete by his taking it in his hand, nor will it be of any service to those who have neither acquired the science of it nor sufficiently practiced themselves in its use?"

The general term for a petteia game board, plinthion, was also used to refer to a column or mass of troops. Elsewhere in the Republic, Plato evokes petteia in a discussion of a fight between two cities. In Politic, Aristotle states that "anyone who by his nature and not simply by ill luck has no state is either too bad or too good, either subhuman or superhuman-he is like the warmad man condemned in Homer's words as `having no family, no law, no home;' for he who is such by nature is mad on war: he is a non-cooperator like an isolated piece in a game of petteia."

Aristotle compares the man without a city (apolia) to the azux-a term used for a piece on the game board that has been isolated, and thus left defenseless. Polybius found the game to be a convenient metaphor for warfare in his HiAtorieA, writing that Scipio Africanus "destroyed many men without a battle by cutting them off and blockading them, like a clever petteia-player."

When Rome imported Greek culture wholesale, petteia arrived with it, morphing into a game Romans called ludu. latrunculum, or latrunculi, the "game of mercenaries." Its game pieces were called latrone. (mercenaries) or milite. (soldiers). Latrunculi was popular with legionaries posted at the empire's distant edges. Boards and game pieces have been found in forts as far way as Britain, with one unearthed from Hadrian's Wall, as well as in the homes of wealthy aristocrats, who would wage miniature battles while safely ensconced in their Palantine villas and seacoast resorts. Ovid remarks that wealthier aficionados played with game pieces made of carved glass or even precious gems; perhaps they did so on the boards of fine marble and silver uncovered by archaeologists. That the denizens of this famously militant and aggressively expansive empire might revel playing the role of a little Caesar seems a completely unsurprising congruence. Lau. Pi.oni., a minor poem written in the first century A.D., includes a rather florid and dramatic description of latrunculi game play:

> *Cunningly the pieces are disposed on the open board and battles are fought with soldiery of glass, so that now White blocks Black, now Black blocks White. But every foe yields to thee, Piso; marshalled by thee, what piece ever gave way? What piece on the brink of death dealt not death to his enemy? Thousand-fold are thy battle tactics: one man in fleeing from an attack himself overpowers him, another, who has been standing on the look-out, comes up from a*

distant corner; another stoutly rushes into the melee and cheats his foe now creeping on his prey; another courts blockade on either flank and under feint of being blocked, himself blocks two men; another's objective is more ambitious, that he may quickly break through the massed phalanx, swoop into the lines and, razing the enemy's rampart, do havoc in the walled stronghold. Meantime, although the fight rages fiercely, the hostile ranks are split, yet thou thyself are victorious with serried lines unbroken or despoiled maybe of one or two men and both thy hands rattle with the prisoned throng.

Whether latrunculi could ever be this thrilling, we may never know. Games aficionados have pored over these allusive words in search of the lost rules of the latrunculi, which remain obscure, though the Pisonie poet strongly suggests the game involved somewhat complex military-style strategy. In fact, the winner of a game was dubbed imperator (general) or rex (king).

What's clear as well is the way in which a technology even as ancient as the board game can be used to envision battle, evoking a mental picture aided by a board and tokens. In the imagination of the Pieonie poet, a few tokens on a square grid provide sufficient means to conjure a cunning battle-simulation, filled with pleasurable tension and excitement, but cleanly bereft of bloodshed and sorrow. It is an early example of how war games, when created for entertainment, present an idealized drama of war.

Barbarian Inventions

Early northern European cultures enjoyed their own versions of these games. Some historians argue that the Viking hnefatafl (and its equally unpronounceable cousins, the Welsh gwyddbwyll and the Irish fidcheli descended from latrunculi, exported via Rome's military campaigns. Played by the Norsemen of the Dark Ages on complicated intersecting grids, hnefatafl in turn proliferated through their own raids and conquests, spreading to Iceland, Ireland, and Saxon Britain. A couple of hnefatafl- related riddles from Scandinavian sagas relate the game to a mythological vision of war, with warrior-women and great dragonlike beasts. "Who are the maids that fight weaponless around their lord, the brown ever sheltering and the fair ever attacking him?" one asks. (The answer: the game pieces in hnefatafl.) "What is that beat all girdled with iron which kills the flocks? It has eight horns but no head," poses another. (The answer is the hnefi or head-piece of the game.) In the Welsh epic The Mabinogion, the knight Peredur enters the Castle of Wonders to find a magical gwyddbwyll that moves on its own, the pieces "playing against each other, by themselves." "The side that he favored lost the game," the

Mabinogion relates, .and thereupon the others set up a shout, as though they had been living men."

The tiny wars fought on the game boards of ancient Europe indeed produced nothing but fantasy. Although the lore and literature of premodern European games show that they were frequently used as metaphors for war, there is almost no evidence that these games were used for anything other than pure play. There is little indication, for example, that such games were employed as means to teach real combat strategy and tactics. A passage from the Icelandic Frithiof'e Saga perhaps comes closest to invoking this concept. While Frithiof plays at hnefatafl with his compatriot Bjorn, a messenger arrives to ask Frithiof's advice on waging war against a belligerent king. Frithiof appears to ignore him, speaking only to Bjorn, but encodes a double meaning in each utterance. In describing his hnefatafl moves and the possible outcome of the game, Frithiof secretly imparts advice to the messenger on how his people should fight their aggressor, using the tactics of his game as illustration. But this action does not indicate that hnefatafl was regularly used for such a purpose-on the contrary, since the saga intends to celebrate Frithiof's sagacity in his clever choice of unexpected, riddlelike metaphor. Were he dealing in cliche, Frithiof would not have appeared to be so sly.

Such a notion, however, became conventional wisdom in ancient Asia, where games became philosophical tools for warriors and kings.

Dynasty Warriors

T'au, petteia, latrunculi, and hnefatafl died out with the civilizations that fostered them, but one game, as ancient as the tombs of Egypt, remains popular today around the world. Go was invented in China somewhere between three and four thousand years ago, where it was called weiqi. (Its Western name is a derivation of the Japanese i-go; in Korea, the game is known as baduk.) "Weiqi" means "encirclement," and anyone who has played go will recognize the reference. The game takes place on a large grid, and where each player sets down a series small, smooth stones, either black or white. Players attempt to control the greater part of the grid, and in the course of doing so, can surround the other's stones and capture them. "Weiqi" also has a martial valence: originally a term for a method of hunting large animals, it could likewise refer to an analogous outflanking maneuver that is peculiarly central to ancient Chinese military tactics.

The Analecte of Confucius provide the earliest mentions of go in Chinese literature, although the sage recommends it only grudgingly. Chastising lazy minds that do little but lounge around and eat all day, the teacher suggests that gambling or playing weiqi "would still be better than doing nothing at all." His philosophical descendant Mencius called go "but a small art" and linked it to such unfilial activities as gambling and drinking wine. Early Confucian thought thus held weiqi in low regard. Nevertheless, weiqi developed into a central facet of scholarly aristocratic culture, eventually ranked with calligraphy, painting, and music as the four great arts, and remained an important part of the education of the Chinese elite for millennia.

While classical Western games like petteia and latrunculi served as enjoyable metaphors for war, the links between the practice of real war and the playing of weiqi were much more complex and concrete: there is stronger historical evidence that the game was used to train potential military leaders in strategy, and in turn, its rules may have been shaped by the actual

practice of warfare. Go historian Peter Shotwell argues that a key moment in the game's development occurs during China's Warring States period, from the fifth to third centuries B.C., when a movement of warrior-philosophers arose to challenge the reigning Confucian order. In a time of struggle between powers, these new thinkers stressed the need for cunning strategy over mere brute force; for them, war, politics, and gaming were as one. Among them was Sun Tzu, the Taoist author of The Art of War, the world's earliest known military manual-a work that has likewise been used as a handbook for players of go. Long after the Warring States period, a Chinese scholar of the first century A.U. noted that "the people have a game called weiqi, which is a kind of'art of war' "-implying that the very game itself functioned as a military guide.

Links between weiqi and war crop up throughout the cultural history of Asia. The earliest surviving book about weiqi, the Yi Zhi, states that the game is symbolic of, among other things, the cosmology of heaven and earth, the structure of human government, and the military events of the Warring States period. The Sui Shu, an important work of history written in the fourth century A.D., includes books about weiqi in its bibliography of war manuals. The Cla.e.eic of Weiqi in Thirteen ChapterA, the canonical eleventh-century text on the game, takes its literary structure from Sun Tzu's treatise. The game likewise became central to Japan, where early elites were keen to import Chinese culture. By the Tokugawa era, the military shogunate considered go important enough to establish a number of schools to promote its competition and foster superior players.

Some say the game influenced Chinese military practice all the way into the modern era. In 1972, young American author (and go aficionado) Scott Boorman argued in his treatise The Protracted Game: A Wei Ch'i Interpretation of Maoiet Revolutionary Strategy that Mao Zedong closely planned his political and military theories on go; understanding the game, Boorman suggested, was key to grasping Mao's success. It appears, however, that Mao himself cared little for the game; other go historians attribute any similarities to deeply ingrained philosophies of action that informed both the development of the game and Chinese thought.

Go served more contemplative purposes as well. During the flowering of Chinese literature in the first millennium A.D., weiqi became an important topic for poetry, particularly for mediations on war. According to games historian Zu-Yan Chen, "weigi was popular not only among the military but also in literary circles, for many courtiers, not satisfied by mere literary distinctions, hungered for the military glory that could be won on the frontier." Ma Rong, in his "Weiqi Rhapsody" quoted at the beginning of this chapter, was one of the earliest writers to draw an explicit connection between the competitive strategizing of weiqi and war. "Looking roughly at weiqi, it simulates the art of war," he writes straightforwardly. "The timid have no merit, and the greedy die first." The stylized nature of weiqi and its centrality to elite culture meant that its allegorical possibilities were never limited to war, of course: the game illuminated all manner of competitive interaction between groups or individuals, and was used to opine on the vicissitudes of love, the necessities of government, and nature of cosmology. The manner in which such a contemplative game allowed the mind to soar is delicately illustrated in an eleventh-century poem by Huang Tingjian, his "Second Poem on Weiqi for Ren Gongjian":

By chance I am free from official duties, and no guests are around;
discussing military affairs on the table, we compete with a few stones.
our minds are like spider threads roaming the empyrean,
our bodies, like cicada shells joined to a withered branch.
There is a single eye, like that of the Prince of Xiangdong, and I truly am willing to suffer defeat;
but the world is split into two, and one can still hold onto a stalemate.

Go resurfaces in the history of games and war during the 1940s, when it became popular among the Manhattan Project scientists and mathematicians who were developing a way of dealing with conflict in a world of nuclear superpowers, a strange new environment of tense diplomacy and blind strategy. The defense realities of such a world were partially shaped by strange developments that occurred with the weaponization of go's Western cousin, chess.

The Origins of Chess

The paradigmatic game of strategy, chess has played a role in European culture comparable to that of go in the East: it is the game of the educated classes par excellence, and a symbol of the heights of human culture. And as with its Asian counterpart, the early genealogy of chess remains mysterious, and has bred controversy among historians for centuries. The most popular theory traces its roots ultimately to the game of chaturanga, a largely conjectural protochess that would have developed in classical India sometime before 600 A.D. Its Sanskrit name means "four armed" and refers the four components of an Indian army: foot soldiers, horsemen, elephant-riders, and chariots. Played on a chesslike board of sixty-four squares, the game included pieces with varying powers of movement, representing a king, a king's counselor, elephants, horses, soldiers, and chariots (or boats). As in chess, the capture of the king ends the game.

Some historians of chess claim that chaturanga was devised as either a replacement for war, or conversely, an instrument for implementing and developing real-world battle strategy. On one hand are those who speculate it was invented by pacifist Buddhist monks, who thought rulers might settle their differences with a jolly round of chaturanga instead of sending troops into one another's lands. Others claim that warlords might have used the game to plan precisely toward that very end. Both positions appear to be mere scholarly legend; the latter claim is likely influenced by some early modern European attempts to use chess as a military tool, an idea that nineteenth- and twentieth-century writers would project backward in time, as if it had been present as an element of the game's very roots. Another factor in the chaturanga theory is the rise of Orientalist studies in Germany and England in the eighteenth and nineteenth centuries, when this theory began taking hold; at that time, it was fashionable to find evidence for the origins of many Western cultural institutions in India, as Sanskrit texts, brought back from colonial adventures, were only just being translated into European languages for study.

From India, the game traveled to the Persian Empire, where it underwent slight alterations and was renamed ehatranj. Unlike the semiconjectural chaturanga, shatranj has a well-documented place in Middle Eastern culture of the first millennium. It used pieces that closely match chess as it is known today. In Europe, its vizier piece became the queen, elephants evolved into bishops; and the chariot (in Persian, rukh) changed into the rook or castle. Like chess sets today, shatranj pieces could be sculpted as representational figures or abstract shapes, and some of the forms they took were passed down into the stylized design of modern chess pieces.

Several different Persian legends include accounts of an Indian origin for the game. Many say that the game was sent as part of a challenge of wits by an Indian king to one of the shahs of the Sassanid Dynasty, who ruled the Second Persian Empire from the third century to the seventh. One of the most extensive versions of this tale appears in a ninth-century manuscript entitled The Explanation of Cheee and Invention of Backgammon, which drew from sources that were themselves centuries old. In the tale, Dewisharm, a mythical ruler of India, sends a shatranj set to Khusraw the Immortal, Persia's great King of Kings, with a letter posing a challenge. "Since you are named as king of kings over us all," Dewisharm writes, "it is necessary that your wise men be wiser than ours." He dares Khusraw to explain the nature of this mysterious new game; if he cannot, then Khusraw must begin paying tribute and taxes to the Indian potentate, posthaste. Khusraw's team of sages takes three days to crack the game's rationale. The game is fashioned, they ultimately report, "like a battle in meaning. (Dewisharmi has made the kings like two princes, the chariots to left and right like the van, a general like the commander of the warriors, the elephants like the commander of the bodyguards, the horses like the commander of cavalry, the footsoldiers like the very infantry at the front of the attack." Thereupon Khusraw played and won three games with the Indian king's envoy, and sends him back with both the answer and, for good measure, a new game of his own court's invention, backgammon.

The same tale appears in the Shahnama, the immense i2o,ooo-line Persian national epic written by Hakim Abu al- Qasim Firdawsi around iooo A.D. In Firdawsi's account, the envoy of the raja of Hind offers a riddle along with the mysterious game when presenting it to the shah of the Persian Empire:

'Tis all, O king!
An emblem of the art of war, and thou
Wilt see, when thou hast found it out, the tactics,
The plan, and order of a battlefield.

The shah's adviser cracks the secret of the game, and displays the correct placement of the pieces on the board for the envoy of Hind. The poet conjures a minuscule battle on the chess board as the pieces are laid down, which more or less correlates to the layout of the modern chessboard:

The sage then fashioned him a battlefield,
Whereon he gave the kings the central place,
And drew their forces up to left and right,
The footmen eager for the fray in front.
Beside the king his prudent minister
Was posted to advise him in the fight.
The warrior-rukhs impetuous on their steeds
Were at the wings and fought on right and left.
Adjoining these the battle-chargers stood,
So that the great king proved the Rája's match,
And then the elephants of war arrayed
On either side both eager for the fight.

Firdawsi relates no less than three other myths about chess. In one, chess provides training for an inexperienced young Indian ruler whose father dies before he can teach him the way of battle and conquest. The wise men present him with a chess set, explaining, "Here you have an exact image of war, which is conducted on principles similar to those which regulate this wonderful game. The same caution in attack and coolness in defense which you have to exercise here, you will have to put in practice in the battlefield." The prince, Firdawsi continues, "made himself fully acquainted with the principles of the game. He then assembled his army and went forth in full confidence to encounter his enemies, whom he defeated at all points. He then returned home in triumph, and ever after he cherished his love for the game of chess to a knowledge of which he considered himself indebted for the preservation of his honor, his kingdom and his life." (Persian poet Ibn ul Mu'tazz describes a similar instructional use for chess that appears in a short poem composed around 1038, writing that shatranj "counsels warriors in their art, / When dangers threat, and perils press"-as well as soothing hurt lovers, weaning drunkards from excess, and providing companionship to the lonely.)

Elsewhere in the sprawling Shahnama, yet another powerful Indian monarch, Kaid, struggles with the demons that have been set loose upon his mind by years of success in warfare. Left without enemies to fight in the real world, Kaid laments that he still remains obsessed with visions of battle, imploring his sages for aid. "Day and night my mind is harassed with the thoughts of war and strife," Kaid confides in his counselor. "When in the hours of the night sleep overpowers me, I dream of nothing but battlefields and conquests, and in the morning, when I awake, I still think over my imaginary combats and victories. Now you are well aware that I

have no longer one single enemy or rebel in my whole dominions with whom to contend. It is utterly repugnant to justice and common sense, to go to war without any cause. If I were to do so God would be displeased with me. What am Ito do in order to regain my peace of mind, and obtain relief from my present state of weariness and disgust?"

The solution, once again, is chess, which the counselor had obtained from the soldiers of Alexander the Great. Pouring his martial obsessions into the game, the king thus entertained himself to the rest of his days in contentment.

In a third legend included within the Shahnama, two halfbrother princes, Gav and Talhand, fight a civil war with one another for the rule of their kingdom. Talhand is defeated and killed, against the wishes of Gav. In order to prove to their grieving mother that Talhand did not die by his direct intention, the new king Gav orders his wise men to create a means to show how the battle was waged. In one night, they invent the game of chess for this express purpose, crafting a board of a hundred squares from ebony, and carving pieces from teak and ivory. Talhand's death is represented by the act of checkmate-a term ultimately derived from the Persian "Shah mat" or, literally, "the king cannot escape"-and thus used in this instance with a double-meaning. The legend of Gav and Talhand concludes with a description of their mother's continued sorrows, served with the bitter taste of tragic melancholy:

Both night and day
She sat possessed by passion and by pain,
With both her eyes intent upon the game.
Her whole desire and purpose centered there;
Her mind was full of anguish for Talhand.
She kept for ever shedding tears of blood,
With chess to medicine her sufferings,
And thus she fared and neither ate nor stirred
Until her life had reached its period.

The legends of the Shahnama offer a number of different ways to think about the relationship of a game that simulates war to real war itself. The game can be a how-to guide to waging war, or a replacement for doing so. The game can be used to depict war, either to frighten us away from entering into true conflict, or as a way to reenact and remember war, whether for analysis, or as a grim memorial. These ideas, as we shall see, return in the realm of computer games of the digital age.

Chess and Death in Europe

Chess spread eastward and soon became popular in the early Islamic world. According to Arabic manuscripts, Mohammed's son-in-law, Caliph Ali ben Abu Talib, encountered men on the street playing the game around A.D. 660; still unfamiliar with its rules, Abu Talib knew only that the new craze had recently arrived from Persia. The game traveled with the spread of Islam, entering Europe through Moorish Spain in the east, and Russia in the west, by at least iooo A.D., where it soon became known as the pastime of kings. Early royal adopters included medieval warrior-monarchs Charles Martel and Charlemagne, who brought a set with him to the front during battle.

By the late medieval period, chess had become assimilated into European Christian culture. Churchmen used the structure of the game to illustrate not merely the mundane wars of humankind, but battles of the soul as well. In the early fourteenth century, Pope Innocent III evoked chess in a sermon. "The world resembles a chessboard," he said, "which is checkered white and black, the colors showing the two conditions of life and death, or praise and blame. The chessmen are men of this world who have a common birth, occupy different stations and hold different titles in life, who contend together, and finally have a common fate which levels all ranks." John Skelton indulged in such medieval fatalism in his morbid singsong poetry, likewise viewing existence as an arbitrary game of fate. In Upon a Deadman:a Head, written in the early 15oos, Skelton declares that

Our days be dated

To be checkmated
With draughtès of death,

Stopping our breath

Other homiletic allegories of the period compare mortal life to a chess match played against either the Devil or Death (a longlasting scenario enacted in the twentieth century by ingmar Bergman's The Seventh Sea!), or equate the chess bag with the grave, since all pieces, regardless of their rank or power, must tumble into it at game's end. A Persian precursor may be found in the twelfth-century Rubaiyat of Omar Khayyam, which sings that humans are

But helpless Pieces of the Game He plays
Upon this Chequer-board of Nights and Days,
Hither and thither moves, and checks, and slays,
And one by one back in the Closet lays.

By the first years of the seventeenth century, when Cervantes penned Don Quixote, such metaphors must have seemed as well worn as the don's clanking chivalric armor. After Quixote compares life to a theatrical comedy, Panza quips that it's "a fine comparison" but "not so new but that I have heard it many and many a time, as well as that other one of the game of chess; how, so long as the game lasts, each piece has its own particular office, and when the game is finished they are all mixed, jumbled up and shaken together, and stowed away in the bag, which is much like ending life in the grave."

The more obvious allegory of chess as worldly war remained, as seen with similar games in other times and places. In keeping with the revival of classic literary forms, chess lent itself to mini mock epics, penned in Homeric style, wherein the battles of the board were described in heroic couplets. One of the most celebrated examples is the Bishop of Alba's Scacchia LuduA of 1527, translated from Latin into English by eighteenth century Irish dramatist Oliver Goldsmith, which begins

Armies of the box that sportively engage
And mimic real battles in their rage,
Please I recount; how, smit with glory's charms,
Two mighty Monarchs met in adverse arms[1]

A Right Subtle Engine

As others had with more ancient games, Renaissance writers debated whether chess was beneficial or detrimental to mental development, presaging similar video game controversies of centuries to come. In his book on the education of gentlemen, Sir Thomas Elyot opined in 1531 that chess, "of all the games wherein is no bodily exercise, is most to be commended; for therein is right subtle engine, whereby the wit is made more sharp and remembrance quickened."2 Thirty years later, Castiglione's Book of the Courtier advised young aristocrats against playing too much of it. "It is truly an honest kind of entertainment," Castiglione writes, "But me think it hath a fault, which is, that a man may be too cunning at it, for who ever will be excellent in the play of Chess, I believe he must bestow much time about it, and apply it with so much study, that a man may as soon learn some noble science, or compass any other matter of importance, and yet in the end in bestowing all that labor, he knoweth no more but a game." A moderate skill at chess, Castiglione recommends, is preferable than too much mastery.

Unlike many of his ancestors, England's James I professed no love for the game of kings. He thought chess failed as a simple diversion; rather than providing a respite from the affairs of

state, "it by the contrary filleth and troubleth men's heads ... as before it was filled with thoughts on his affairs."3 Robert Burton, in the Anatomy of Melancholy, concurred. "Chess-play is a good and witty exercise of the mind for some kinds of men," Burton writes, "but if it proceed from overmuch study, in such case it may do more harm than good; it is a game too troublesome for men's brains, too full of anxiety, all out as bad as study; besides, it is a testy cholerick game, and very offensive to him that loseth the Mate." Burton cites an anecdote from the life of William the Conqueror as case in point: after losing to the Prince of France in a game, young William cracked the Dauphin over the skull with his chessboard.4

But as a new emphasis on logic and rationalism overtook affairs of European society in the Age of Reason, some military thinkers began to see the potential for a different kind of learning from chess: not just the general wits-building afforded by the game's intricate rules, but something more closely simulating war as it was actually fought. And while lore and literature had long explored how chess resembled war, the wars of the seventeenth century increasingly looked chesslike. The loose bands of mercenaries answering only to their generals that typified warfare in the Middle Ages had evolved into the regimented chain of command seen in modern armies. Larger than ever before, these new armies of Europe were also rather busy; from i5oo to the early years of the eighteenth century, barely a year passed without war somewhere on the Continent. Governments introduced ministries of war, which put the military under more direct control of the state, and implemented the earliest examples of systematic discipline and training, from weapon-wielding infantry to aristocratic officers. The Royal Academy of Sciences in Britain and France's Academie royal des sciences were both founded in the 166os; much of their work went toward military science, making them in effect the precursors to today's defense research institutes.

The new intellectual freedoms of the scientist, inventor, and discoverer were the flip side of the contemporaneous rise in novel forms of social order that flourished in the age of absolutism. Freed of the static hierarchies of the Middle Ages, the Age of Reason brought "the rigor of self-imposed disciplines ... compulsively drawing society into a regimented mold," as Lewis Mumford put it, and the practice of war was no exception. The modern way of life would prove to be "the methodical routine of the drillmaster and the bookkeeper, the soldier and the bureaucrat."5

Advances in cartography, mathematics and optics created better possibilities of ordering troops in rigid geometrical formations, inspired by the phalanxes of ancient Greece. (The wars of the sixteenth century, like its art, combined modern science with the teachings of classical literature; even its military was Mannerist.) The spread of gunpowder gunnery precipitated ballistics-a new field of applied math-and consequently a need for innovative methods of engineering for fortifications. Even the telescope began use as a military technology. Though remembered today for his advances in astronomy, Galileo benefited from an early version of defense underwriting; he was granted a lifetime university position after presenting his new telescope to the Medici court, which saw a tactical military advantage in the device, and hired him to teach private courses in its use. Commanders looking onto landscapes filled with real, seemingly tiny soldiers arrayed in lines and squares would have seen something gamelike indeed: men reduced to mere mathematical objects, running through a clockwork calculus of destruction. No wonder the same period saw the first toy soldiers, manufactured for the amusement of those same aristocrats who sent real soldiers to war.

On the cusp between education and entertainment, chess would be taken up by military-minded researchers and pushed in wholly new directions. In the mid-16oos, Christopher Weikhmann of Ulm expanded traditional chess to produce a game that reflected warfare in the age of pike and musket. His "King's Game," or Grosses Koenigsspiel, almost doubled each player's pieces from sixteen to thirty. He replaced medieval rooks and bishops with a modern array of martial characters: a king, his marshal, a pair of chaplains, chancellors, heralds, couriers, lieutenants, adjucants, bodyguards, halberdiers, and a set of eight private soldiers, which were given sixteen different powers of movement on the board. Up to eight players contested on a board of nearly 700 squares.

The King's Game, Weikhmann wrote, "was not designed to serve merely as a pastime." Designed for nobles who might someday serve as military officers, "it would furnish anyone who studied it properly a compendium of the most useful military and political principles." Weikhmann's invention spread from Germany to Austria, Italy, and France, and inspired a number of imitations. (Using games to train military officers was not such an alien concept at the time; in France, students learned basic concepts of open battle and siege warfare respectively from two specially designed card games, Le Jeu de la Guerre and Le Jeu de la Fortification.)

These new board games for training, called "military chess" or "war chess," in truth may have provided little more than mildly educational diversions-more like themed chess set with expanded rules than actual lessons in strategy. But later designers saw greater potential in Weikmann's innovation. In 1780, Dr. C. L. Helwig, the master of pages to the duke of Brunswick, created a more elaborate game system for educating the young nobility in his care. Dispensing with the ageold chessboard, Helwig introduced a field of 1666 multicolored squares symbolizing various forms of terrain. Blue squares represented bodies of water, red served for mountains, light and dark green for marshes and forest, and black and white for open fields. Buildings were indicated by squares of half-red. Helwig expanded the typical chess set into a collection of hundreds of individual pieces, including dragoons, hussars, grenadiers, field artillery, and mortars. Instead of indicating individual soldiers or commanders, each piece could stand for an entire collective unit-battalions, squadrons, and batteries-while special pieces could be placed down to represent strategic fortifications. To guide and monitor the elaborate game play, Helwig added the use of a third player, a director, who no doubt played the role of umpire as well. He intended the whole system as a pleasurable supplement to an officer's education. In a letter written a year after he unveiled his project, Helwig claimed that "numbers of military men, profound in the theoretical and practical science of their profession, examined it; ... they recognized in it a very efficacious means for attracting the attention of young men destined for military service, creating in them a taste for the service, and lessening the difficulties of instruction."

Two decades later, German tactician and philosopher Georg Venturni (who went by the Latinate nom de plume Virturnius, as was his age's fashion), published a sixty-page book entitled Rules for a New Wargame for the Use of Military Schools. "One should not call this officer's exercise a game," he warned, stressing that its value as an accurate simulation of warfare would override its relative difficulty of play. His proposed system, sometimes referred to as simply the Neues Kriegspeil, employed a 3,600- square grid laid on an actual map of the Franco-Belgian borderone of the more contested demarcations of his era-with each square representing one mile. Military cartography had become increasingly crucial to strategy in the conduct of real warfare;

Venturi's innovation thus added a contemporary technical touch. Each player commanded over 2,5oo brigades and batteries, including infantry, cavalry and field artillery, as well as special pieces for various logistical factors: wagon convoys, field bakeries, supply magazines, bridges, and fortifications. The Neues Kriegspeil gained popularity in a number of countries beyond Germany, but not without critics, who thought it too complicated and overly mathematical. Later in the century, the Prussian general von der Goltz sniffed that Venturni's game was "a bad product of the refined military education of the period, which has piled up so many difficulties that it was incapable of taking a step in advance."

In its very unweildiness, Venturni's Neues Kriegspeil testifies to how, in the span of less than two centuries, chess had been modified so far beyond its origins that this new genus of military games barely resembled its ancestor. The abstract pattern of the chessboard sprawled into an intricately rendered real map, the simple hierarchy of chessmen transformed into a complex miniature modern army, and the elegant simplicity of chess moves blossomed into a sixty-page tome of instructions. Whereas chess symbolized battle in an almost fairy-tale fashion, these new war games sought to simulate warfare in its most modern incarnation; chess merely evoked conflict, while the new games tried to replicate war's reality. They marked a shift from the elegance of an art to the logic of a science. While chess could symbolize war as a concept, these games could play with possible outcomes of specific events, detailed down the single soldier. Would-be Napoleons could toy with the course of history.

In his War in the Age of Intelligent Machines, philosopher Manuel De Landa proposes that these pre-twentieth-century war game systems should be seen as early innovations in information technology, albeit a technology made of wood, stone, and leather rather than metal, plastic, and circuitry; their hardware consists of maps and counters, while their software is contained in "a relatively rigid set of rules that attempts to capture the essence of the `laws of warfare: " Even if Venturni's hardware mod incorporated the latest strategic advances in military cartography, its programming proved too complicated for the average user. But only a few years later, the German military environment precipitated a new kind of war game-the genre's killer app, so to speak, which was to influence the military operations through the twentieth century, right up to the wars of the early twenty-first century.

"This is training for war"

In 1811, the governor of Princes Friedrich and Wilhelm-the future King Friedrich Wilhelm III of Prussia and Kaiser Wilhelm I, respectively-informed his teenaged charges of a new type of war game devised by one Baron von Reisswitz, a civilian war adviser to the German court. Intrigued, the pair decided to visit the baron and investigate his invention. The baron's game consisted of a large sand table, used to sculpt three-dimensional terrain, and a series of tiny wooden markers, representing various military units, indicated by bits of colored paper pasted onto their sides. After a demonstration, the young princes greatly enjoyed playing the game themselves. Impressed, their governor arranged for Von Reisswitz to present his invention to King Friedrich Wilhelm III.

The baron took several months to devise an improved version. The result was an extravagantly produced apparatus, fit for royal amusement and edification. The baron replaced the sandbox with a set of movable plaster reliefs, depicting various types of terrain, which could be arranged

into customized landscape formations, and miniature troops crafted from porcelain. This system was set into an immense recessed table, more than six feet square. Though it boasted ingenious hardware, the baron's game offered only rudimentary rules, mostly dealing with troop mobility. Despite this (or perhaps because of it), the king responded with enthusiasm. He became deeply engrossed with the game, frequently playing rounds of miniature war with the members of his family and court deep into the night. Prince Wilhelm was soon contesting his friend the Czarevich Nicholas on their diplomatic trips between Moscow and Berlin, the two young royals acting out little conflicts just as their elders had ordered men of flesh and blood into battle.

A decade later, the baron's son, Lieutenant Georg Heinrich Rudolph Johann von Reisswitz, made several key alterations to his father's design, calculated to enhance the sense of realism. He discarded the impressive but impractical Chinese puzzle of terrain blocks, bringing in modern topographic maps of true landscapes, scaled at about eight inches to the mile. The porcelain pieces were switched out for metal figurines, also at the same scale, standing in for infantry, cavalry, and artillery. He colored the two challenging armies red and blue (a convention that famously persists to this day in a variety of military exercises); each contender moved his pieces in two-minute turns, but was limited to covering a distance equal to what true troops could march in the same time. An umpire determined the results of each melee, employing dice and statistical tables based on data gleaned from military history; the umpire thus established not only the victor, but how many men were lost on each side as a result. Whereas his father's immobile game was as large as an ostentatious piece of nineteenth-century furniture, the younger von Reisswitz's game was fully portable: all of its necessary parts were kept and carried in a small mahogany case, the size of a cigar box.

Von Reisswitz published his rules in 1824, in a booklet entitled Inetructione for the Representation of Tactical Maneuver under the Guiee of a Wargame; his system is today generally referred to simply as the war game, or kriegspeil. After playing von Reisswitz's new kriegspeil, Prince Wilhelm set up a meeting between the game designer and the king's chief of staff, General Karl von Muffling. The scene has become something of a legendary anecdote in the history of war simulation. At first resistant to the idea an hour-long game played on top of a map, the chief of staff eventually embraced the kriegspeil with enthusiasm. "One can honestly say that the old gentleman," one of von Reisswitz's colleagues recalled, "so cool toward the idea at the beginning, became more and more interested as the game went on, until at the end he exclaimed, This is not a game! This is training for war! I must recommend it to the whole army.' "

Soon thereafter, by royal order, all German regiments procured the kriegspeil for training. Von Muffling announced the event in the official military weekly newspaper. "There have already been a number of previous attempts to represent warfare in such a way as to provide both instruction and entertainment," Von Muffling wrote. "They have usually presented many kinds of difficulties in the execution, and they have always left a large gap between the serious business of warfare and the more frivolous demands of a game."

"It is noticeable that up till now it has only been non-military personnel who have occupied themselves with the war game invention, and the resulting incomplete ideas of warfare, and its incomplete imitations have never seriously been able to claim the attention of trained officers. At last, after years of trial, insight, and perseverance, an officer has pursued the topic begun by his

father ... and has so much extended it that warfare can actually be represented in a simple and lively way."

The artful balance of "instruction and entertainment" that von Reisswitz's kriegspeil afforded-the result of two centuries of tweaking chess toward the goal of useful warfare simulationwon it many admirers, and a kriegspeil mania gripped German military society. Numerous clubs devoted to the game sprang up; Berlin's military academy alone boasted seven such societies by 1874. Important tacticians and commanders became ardent fans of the game, and its fame soon spread to the other European powers. Von Reisswitz did not live to see his kriegspeil reach the full flower of its popularity and influence, however. His very success precipitated an internal political campaign against him, and in 1826, he was transferred from the royal court to a small provincial outpost in Saxony. Despondent at his separation from his friends and circle of admirers, von Reisswitz shot himself a year later.

General Ideas

The kriegspeil craze that gripped German military culture in the mid-nineteenth century was not simply a function of von Reisswitz's ingenious improvements on war games; as noted, similar games had existed for over a century. Rather, these games of war fit a new intellectual climate that saw war, in effect, as an enormous game-with the officer corps as its most valuable players.

In the wake of Napoleon's severe trouncing of Prussian power, the theory of warfare embraced by the war academies of Germany changed in reaction. A new emphasis on strategy, influenced by the theories of Antoine-Henri Jomini, took hold beginning in the early nineteenth century. Jomini held that, following the model of Napoleon, nations needed to entrust the waging of war to their ablest commanders, a professional, elite class who had been trained in the universal formulas of military science, and had been given the power to enforce them for the good of the state. Unlike Clauswitz, who famously placed war in a continuum with the political commerce of nations, Jomini saw war as an activity set apart from the rest of human endeavors, and thus best understood through a specialized knowledge. The key to victory, then, was the education of this elite class in the scientific principles of strategy; the study of war could reduce its operations to simple, predictable rules, which could then be used to form a basis for prescribing action. The beautifully simple kriegspeil-in its essence an embodied set of mathematical calculations, whose objects revisioned and rationalized the actual world as cold counters on a grid-could be seen as a form of laboratory experiment.

After the death of von Reisswitz, his kriegspeil underwent modifications as it continued to spread through the Prussian officer corps. Players added on new mathematical rules to better calculate and standardize outcomes; the end result meant that the umpire, now armed with tables of logarithms, became little more than a calculator. Some tacticians opposed these new rules, arguing that seemingly logical mathematical results could often contradict tactical sense and historical indications. The elegance of the rules, they feared, might overtake the experience of reality. This controversy eventually split the practice of kriegspeil into two modes: "rigid," which continued to adhere to more strictly mathematical model for umpiring, and "free," in which the umpire made calls based on his own judgment. Rigid games remained in use for lower-level tactical exercises, while free kriegspeil was employed for upper-level strategic gaming.

Up through the mid-18oos, war gaming remained a primarily German pursuit. But after German victories against Austria in 1866 and France in 1871, the other European powers developed a keen interest in Prussian military practices. Many thought that kriegspeil had played a decisive role, as key part of a larger system of elite training and strategy. In the United States, Major William R. Livermore introduced the practice in 1882 with a system he called "The American Kriegsspiel, A Game for Practicing the Art of War on a Topographical Map." His colleague Lieutenant William McCarty Little's lectures at the U.S. Naval War College in Newport, Rhode Island, in 1887 initiated seagoing war gaming; the school's War Gaming Department has flourished ever since, and played a celebrated role in planning strategy for the Pacific theater in World War II.

In Britain, military reformer Spenser Wilkinson strengthened with position the game served for the British command with his E&saye on the War Game. Here, Wilkinson raises the question of how the practice of war gaming entails facing a mathematical model of death. "The only difference from actual war is the absence of danger, of fatigue, of responsibility, and of the friction involved in maintaining discipline," Wilkinson wrote in 1887. While not denying that these factors were influential, Wilkinson assumed they were equally so on either side, thus effectively canceling each other out. If the intangibles of war were theoretically equal on both sides, victory becomes a matter of calculating and predicting body counts in a form of utilitarian cost-benefit analysis. "The question therefore becomes-How many men must be killed or wounded before the remainder will be induced to change their mind and go back?"

Steadfast Tin Soldiers

As noted earlier, the concept of learning through a game is very old. In ancient times, strategy board games like chess and go were thought to be good mental exercise, particularly for rulers of state and military commanders. In the sixteenth century, new games like Koenigspeil and Le Jeu de la Fortification were designed to incorporate important facts to be learned into the process of play. The process of refining Koenigspeil into Kriegspeil involved modeling an increased, more detailed realism, while maintaining an ease of game play, a dichotomy at the center of the debate between advocates of "free" and "rigid" kriegspeil.

If kriegspeil became an important training device, and subsequently a tool for strategy, at least part of its success at spreading so readily can be attributed to the fact that many of its practitioners thought it was great fun-judging from anecdotes about all-night kriegspeil parties at royal palaces and the bustling social scene of junior officers' clubs. At a time when Western children were learning by either rote memorization-if they were lucky enough to be in school at all-or by practicing the real thing, kriegspeil was far ahead of its time as a prescient form of nineteenth-century edutainment.

The elite junior officers and young aristocrats may have taken to kriegspeil so fervently because they had been weaned on model warfare from babyhood. The same era that brought the development of professional war gaming also saw the spread of toy soldiers, which soon became a staple of young boys from the more privileged classes of European and American society.

Toy soldiers have their origins in the Middle Ages, when European monarchs commissioned artisans to create miniature reproduction of their own armies, from precious metals, for their

amusement, and as emblems of their kingly power. Whether youthful princes (or princesses) borrowed Daddy's little knights to play at crusading against the Saracens remains unknown. But early modern youngsters surely did so, for in the sixteenth century, a cluster of villages around Nuremberg began the first toy manufacturing businesses. By the eighteenth century, these companies were selling middle-class families relatively inexpensive tin knockoffs of the luxurious silver and lead toy soldiers found in aristocratic playrooms.

Many toys for children involve miniaturizing and simplifying adult pursuits, and thus provide a kind of pleasurable education by mimicry. Even early on, it was understood that such toys had a role in fostering desirable social roles. The Sporty and Pae- time s of the People of England, a historical study published by Joseph Strutt in 18oi, includes a whimsical illustration of two toy knights jousting, adapted from a sixteenth-century German manuscript. "Persons of rank were taught in their childhood to relish such exercises as were of a martial nature," writes Strutt, "and the very toys that were put into their hands as playthings were calculated to bias the mind in their favour." The puppetlike knights pictured were explicitly designed for such activities: According to Strutt, "These toy figures could be readily separated from the horses, and were so contrived as to be thrown back-wards by a smart blow upon the top of the shield or the front of his helmet, and replaced again with much ease."

Nuremberg remained the leading center of toy soldier manufacturing until the early twentieth century, and was known for other miniatures as well: wealthy little girls of the Wilhemite age busied themselves with a well-known play set called "the Nuremberg kitchen" while their brothers aped Napoleon and Bismarck in the garden with their collections of midget armies. After new manufacturing techniques developed to enable metal soldiers to be mass-produced and sold at cheaper prices, their popularity surged. The practice of purchasing professionally made toys trickled down from aristocratic realms to the burgeoning bourgeoisie; by the late nineteenth century, even a working-class lad of Liverpool, Boston, or Frankfurt might have expected a tiny army in a box beneath the tree at Christmas.

In Britain, some Victorians endorsed boys' interest in toy soldiers in the cause of imperial security. Upon a visit to his father's homeland, British writer W. H. Cremer discovered to his alarm that German boys enjoyed access to superior toy soldiers, and in greater quantities. Cremer's 1873 book The Toys of Little Folk urged that patriotic parents step up the purchasing of toy soldiers and thereby close the miniature arms race on the home front. He considered it "important that every child of the new royal empire should be well acquainted with the customs of soldiers of other countries against whom he might one day have to stand, face to face, in mortal strife, and therefore very good copies of possible antagonists are prepared for his instruction." The populist Daily Graphic concurred, stating that tin soldiers should "serve as a sort of elementary training to fire the war spirit of the nation."

Pacifists also recognized, albeit with caution, that model soldiers might prepare youngsters for real war. Feminist advocate Constance Wilde-wife of Oscar-speaking to the Women's Committee of the International Arbitration and Peace Association in 1888, declared "children should be taught in the nursery to be against war. It has been suggested that toy soldiers and toy guns should be kept from the children. I do not think much good can be done that way. It is impossible in London for children not to see [real] soldiers, and, seeing them, to like their bright clothes and upright bearing. At the same time, a wise mother can instill into the child a dislike of war."

Mrs. Wilde and her proto-peacenik compatriots may have had a point. In the two decades prior to World War I, Britain underwent such a sharp increase in the production and purchase of model soldiers and other war-themed toys that modern historians suggest it may have had a significant influence on the curious enthusiasm that greeted the outbreak of that bloody conflict. The Great War began with an outburst of popular excitement that has since only been seen at the end of wars, not their beginnings. Following the declaration of war, reveling crowds filled the public squares in Berlin and London for days. "In St. Petersberg," Barbara Ehrenreich writes in Blood Ritee, "women ripped off their dresses and offered them to soldiers in the middle of a public square." Similar explosions of public ecstasy occurred in the United States when it entered the war. Even typically anti-imperialist socialists and suffragettes abandoned their usual causes in favor of the war effort. "The war is so horribly exciting but I cannot live on it," Ehrenreich quotes one Edwardian feminist. "It is like being drunk all day." Within the first two years of the war, over two and a half million British men volunteered for service-over a fifth of Britain's adult males-before a draft needed to be implemented.

Many historical explanations have been offered for this strange cultural bloodlust. Some point to the new rigors of industrialized life-that now familiar combination of institutionalized boredom and high-stress environments-that pressure-cooked the new modern psyche until it exploded. Others note that several generations of Europeans been fed a steady diet of imperialist pop culture through the kiddie literature of the day. For those who never knew war firsthand, these fictions portrayed it as a great adventure, a thrilling, testosterone-affirming escape from the emasculating drudgery of modern existence. Those eager young men who flooded Britain's military ranks had been raised on a steady diet of tales of colonial derring-do in popular kiddie publications like Boy:e Own Paper and Boys of the Empire. ("It is probably that many people who consider themselves sophisticated and `advanced,' " George Orwell wrote in an essay on boys' weeklies, which still existed at the empire's tail end of the 1930s, "are actually carrying through life an imaginative background they acquired in childhood.")

Many no doubt had prior experience serving in the Boys' Brigade, a quasi-militaristic organization for youngsters that encouraged manly activities and even offered its own little soldier's uniform; their younger brothers could have joined its better-known imitator, the Boy Scouts, founded after the turn of the century.

Toy soldiers played their part in this highly militarized youth culture. Collecting armies of different lands was a popular pastime, and toy companies fed this interest by releasing figures based on the armies of nations that were currently at war, often sold in sets of opposing troops. So after the Spanish-American war broke out, a young Londoner's parents could buy him a smart set of American and Spanish infantry, ready for battle. "Nine out of every ten boys until they are twelve years of age at least want to be soldiers," Britain's Toye and Fancy Goode Trader declared in 1914, "and the desire is much greater if there is a war in progress in some part of the world." Historical battles were likewise packaged in sets, including the American campaigns against "Red Indians," the Paris Commune of 1848, the Franco-Prussian War, and wars far more ancient. Describing these elaborate, meticulously documented model sets, war historian George L. Mosse observes, "the literature about tin soldiers was an education in warfare. Mimicking actual battles was a war game which boys played with toy soldiers; manufacturers' catalogs listing available uniforms included all the great battles of world history, ancient and modern.... History came alive, but it was history as a military struggle."

Other kinds of toys were no less martial. Records indicate that toy gun sales surged before and during World War I. In 1913, parents could purchase the Boy Scout Machine Gun, which shot hollow rubber balls and came complete with soldier targets, ready for rumpus-room slaughter. In 1917, stores sold a charming play set called Modern Trench Warfare, which came with a tiny grenade thrower, sandbags for barricades, a trench shovel, and other fun items. Its manufacturers claimed that this grim diversion had been constructed on the "recommendation of the world's best war correspondents and authorities." Other wartime toys bore telling names: Bombardment, Battleship, Sharpshooter. Even after the war, the toy arms race continued. In 1920, Milton Bradley came out with the Black Jack Machine Gun, named after General John J. "Black Jack" Pershing, the most celebrated American warrior of the era. "Just now big brothers are coming home," ran its ad copy, "and little fellows are saturated with the spirit of hero worship." In France, toy tanks were available as early as 1917-a mere year after their first implementation on the battlefield.

Not all parents were happy with giving little Johnny a tommy gun for Christmas. In the anti militant tradition of Mrs. Wilde, many disapproved of war toys on moral grounds, believing that they instilled a violent and dangerous temperament in the developing mind. Such educational philosophies became prevalent enough to be spoofed in a short story by Saki (H. H. Munro), "The Toys of Peace," published in i9i9. In Saki's tale, two very modern Londoners, Eleanor Bope and her brother Henry, take heed of an announcement in the Sunday paper:

> " 'In the view of the National Peace Council,' ran the extract,'there are grave objections to presenting our boys with regiments of fighting men, batteries of guns, and squadrons of "Dreadnoughts." Boys, the Council admits, naturally love fighting and all the panoply of war ... but that is no reason for encouraging, and perhaps giving permanent form to, their primitive instincts.' "

The council suggests that adults give boys "not miniature soldiers but miniature civilians, not guns but ploughs and the tools of industry." Inspired, Henry presents Eleanor's two boys with a new set of toys to replace their soldiers. Instead of forts, the boys are presented with scale models of a "municipal dust-bin," a public library, an art school, and the Manchester branch of the Young Women's Christian Association; rather than infantry and cannon, they receive metal figurines of philosopher John Stuart Mill, astronomer Sir John Herschel, a district councilor, an eminent poetess, and other upstanding civilians.

The boys, however, do not take to Henry's suggestion that they use these pacifist toys to play at holding a general election. Later in the day, their uncle finds that they have retooled Mill, Herschel, and the others to reenact one of the battles of Louis XIV, complete with red ink splashed over the YWCA, now standing in for a bloody Versailles. "The experiment has failed," Henry reports, "We have begun too late."

A far more brutal satire appears in German anarcho-pacifist Ernst Friedrich's brutal antiwar picture book War againAt War!, published in 1924. Horrified by the carnage wrought by the Great War, Friedrich composed a series of photographic beforeand-after juxtapositions that ridiculed pre-1914 ideals of nation, glory, and heroism with shocking images of mutilated bodies, both living and dead. In one spread, the left page is a photo of young German men smiling and waving in a war parade in some city; the facing page is a pile of corpses,

unceremoniously filling a trench like nothing more than rotting garbage. Images of toy soldiers and miniature cannons are also included, mocking photographs of men with their faces nearly blown off, eyes destroyed by shrapnel, or arms replaced by spindly mechanical pincers.

In an introductory essay, composed in the exhortations of a modernist manifesto, Friedrich pins the cause of war not only on the harsh rule of capitalism-a familiar enough leftist theory of the day-but on the misguided, romantic attitudes of everyday people themselves. "It is true that capital is the cause of every war," he writes. "But the guilt of war rests on our shoulders." In a section "The Prevention of War," Friedrich partially lays the blame on parents who have raised their children to glorify war:

> The father that makes gifts of toy soldiers to his child mobilieea the child for the war idea!
>
> The toy soldier is the Judge that you yourself bring into the home, is the betrayal of human life! Remember always this one thing:-
>
> The little helmet made of paper will one day be a steel helmet on the head of a murderer!

Another plate shows an Art Nouveau drawing of a mother sternly blocking her young son from a collection of toy weapons. Below her is a Dutch couplet: "Eerst het spel / Dan de Hel" Or, "First the game, then the real Hell."

Little Wars for Big Men

Boys weren't the only market for early war toys. Among their most ardent enthusiasts were adult men, particularly in Britain-including some of the same individuals who would send real soldiers to the Continent's trenches. Collecting-and playing with-model soldiers became something of a vogue among the British elite around the turn of the century. Literary figures like Robert Louis Stevenson, H. G. Wells, and G. K. Chesterton were all mad for toy soldiers, as were politicians C. F. P. Masterman, C. P. Trevelyan, and Winston Churchill. Churchill later claimed that his boyhood passion for toy soldiers was the key factor in his decision to enter a military career; like many of his peers, his interest in model soldiers carried over from youth to adulthood. Fathers often shared the pursuit with young sons.

Influenced by the rise of military war gaming, which had become more common with British officers in the latter half of the nineteenth century, many of these grown-up intellectuals and future statesmen created homemade versions of kriegspeil, using store-bought model armies, and improvised elaborate rule systems with fellow gamers. Scribner;e Magazine published an account in 1898 of one such tourney as described in the notebooks of Robert Louis Stevenson, played with his stepson, Lloyd Osbourne. Stevenson describes the events of the game as if he were a newspaper war correspondent of the day, complete with breathless accounts of imaginary melees and sketched diagrams of maneuvers. "This game of tin soldiers, an intricate 'kriegspiel; Isici involving rules innumerable, prolonged arithmetical calculations, constant measuring with foot-rules, and the throwing of dice," Osbourne recalls, "sprang from the humblest beginnings-a row of soldiers on either side and a deadly marble. From such a start it grew in size and complexity until it became mimic war indeed, modeled closely upon real conditions and actual warfare, requiring, on Mr. Stevenson's part, the use of text-books and long conversations with military invalids."

"The abiding spirit of the child in Stevenson was seldom in more lively fashion," Osbourne continues. "He brought a boy's eagerness, a man's intellect, a novelist's imagination." Together in a cold, cramped attic, "we would play by the hour, with tingling fingers and stiffening knees, and an intentness, zest, and excitement I shall never forget."

H. G. Wells was another member of the British intelligentsia who enjoyed modeling elaborate war scenarios with colleagues. Eschewing tabletops, Wells preferred the floor or well-cut lawn, upon which he created paper cities and fortifications, improvising details like forests, hills, and waterways, and occasionally a railway. He and his friends dealt symbolic death to their metal battalions through spring-loaded cannon that fired tiny missiles. C. F. G. Masterman, a Member of Parliament and later a government minister during WWI, reminisced about once occasion in which he called on Wells and found him in the midst of a floor-top campaign with another cabinet minister, Sidney Buxton, then president of the Board of Trade. Buxton was "sprawled full length on the floor and with unerring accuracy picking off the flower of Wells' Imperial Guard, which he thought he had concealed and protected in a thick pine forest." Masterman and Buxton themselves had engaged in another daylong engagement that ended when Buxton's "magnificent shot from the other end of the nursery ... destroyed a missionary fleeing on a dromedary-the last representative of the nation which had marched so gaily into battle so many hours before."

Wells published two short books about this hobby. The first, Floor Ware, is a lighthearted guide for children on creating small playroom environments out of toy soldiers, model railroads, and other miniatures, published in 1911. In this slim volume, he downplays the aspect of waging battles in these temporary worlds, suggesting other forms of adventure: one scenario involves an expedition to a tropical island populated by pear trees, white settlers, and (in what was then considered acceptable terminology) "negroid savages." This kind of imaginative play, he offered, would have an improving effect on young minds, "building up a framework of spacious and inspiring ideas in them for after life," Wells writes. "The men of to-morrow will gain new strength from nursery floors."

A sequel of sorts, Little Ware, provides extensive rules and details for war gaming with miniatures, and addresses both children and adults as potential players. As its subtitle indicates, Wells proposes this pastime as "a game for boys of twelve years of age to one hundred and fifty and for that more intelligent sort of girl who likes boys' games and books." Echoing chess, Wells dubs his nursery-room invention "the game of kings-for players of an inferior social position." Little Ware has since been enshrined as the foundational work of twentieth century miniature hobby war gaming, perhaps less due to direct influence (it remained obscure for many decades) than for the cultural weight its author's name gave to a pastime frequently denigrated as childish, nerdy, and unattractive-not to mention morally suspect.

As Robert Louis Stevenson's attic adventures show, Wells, of course, did not invent the idea of playing detailed wars with small soldiers, and Little Ware was not the first hobby war gaming guidebook. Around i9io, a former British serviceman named A. J. Holladay published a book called War Gamea for Boy Scout_e Played with Model SoldierA. The writer instructs young generals-in-training to "try and realize what Lord Roberts and Lord Kitchener felt when in command of all those men in South Africa." Its color cover illustration depicts two youngsters in

Edwardian smocks maneuvering midget troops upon a large, kriegspeil-style table; an adult male twirls his mustache and watches the match, perhaps acting as informal umpire, as an admiring girl lounges at his side. Holladay's book was sold complete with a set of two armies, packaged as "The Great War Game"-a name that no doubt would chill the hearts of some parents a less than a decade later.

In an introductory chapter to Little Ware, Wells, like Stevenson, explicitly links the inspiration to the phenomenon of professional military gaming, recounting how he suggested to a friend the origins of the concept. "I believe that if one set up a few obstacles on the floor, volumes of the British Encyclopaedia and so forth, to make a Country, and moved these soldiers and guns about, one could have a rather good game, a kind of kriegspeil." In turn, Little Wars may have influence the practice of kriegspeil to some extent. In an appendix to a later edition of the book, Wells writes,

> I have had quite a considerable correspondence with military people who have been interested by it, and who have .shown a very friendly spirit towards it ... They tell mewhat I already a little suspected-that Kriegspeil, as it is played by the British Army, iA a very dull and unsatLifac- tory exercise, lacking in realism, in Atir and the unexpected, obsessed by the umpire at every turn, and of very doubtful value in waking up the imagination, which should be its chief function.

But for all his enthusiasm for "tin murder," Wells was a pacifist when it came to real wars. He took care to clarify this position in the work's conclusion, which consists of a lengthy, eloquent argument that playing nursery-floor battles can advance the cause of peace. In what Wells calls the book's "pacific outbreak," he advances three positions on the matter. These are important to delineate, for not only do they echo writings on war games stretching back to ancient times, they presage similar sentiments and fantasies about war-themed video games in our own time.

First, Wells asserts that his Little Wars are, in fact, more entertaining than real war; the game retains the fun, exciting aspects of war, but none of the horrible downsides-death and boredom. "How much better is this amiable miniature than the Real Thing!" he exhorts, offering up his game as "a homeopathic remedy for the imaginative strategist. Here is the premeditation, the thrill, the strain of accumulating victory or disasterand no smashed bodies, no shattered fine buildings nor devastated country sides, no petty cruelties, none of that awful universal boredom and embitterment, that tiresome delay or stoppage or embarrassment of every gracious, sweet, and charming thing, that we who are old enough to remember a real modern war know to be the reality of belligerence."

Second, he suggests, with mild satire, that the practice of Little Wars could be used to replace the waging of real wars. "This world is for ample living; we want security and freedom; all of us in every country, except for a few dull-witted, energetic bores, want to see the manhood of the world at something better than apeing the little lead toys our children buy in boxes," he writes. "Let us put this prancing monarch and that silly scaremonger, and these excitable `patriots,' and those adventurers, and all the practitioners of Welt Politik, into one vast Temple of War, with cork carpets everywhere, and plenty of little trees and little houses to knock down, and cities and fortresses, and unlimited soldiers-tons, cellars-full-and let them lead their own lives there away from us." Likely unconsciously, Wells echoes the efforts of King Kaid's counselor in the

Shahnama, who successfully advised his belligerent monarch to vent his unsatisfied warrior urges in the safely simulated battles of chess. "My game is just as good as their game, and saner by reason of its size," Wells boasts.

Finally-with that most Victorian of sensibilities, alluded to in the previous metaphor-Wells argues that playing Little Wars would be an altogether civilizing experiences: "Here is War, done down to rational proportions, and yet out of the way of mankind, even as our fathers turned human sacrifices into the eating of little images and symbolic mouthfuls." Playing war games could expose young and impressionable minds, through simulation, to the horrors of real war and thereby enlightening its users. "You have only to play at Little Wars three or four times to realize just what a blundering thing Great War must be," he promises.

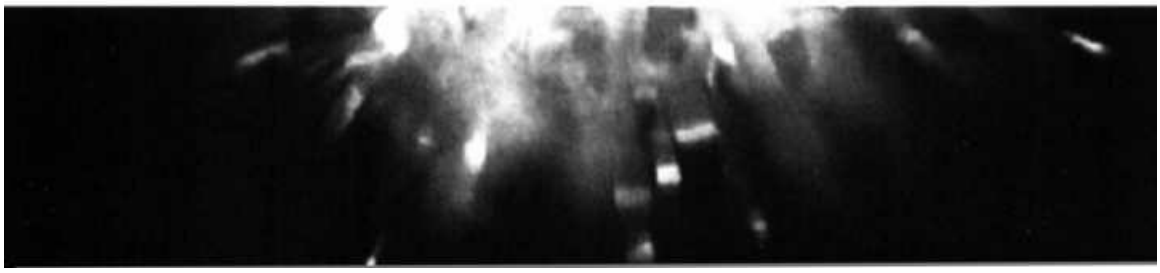
Thinking of armed conflict as an enormous game was not uncommon concept in Wells's day; consider, for example, the case of "The Great Game," a term for the struggle for power in Central Asia between the British Empire and tsarist Russia, popularized by Rudyard Kipling's turn-of-the-century novel Kim. (The Russians, in good turn, called this conflict "The Tournament of Shadows.") With this in mind, Wells concludes his guidebook on conducting little wars with a warning and a hope. By taking this hackneyed cliche of war as a game, and literalizing it, Little Wars will undermine real wars. "Great War is at present, I am convinced, not only the most expensive game in the universe, but it is a game out of all proportion. Not only are the masses of men and material and suffering and inconvenience too monstrously big for reason, but-the available heads we have for it, are too small. That, I think, is the most pacific realization conceivable, and Little War brings you to it as nothing else but Great War can do."

With origins at least as old as the Shahnama's tale of a battleaddled king who works out his aggressions with rounds of chess, Wells' dream of bloodless game-wars persists into modern times. In the 199os, Lt. Col. John "Wild Bill" Stealey, a pioneering designer of military flight simulator games, told writer J. C. Herz, "The best thing would be to put a couple of those leaders in a room and let them go at it on these things, then nobody gets killed. And we could figure out the same things. We'd all use the same weapons. They'd just sit there and push buttons, and we'll have a simulation on this, and nobody']] die. And we'll just live by the results."

PART TWO

PENTAGON INPUT

COMPUTER GAMING
THE COLD WAR



COMMERCIAL GAMES AND ARTISTIC INTERVENTIONS

> To define force-it iA that x that turn.A anybody who L Aub- jected to it into a thing. Exerci.Aed to itA limit, it turn man into a thing in the moAt literal Aen.Ae: it makee a corp.Ae out of him.
>
> -Simone Well, The Iliad, or The Poem of Force" (1940)

"We wire the Ho Chi Minh Trail like a drugstore pinball machine, and we plug it in every night," an Air Force officer reported to Armed ForceA Journal in 1971. He was describing his involvement in Operation Igloo White, a high-tech, high-priced American effort to shut down the entry of North Vietnamese convoys into the South during the height of the war. From 1966 to 1972, the Air Force oversaw the implementation of a 16o-mile wall of electronic sensors stretched across the network of truck roads and bicycle pathways that led through the inside of Vietnam's elbow, via the eastern edges of Laos and Cambodia. Sometimes called the "McNamara Line," after Igloo White's initiator, Secretary of Defense Robert McNamara, this intangible barrier consisted of around 20,000 highly advanced sensors of various types, dropped from airplanes onto areas of the trail, designed to blend in with the organic landscape. Some were shaped like spikes, weighted to wedge into the ground upon contact, so their splays of skinny green antennae would resemble jungle plants. Others descended on camouflage parachutes made to tangle and hang in treetops. One prototype was sculpted to mimic dog feces. As it turned out, however, there weren't any dogs on the trail, so it was modified to look like a fallen piece of wood.

Once in place, different varieties of sensors picked up sound, motion, body heat, and even odor-some could "sniff" for chemicals found in human urine. They were, literally, plants. When a sensor detected a presence in its vicinity by one of these means, it transmitted a signal to Air Force aircraft, which flew over the McNamara Line twenty-four hours a day for this express

purpose. The aircraft in turn relayed this data hundreds of miles west to Nakhon Phanom, Thailand, where American forces had constructed the sprawling Igloo White Infiltration Surveillance Center, at the time the largest building in Southeast Asia. Security for this top-secret command center was so high that airmen had to work double time as its janitors. Inside ISC's climate-controlled clean-room sanctuary, two IBM 360/65 computers-the most powerful data processors of the era-analyzed the sensors' incoming information, which translated onto a display terminal as white streaks of light, called "worms," that moved across a superimposed map grid in real time. "In their electronic brains are the entire 3,500 miles of turning and twisting Ho Chi Minh Trial system," Military Aircraft magazine boasted in 1971. "The locations of every crossroad, gully and sensor are known to them." ISC then relayed these coordinates back to bombing jets, which were guided by computerized navigation systems directly to the correct location. The lab men at central command could even remotely control the release of the bombs from the jets, whose pilots might do nothing but watch it all happen. Upon destruction of the intended target, its correlate white blip disappeared from the screens at ISC.

A group of scientists from Harvard and MIT had suggested a plan along the lines of Igloo White to McNamara in 1966. As Air Force Magazine put it, in a 2004 history of the operation, the eggheads hoped to provide "a technical solution in Vietnam" that could succeed in ways that the Rolling Thunder campaign of constant bombing had failed. The intellectual McNamara, always a friend of innovative solutions, aggressively pushed the project forward, even though military leaders protested that it would be too costly in terms of both money and personnel, and thus detract from the rest of the war's operations. McNamara nevertheless established the top-secret, innocuously named Defense Communications Planning Group, a Washington-based office boasting an elite cadre of scientists and engineers, generously funded with the Manhattan Project-style goal of producing a new form of electronic warfare. Ultimately, the military brass was right: it did indeed prove expensive. By one estimate, each North Vietnamese truck cost an average of $ioo,ooo to destroy, though the value of its contents would be no more than a few thousand dollars at best.

While some of the military's faux foliage could transmit live audio feed, ISC received only data, which it then reconstituted into as an electronic marker on a map. In the spirit of an updated electronic kriegspeil, human elements became reduced to mere tokens, but this game was played real-time, with powerfully real results. The relaying aircraft, however, did record the sounds that the sensors picked up, for use in later analysis, and thereby retained a more material record of events. Paul Dickson, whose 1976 study The Electronic Battlefield extensively recounts the formation and operations of Igloo White and its effects on the course of American military practice, heard a few such recordings after the war, in the course of his research. One tape contained the sounds, in quick succession, of a shouting voice, bleating truck horns, the whine of an approaching jet, a series of explosions, a long stretch of silence, and then a racketing of anti aircraft fire. Another recorded a Vietnamese soldier telling his comrade that he was going to grab a sensor's camo parachute fabric in order to give to his girlfriend, so she could make a dress out of it. Yet another tape simply preserved the sounds of a man being crushed by a falling tree.

Over time, the North Vietnamese learned to hack this network using low-tech means: playing strategically placed tape recordings of truck motors, hanging bags of urine in trees, or driving farm animals into the sensors' vicinity. Though these counter-measures never became a widespread practice, similar actions appear in a 1972 Vietnam War novel The Ears of the Jungle,

by Pierre Boulle, better known as the writer of Planet of the Apes and Bridge on the River Kwai. Boulle's story, often mistakenly classified as science fiction in its English translation, is in fact closely based on the realities of Operation Igloo White. In the novel, the North Vietnamese use recordings of crickets to mask the sounds of their trucks, and then employ recordings of trucks to trick the U.S. into bombing wild buffalo for their troops to eat. Eventually, they produce a complex scheme of faked sounds that tricks the multi-billion-dollar Infiltration Surveillance Center into bombing itself.

Contemporary news reports likewise found themselves reaching for science-fictional metaphors when describing the strange new realities of Igloo White: "Buck Rogers is alive and well and bombing Indochina," the Christian Science Monitor frowned. Government and military press relations encouraged such fantastic visions. "One has only to read through a few of the official briefings and descriptions that were given of Igloo White to see that the image being pushed is that of a clean, efficient machine functioning like a large, electronic chess set," Dickson notes. "Such nasty considerations as pain, civilian casualties, blood and death (foreign or American) were deleted." Not to mention that American attacks, which were never truly pinpointed, occasionally succeeded in merely exterminating a group of unlucky elephants. Over in Thailand, after all, they were just fighting blips on a screen.

This blip was a visible monad of pure information, a dot that simply says, "there." Wriggling like a worm on the display screen, the blip was a way of looking at the target without seeing it. The very use of the word "target" performs a similar function: it elides the killing of a human or group of humans with the destruction of an automobile or building or simply the spot on the ground where bombs will fall. Warfare has always been about inflicting maximum damage at as far a distance as possible, but in the twentieth century, airpower extended this rule of thumb to new levels. Combined with the new and slightly unreal imaging powers of the computer, the distance became not only physical, but conceptual. Like Simone Weil's "x," it provided a way in which the practice of war turns a person into a thing. But in this case, the blip was a person turned into a unit of information, translated into wiggling light spot.

It would have seemed novel, but not so odd, to the servicemen and scientists of the Great Society era that Operation Igloo White should transform a Vietnamese convoy into a target by turning it into an electronic blip. By then, Americans were used to the idea of people being turned into information, into data, numbers. They had grown familiar with it by receiving computer-printed utility bills and bank statements that had assigned to them arbitrary account numbers. That this seemingly harmless act of information management might have contributed to a fear of dehumanization is attested in the dystopic science fiction of the period. By the early 1970s, it had even become a cliche. Consider George Lucas's first feature film, THX 1138, released in 1971. In Lucas's future, people have nothing but numbers for names. The film's title is the name of its protagonist; his girlfriend is the lovely LUH 3417. In a world completely run by computers and policed by robots, THX and LUH live in ultramodernist monochromatic white environments, as pure and clean as data itself, stripped of all the visual noise and informational clutter of everyday living. For a computer, such a world of pure, clean data would be the apotheosis of its being, a utopia; for humans, it is experienced as a blank, passionless hell.

No War during Business Hours

While airmen bombed unseen convoys in Southeast Asia, computer programmers back at the same academic research world that fostered Igloo White were engaged in a similar, not-so-secret project, also involving destroying blips on a screen. But these blips created more recognizable targets than the ones that Air Force officers back in Thailand were busy making disappear on the other side of the globe. They were little point-plotted rocket ships, hurtling through the star-speckled blackness of outer space on gravity-inflected arcs, blasting away at one other with tiny pinpoint "torpedos" of light. One craft looked like the classic fifties sci-fi movie space rocket, pointy on one end with two Cadillac tail fins in back; the other was long and needly, like an arrow. While American armed forces were fighting the Vietnam War, Pentagon-subsidized programmers were fighting Spacewar!, the modern video game's mainframe-era ancestor.

Spacewar! came into being in 1962, brainchild of computer engineer Steve Russell and his so-called "Hingham Institute Study Group on Space Warfare." This group of hot-shot young programmers, all in their early twenties and working at MIT, were determined to do something cool during downtimes with their facility's latest toy: the Programmed Data Processor I, or PDP-i, manufactured by the Digital Equipment Corporation of Maynard, Massachusetts, one of the many high-tech companies circling Boston's hub that flourished in the early days of the government-funded military-industrial complex. Small by atomic age standards, this early "microcomputer" equaled merely the dimensions of a few refrigerators stacked side by side. "The entire computer occupies only 17 square feet of floor space," bragged its operating manual, at a time when research institutes would devote whole rooms to a single computer. But compactness was not its only important innovation: the PDP-i also provided an improved interface. Presaging modern PCs, the PDP-i came equipped with a keyboard and a primitive monitor, then simply called a Visual CRT (cathode-ray tube) Display, a device for graphical and textual presentation directly descended from the radar screens of World War II. Betraying its heritage, the CRT consisted of a circular monitor, set into a hexagonal metal body.

The CRT's porthole shape became an integral part of Spacewar!s design. The middle of the screen marked the center of the tiny universe's gravity, and competing rocket ships could whip around the twinkling-star hub if players knew how to best maneuvers the set of coordinated switches that served as controllers in lieu of later joysticks. The era of networked computers had just begun, and Spacewar! spread rapidly through these early programming centers, modified, improved, and customized by users as it traveled. By 1963, the game had become such an obsession that Stanford University's Computer Studies Department had to enforce a strict policy: no Spacewar! during business hours. The game continued to spread through the 196os; by the end of the decade, virtually every computer operator in North America with access to a CRT would have at some point experienced Spacewar!, and the game took on a mythic status. Some who began working with computers in the late'6os even claimed that it was seeing a game of Spacewar! that led them to pursue studying the machines that could make such marvelously intelligent toys happen.

The genesis of this Kennedy-era time killer has since become the originary myth of computer game history, celebrated in numerous chronicles of the genre. The premise of the game could only have emerged from the Cold War culture of engineers and scientists who populated the universities and research centers where the bulk of computing transpired in the '5os and '6os. Since the Soviet launch of Sputnik in 1957, the space race and the arms race were closely intertwined, and science fiction and technological themes in general permeated popular culture.

According to J. M. Graetz, one of the original Hingham Institute fellows who wrote a history of Spacewar!for an issue of Creative Computing in 1981, the game's science-fiction concept grew out of the group's semi-ironic love of trashy Japanese monster movies and E. E. "Doc" Smith's Lensmen novels. Now considered classics, but then dismissed as nerdy kitsch, Smith's Golden Age space operas were among the first to feature massive battles between hulking spaceships-basically modern naval battles transposed into a futuristic scenario. "These stories are pretty much all of a piece," Graetz wrote. "After some preliminary foofaraw to get everyone's name right, a bunch of overdeveloped Hardy Boys go trekking off through the universe to punch out the latest gang of galactic goons, blow up a few planets, kill all sorts of nasty life forms, and just have a heck of a good time."

BattleTech

Spacewar! was not the first nifty graphical toy designed for the computer lab. When MIT held its public Open House day, programmers might run something called "Bouncing Ball" on one of the few pre-PDP computers equipped with a CRT. This noninteractive program simply set a dot in motion, bouncing off the sides of the monitor-a precursor to the screen saver-but nevertheless mesmerized incoming visitors as a visible, easy-toappreciate manifestation of the possibilities of computers. In the 1950s, computers at other labs had been programmed to play chess, checkers, and tic-tac-toe, albeit sans visual representation, save for one example of tic-tac-toe programmed for display on a hulking EDSAC unit at Cambridge University in 1951.

William "Willy" Higinbotham, a former Manhattan Project physicist who witnessed the first atomic bomb test, produced a more recognizable video game ancestor at Brookhaven National Laboratories on Long Island in 1958. Jerry-rigging an analog computer to an oscilloscope, Higinbotham created a simple interactive game called Tennie for Two (also remembered as Tennie Programming). Its game play resembled the later Pong, but this was tennis represented from the side, not from above. The circular screen displayed an inverted "T" for the ground and net. Players bonked a point of light back and forth over the net, manipulating it with the crude paddle controllers devised by Higinbotham.

At a time when average Americans were wary, even frightened, of all things atomic, Brookhaven held Open House days, hoping to dispel the fears of at least the nearby Long Islanders who were their neighbors. Higinbotham invented Tennia for Two as a user-friendly attraction at these events, hoping to provide something more inviting to the everyday visitor than the lab's cold, imposing banks of ineffably blinking lights. Tennie for Two proved popular with the local kids who came, but was dismantled after a couple of years of use, and its parts recomissioned to other projects.

Because he never bothered to patent his invention, Higinbotham's name has survived in video game histories as more or less a curious footnote, but in fact his more substantial pursuits lay elsewhere. He served as first chairman of the Federation of American Scientists, a group formed immediately after World War II by a number of Manhattan Project scientists to organize against nuclear proliferation, and did so at a time when such a position was not popular. After his death in 1994, the federation's Washington, D.C., headquarters was renamed Higinbotham Hall.

Spacewar! evolved in an academic setting, while Higinbotham concocted TenniA for Two at a

national research center. It was not an arbitrary circumstance that video games would emerge out of these venues rather than, say, the booming toy business or the nascent consumer electronics industry. Prior to the advent of personal computing in the 1970s, the most advanced computer and electronics research was largely the purview of Big Science-and Big Science was itself created and fostered for military purposes.

That computers as we know them would not have been possible without massive government funding, largely through military channels, is a concept many today would find surprising. Latter-day corporate hype has colored our conventional understanding of the history of digital technology with a decidedly libertarian streak. Innovation is portrayed as the product of single inspired individual: independently minded, even rebellious entrepreneurs, exemplified by alpha-geeks like Steve Jobs and Bill Gates. Those who think differently. But a closer look into how digital technologies actually came into being shows that their ultimate origins were anything but free-market. The directions that these technologies took-indeed, the very creation of the digital computer itself-was an enormously subsidized affair, pursued in the interests of maintaining and strengthening American military dominance, at a time when the very future of humanity seemed to rest on the outcome of this contest.

This relationship had its roots in a massive restructuring of scientific research during World War II, overseen by Vannevar Bush, the visionary director of the federal Office of Scientific Research and Development. An engineer by training, Bush is today remembered as the inventor of the concept of hypertext, and cofounder of Raytheon, a major military contractor. By the mid-1940s, the OSRD functioned with an annual budget of $ioo million, while the Army and Navy's research divisions combined worked with more than $700 million, and the Manhattan Project alone over $8oo million-unprecedented sums, since total annual spending for military R&D prior to the war was a mere $23 million. The OSRD instituted a system of large central laboratories, administrated by major universities like Stanford and MIT; there, researchers from diverse fields worked together, with increased levels of disciplinary cross-pollination, on projects designed with an eye toward immediate wartime needs. During WWII, the worlds of academia, industrial research, and the military thus became more closely linked than ever before.

The effects of this sea change in both allocation of funding and the relationships between vastly different disciplines and professions were long-lasting, and continue up to today. At universities, science departments grew bigger and stayed bigger. MIT, for example, doubled the size of its prewar staff, and its research budget grew tenfold, with 85 percent coming from military and other defense-related government sources. When Eisenhower introduced the phrase "military-industrial complex" in his i96i Farewell Address, he neglected one side of this iron triangle: a more faithful term would be the military-industrialacademic complex. It is a three-way relationship today so common that one might consider it-if one notices its existence at all-a purely natural development, or perhaps the way things have always been. It is in fact the result of a series of conscious policy choices grounded in Cold War thinking.

After the war, funding didn't diminish; in fact, it continued to rise dramatically. From the beginnings of World War II until the early i96os, the Department of Defense and its related federal agencies remained by far the greatest underwriters of computer and electronics research and development. Keeping an American technological edge over the Soviet Union became a major priority during the Cold War; the temporary wartime economy of the 19405-at least in the

research and development sectorwas transformed into a permanent model of dollar-greased collaboration. In the '4os and '5os, the Department of Defense founded a succession of research-granting agencies that were and continue to be major recipients of Pentagon funding up to the present day: the Office of Naval Research, the Army Office of Scientific Research, the Air Force Office of Scientific Research, and the Advanced Research Projects Agency (ARPA), today known as Defense Advanced Research Projects Agency (DARPA). This period also saw the creation of the National Science Foundation, officially earmarked for civilian projects. However, the distinction between military and civilian projects remains unclear, and in any case, the NSF had traditionally competed for funding with this other plethora of Pentagon agencies.

The vast network of national research labs, many operated by large universities, rounded out the postwar R&D infrastructure. Eventually organized under the Federally Funded Research and Development Centers (FFRDC) program, this long list of facilities include some well-known institutions like the Lawrence Livermore National Laboratory and the Los Alamos National Laboratory. Although many of these centers exist for officially nondefense purposes, a cursory glance at the FFRDC's master list of funded centers makes it clear that the majority deal in military matters. Even the nonmilitary centers like Higinbotham's Brookhaven National Labs, founded in 1947 for the purpose of developing peacetime uses for nuclear energy, did not function-during the Cold War at least-outside of a larger geopolitical competition between the superpowers. Beyond the matrix of institutions directly operated by the Department of Defense was a growing defense contracting sector, from companies whose entire existence depended on military contracts, to larger, more diverse companies, like IBM, who made their money both through military subsidies and successes on the open market.

In the 196os, the private electronics sector expanded rapidly and began investing heavily it its own R&D: IBM, for example, put more than half its profits into research. Even then, military sources of funding remained the major impetus behind the development of certain technologies, such as semiconductors, integrated circuitry, and miniaturization, and many projects undertaken autonomously by private companies were only pursued because of the incentive of probable military procurement.

So while computer games were not created directly for military purposes, they nevertheless arose out of an intellectual environment whose existence was entirely predicated on defense research. The seeds of what would become the multibillion-dollar global video game industry thus appeared as mere side effects of Pentagon spending. But the advent of computer games was not simply a question of underwriting a profession that might have invented them. The ways in which military needs shaped the development of computers created several factors in hardware and programming that came together in fortuitous ways. These moments of invention, as discussed earlier, were multiple, as the video game has several beginnings.

Shoot Your Television

A third milieu from which video games emerged was Sanders Associates, a private military-contracted electronics firm based in New Hampshire. Sanders is now part of British conglomerate BAE Systems, one of the world's largest defense contractors. In 1966, Ralph H. Baer, Sanders' chief engineer of product design, proposed researching (as he puts it in his autobiographical account Videogameh in the Beginning), "the concept of using TV sets for

something other than watching network fare"-in other words, electronically enhanced, interactive television. The idea grew out of a similar project he had proposed, to no avail, when working as a television engineer at a consumer electronics firm in the early 195os, and it would lead to the creation and marketing of the first home video game system. By 1967, after working on several successive versions of TV games, Baer and his colleagues produced a "Brown Box" prototype: a box-shaped console, two paddle-style controllers, and a light gun shaped like a small hunting rifle, all covered in tasteful wood-grain vinyl.

The light gun, surprisingly, was not in itself a new invention, though Baer's toy-rifle design for it may have been. Non-computerized arcade attractions using light guns had existed since the 193os. But the version crafted by Baer and subsequently used by home and arcade systems was a direct descendant of the light pen, a device widely used to manipulate graphics on CRTs prior to the development of the keyboard-friendly mouse. The light pen, in turn, was invented for use in Project Whirlwind, a Navy-funded initiative begun in the 1940s at MIT with the intention of producing the first computer-based flight simulator. (Though the Whirlwind computer never produced such a simulator, it did push forward computing technology in significant ways, and led to the SAGE missile-defense system that operated from the i95os to the i98os.)

With the help of a series of clear plastic TV-screen overlays, the Brown Box offered a series of games involving crude graphics of moving blocks: Ping-Pong, soccer, target shooting, golf, and others. The prototype led to a contract with Magnavox, which released the Sanders-developed Odyssey, the first home video game system, in 1972. The licensing of Baer's invention to Magnavox became a major source of income for Sanders for over a decade, arriving at a time when defense contracts for electronics firms had sharply receded.

Unlike the work of Russell and the Hingham Institute crew, whose Spacewar! evolved organically through open-source distribution in the early hacker scene, Baer's television games project worked from the beginning to produce a cutting-edge but relatively inexpensive commercial product. The fact that this home-entertainment gizmo developed at a military electronics firm was unusual at this time. Looking back on his initial proposals, Baer offers that his often circumlocutory wording "shows how conflicted I was at the moment," since he felt the need to use the language of Cold War contracting to justify what amounted to the creation of a high-tech toy. "I was in a defense electronics company disclosing concepts about playing games on a TV set," he writes. "So the initial impulse was to clothe it all in military jargon." Thus the prospectus contained "all that verbiage about 'low cost data entry devices which can be used by an operator to communicate with a monochrome or color TV set.' That lasted about two more lines and then I clearly said to myself, 'the hell with it! Let's call it what it really is: TV Games.' "

Nevertheless, Baer's interactive television system would eventually feed its innovations back into the military sphere. In the late 1970s, Baer modified a large-screen television game into a variety of weapons-simulation and weapons-training systems: a Combat Engineer Vehicle Trainer, an Interactive Video System Rifle Training System, and a Light Antitank Weapon Simulator, which allowed the user to practice destroying video images of Russian tanks. After all, "shooting at targets in an arcade game is not too different technically from shooting at targets in a weapons training exercise," Baer writes. "The same interactive video technology works well in both scenarios," he remembers. "I loved that stuff ... and moving back and forth between the commercial and the military world was no problem at Sanders because the license income from

the video games gave me a nearly free hand to determine what I wanted to work on. Money talks!"

A prolific gadgeteer in the Edisonian mold, Baer has patented a strikingly diverse range of inventions. Just a sampling of items eventually produced include a device for monitoring Soviet radio transmissions, a medical depilation unit, electronic components necessary for a moon-landing camera, Milton Bradley's "Simon" light-pad game, and a chatty collection of talking toys, talking greeting cards, talking picture frames, and even a talking doormat.

Knowledge Is Power

Though produced with different technologies, the three inventions generally considered to be the ancestors of the video game-Tenni.e for Two, Spacewar!, and Baer's interactive television-all share one element: they simulate objects bouncing through virtual space in ways that are recognizably analogous to everyday physics. Higinbotham's analog tennis match, the gravity-arc of Spacewarfs ships (and their light-dotshaped "torpedos"), Baer's solid-state Ping-Pong game, and MIT's Bouncing Ball demo all move virtual objects around ways that seem "real" to us, in an intuitive fashion. This illusion of weight and inertia helps us to perceive shifting patches of pixels on a flat screen as an object moving in actual space and real time, subject in some fashion to our control (or at least our manipulation); the seemingly natural movements of these objects are, of course, determined by specific mathematical models embedded in their generative programs.

To twenty-first-century gamers, the fact that this trio of primal games all share the use of projectiles may seem inconsequential. After all, didn't 99 percent of arcade games in the eighties likewise involve shooting bullets or lasers? Even today, mention "video games" to the average person, and some variant on shooting games would be the first thing that comes to mind. "Combat games have always been at the heart of computer gaming," legendary Atari game designer Chris Crawford observed in 1982 in his seminar Art of Computer Game Deaign, specifically referring to shooting games. "Players never seem to tire of them; it appears that they will be around for a long time to come." But the fact that these three early games all followed the bouncing ball was not a mere coincidence. Early designers had to work with the capabilities of the computers at hand; that simulating a projectile appears to have come naturally to three different inventors, completely independent of one another, suggests that there is something essentially basic in this design all three tapped into.

Mapping the movements of bodies in space was one of the raieone d'etre for the development of computers, a function that can be traced back to their very origins in the military needs of World War II. With the rise of gunpowder warfare, calculating ballistics tables became a tactical imperative. As late as World War I, ballistics data were tabulated largely by hand, even as the proliferation of twentieth-century armaments called for increasingly complex number crunching, performed by mathematicians who were known as "computers." Analog computers sped up computing times in the 1930s, but in World War II, advances in airpower, artillery, and bomb technologies meant that more efficient means were necessary.

To speed up this process, the Army commissioned the creation of ENIAC, long celebrated as the first digital computer and for years symbol of American scientific supremacy. Digital

computers are what we today generically know as computers: they employ a stored-memory architecture and a binary language of zeros and ones, and their functioning is thereby more reliable and flexible than their analog cousins. Unlike its analog predecessors, ENIAC-the "Electronic Numerical Integrator And Com- puter"-was fully electronic and general-purpose. ENIAC was not finished until after the war, at a cost of nearly half a million dollars, but it was one of the large-scale projects that helped cement the American technological lead over all of the governments left standing after the war-even Britain, who had in complete secrecy completed the true first digital computer, Colossus, a few years earlier, but could not maintain a scientific edge during its economic struggle after its victory. Certainly, ENIAC would not have happened as soon as it did without wartime monies. Technology historian Paul N. Edwards argues "without the vast research funding and the atmosphere of desperation associated with the war, it probably would have been years, perhaps decades, before private industry attempted such a project."

Though the fight against the Axis menace was over, ENIAC was immediately pressed into the needs of the Cold War. Upon its completion in fall 1945, ENIAC's first job was to calculate a mathematical model of the hydrogen bomb. Without irony, Major General Gladeon Barnes oversaw ENIAC's switching-on ceremony, piously dedicating the machine in the service of "man's endless search for scientific truth."

Command and Conquer

Why did the U.S. military spend so much on the postwar development of-as the press liked to put it-"giant electronic brains"? On one level, the Pentagon was interested in computers for the same commonsense, quotidian reason the rest of the government and large corporations would become interested in theminformation processing for a massive bureaucracy. The global campaign of World War II expanded the operations of the American military like never before, and America's continued power during the Cold War demanded an equally large organization. For a vast social body whose continued existence depended on number-crunching bureaucracy, computers speeded things up, and thereby made the growth of an even larger, more efficient, and more complex organization possible. While many today think of the Pentagon-created in 1943-primarily as a symbol of American power, it is also, as media critic McKenzie Wark has pointed out, the largest office building in the world.

But the Pentagon's push to computerize the American defense infrastructure connected with a deeper, more ideological change, something that went beyond merely hastening paperwork. In the early Cold War period, the rise of computers became part of a larger paradigm shift toward the application of statistical, calculable methods to a range of large-scale social and organizational problems. Operations research, born of mathematical studies of flight missions and submarine tactics in World War II, gave the generation already confident from victory a new vision that whole societal swaths could be improved and remade through similar methods. The computer's ability to process the necessary figures with greater complexity, flexibility, and speed gave it a central place in this vogue for mathematical models of grand systems; in turn, generations of computers were developed with these functions in mind.

What was good for the military was good for business: Robert McNamara, who pioneered operations research with his successful studies on how to improve the firebombing of Japan, shifted his vision from destruction to production by reforming the workings of Ford Motor

Company, leaving that job to become Kennedy's secretary of defense. A related practice, systems analysis, was developed and promulgated through the work of the Rand Corporation, a think tank founded by the Army Air Force and the Douglas Aircraft Company in 1945; later, it was separated from Douglas and became an independent, nonprofit entity. Rand famously became an incubator of Cold War policy, packed with intellectual heavyweights like mathematicians John Nash and John von Neumann (who crucially honed the architecture for the digital computer), and roly-poly strategist Herman Kahn. Though ostensibly independent of the government, the Rand Corporation had wide-ranging influence on government and military thinking during the Cold War. In 1961, McNamara established an Office of Systems Analysis as part of the Department of Defense, and staffed it with Rand thinkers.

One of Rand's military innovations was politico-military game, a Cold War update of kriegspeil, developed in the i95os by Herbert Goldhamer. Not just concerned with the movements of troops and weapons, the politico-military game also factored in economic and diplomatic concerns, all of which were converted to numerical values for calculation. About five or six of these three-day affairs were held at the Pentagon during the i96os, with one group of officials playing team Blue (the U.S.) and another group playing as Red, an opposing nation or force in the given scenario. Team Blue would have consisted of high-ranking members of the president's cabinet, the CIA, State Department, and the Department of Defense; Red would be area specialistsKremlinologists or diplomats, for example. After each game's conclusion, its findings were shaped into a half-hour mockdocumentary, souped up with stock footage of missile launches, riots, and armies on the march, which would be screened before Pentagon and State Department officials for analysis. Because of their sprawling, complex nature, the politico-military games were apparently not used for actual prediction or strategy, but more as an educational tool for understanding possible outcomes in various global situations.

"Rand thinkers inhabited a closed world of their own making, one in which calculations and abstractions mattered more than experiences and observations, since so few of the latter even existed to be applied," Edwards observes in The Clued World. "Nuclear war existed only as a simulation, a game, a computer model." The vast computer game that was the Cold War could be seen as a perverse fulfillment of H. G. Wells's wish to replace the deadly rituals of the battlefield with the fantasy of leaders playing with models. The fear of nuclear annihilation meant that the Cold War involved rival simulations of possible outcomes, but nobody seemed to feel any better with this new arrangement.

Conceptualizing the Cold War as nothing but a world-girding game was not uncommon in the popular culture of the period, and Rand itself enjoyed a kind of notorious celebrity, as game theory became integrated into mainstream business practice, the social sciences, biology and elsewhere. Game theory terms like "mutually assured destruction" and "zero-sum game" became part of the Cold War lexicon. Rand's philosophies even reached laymen, as popularized by the zippy Rand book The Compleat Strategyet: Being a Primer on the Theory of Gamee of Strategy, by J. D. Williams, first published in 1954. Breezily written and illustrated with whimsical ink drawings, The Com- pleatStrategyetexplained game theory in colloquial terms, while noting its genesis in thinking about war. The book, Williams writes, was conceived of "among a group of persons who have been concerned for some years with the dual problems of the development and application of the Theory of Games of Strategy. While their immediate and primary interest has been applications pertinent to military affairs-particularly of the Air Forcetheir tangential

interests in these problems are broad, practically without limit." Though Williams informs his readers that "the study of games is a useful and usable starting point in the study of strategy ... because games contain many of the ingredients common to all conflicts," he accepts the notion that game theory could be ultimately impotent. "It may be that military, economic, and social situations are just basically too complicated to be approached through game concepts," he sighs.

Armageddon as Endgame

But if everyday Americans saw the Cold War as a giant, computerized military-political game, it was a game whose decisive actions occurred entirely out of their control. Medieval Europeans envisioned God and the Devil playing chess with souls, on a dual-colored board that represented an earthly realm of stark moral choices. In the twentieth century, God and the Devil had been replaced with a new Manicheanism of democracy and communism, of nuclear superpowers who manipulated whole nations as pawns. Or, to borrow a metaphor from another table game, as precisely planned processions of falling dominoes.

In American movies of the period, this vast global game was represented onscreen in synecdoche as the "big board" of fictitious Pentagon war rooms: the gigantic illuminated map of the world, with pin lights for major cities and bases, and lines stretching across continents to show the trajectories of potential nuclear strikes. In Stanley Kubrick's 1964 satire Dr. Strangelove or. How I Learned to Stop Worrying and Love the Bomb, milquetoasty American president Merkin Muff ley accedes power to an overenthusiastic gaggle of generals and advisers: the film's eponymous scientist commissions a study from the "BLAND Corporation." The nuke-crazy doctor's ideas seem suspiciously close those of Randite Kahn. Like Strangelove, Kahn argued that nuclear war could be winnable, rather than a total apocalypse-even if, as Kahn notoriously stated, "only two million" die.

Sidney Lumet's Fail-Safe, a less-well-known dramatic film from the same year that was based on a best-selling novel of 1962, involved the beginnings of a nuclear war triggered by an irreversible chain of computer errors. Though critics of both the book and the film dismissed the details of how such an occurrence would actually happen as humbug, Fail-Safe nevertheless captured a popular anxiety of the period. The clockwork concatenation of computer-assisted events bespoke a sense of loss of human agency. The cold inhumanity of computers stood in for dispassionate doom that seemed to hang over of the Cold War, one in which a random event could trigger an Armageddon beyond any individual's-or nation's-control.

British director Peter Watkin's controversial 1964 film The War Game limited its war-as-game theme to its title; the film itself is a grueling mock-documentary of life among the survivors of a nuclear war. However, Watkins returned to a ludic vision of future warfare in two later films, The Gladiators (1969) and Punishment Park (1971). In the former, large-scale war has been abolished in favor of reality-TV style combat between tiny bands of professional warriors, who are placed in a commandercontrolled fun-house-style environment. In the latter, political radicals must compete a desert race for survival after being arrested and tried for treason; adding to Watkins' psychodrama is his casting of mostly nonactors: actual student longhairs as the radicals, real-life hippie-hating conservatives as the cops and tribunal. Blurring the lines among game, psychological experiment, and outright conflict, Punishment Park plays like a large-scale version of the Stanford Prison Experiment, the notorious 1971 Navy-funded study that discovered how,

even when play-acting as prisoners and guards, otherwise mild-mannered college students could become vicious and violent. The most ambitious critique emerged from the polymathic mind of R. Buckminster Fuller, who designed a constructive, educational alternative to the massive games of nuclear speculation played by the superpowers. Writing in 1969, Fuller imagined a huge apparatus called the "World Game," a mechanical globe that folded out into a complete map of the earth the size of a football field. It would take the shape of a cartographic configuration called the Dymaxion Map, a snaking, many-sided polygon also of Fuller's invention, designed so that the world's continents appear as a single near-contiguous chain of islands floating in one ocean. Covering the map would be a matrix of miniature electric light bulbs that would display accurate real-time information about "world conditions, events, and resources." Fuller began forming the concept in the early '6os, during escalating Cold War tensions; he included the notion of the enormous unfolding globe-map in his proposal for the World's Fair Expo '67 in Montreal.

"The objective of the game," Fuller writes, "would be to explore for ways to make it possible for anybody and everybody in the human family to enjoy the total earth without any human interfering with any other human and without any human gaining advantage at the expense of another." If the military and political leaders could play world-spanning games of potential nuclear annihilation, then why not counter them with a more positive game of reallocating the world's resources to increase the common good? Fuller saw this global traininggame as a conceptual riposte to game theorists of Rand:

"In playing the game I propose that we set up a different system of games from that of Dr. John von Neumann whose 'Theory of games' was always predicated upon one side losing ioo percent. His game theory is called'Drop Dead.' In our World Game we propose to explore and test by assimilated adoption various schemes of 'How to Make the World Work.' To win the World Game everybody must be made physically successful. Everybody must win."

Though its grand architectural embodiment was never built, the World Game did become reality through a series of World Game seminars and the eventual founding of a World Game Institute that continues to hold such large-scale learning simulations today. In a 1972 seminar, Fuller projected a Dymaxion Map with global resource data visualized as bright lines of light connecting various points on the earth, resembling a peaceful version of electronic maps seen in war rooms.

Conflict: Vietnam

Of course, the Cold War was more than just a simulated tete-a- tete, or a mere global game of speculative futures. As the Vietnam War so brutally illustrates, the so-called Cold War involved numerous, localized hot wars. And it was in Southeast Asia, with an invisible grid of American sensors designed as vegetation, that the once-speculative gaming of superpower war rooms became a form of active practice. A science-fictional fantasy-an electronic simulation-melded for the first time into the reality of the battlefield. The game had shifted from strategy to tactics.

In 1966, McNamara had assembled a group of top-notch scientists, codenaming them The Jason Group, informally known as "The Jasons." McNamara hoped the Jasons could find a solution to blocking the supply lines the North Vietnamese ran down the Ho Chi Minh Trail,

based in the supremacy of American science. After all, the advanced know-how of the U.S. had won wars before, so the Defense Communications Planning Group (DCPG) was modeled expressly on the previous wartime groups like the Manhattan Project. Among the ideas kicked around were a chemical to turn Ho Chi Minh Trail to mud, or a gargantuan fence on the model of the Berlin Wall. The former suggestion never panned out in the research stage; the latter was deemed too labor- and maintenance-intensive for success. The plan that stuck, however, was the idea of an electronic barrier of sensors, implemented via American airpower. McNamara created the Washington-based DCPG that year, and work on what would become Igloo White began.

The coming together of scientists and the military was of course not a new twentieth-century idea; this tradition stretches as far back as Archimedes, and certainly farther, and had become increasingly common since the advent of gunpowder. As previously noted, World War II brought the fields of war and science closer together than ever before, on grander scales both operational and financial. But the wedding of the worlds of intellectual research and international warfare that occurred as a burst of national pride in World War II became, to many, more morally suspect in the decades that followed. It was one thing to acknowledge the heroic efforts of the Manhattan Project, who worked knowing that Nazi Germany was simultaneously trying to develop atomic weapons. It is quite another to read the almost gleeful recollections of DCPG technologists, who were given the task of increasing deaths and destruction for a war now broadly perceived as the height of Cold War folly.

"As an engineer it is what you dream about," said Stanley Hirsch, hired as one of the DCPG's researchers. He recalled with enthusiasm his well-funded days developing novel ways to wage war in Vietnam. "You count yourself as extremely lucky if something like it comes along just once in your lifetime. It allowed you to be in on the birth of an idea and see it move through all its stages-design, development, prototype, testing, productionand into combat in Vietnam in just about the fastest possible time which was less than a year in most cases. This is an amazing thing because in most military projects the cycles take at least seven years and the men there at the beginning are seldom around for its application ... But that's just one point, everything else about it was exhilarating. For instance, everything was streamlined and there wasn't a lot of paperwork, red tape and running around getting approval for every little thing. You could work your own hours and if you felt that you had to go to Europe, California, Vietnam or wherever to get your work done, you'd just get on that next plane. What a wonderful experience it was!"

The fruits of Hirsch's "wonderful experience" would change the future of war fighting. "The one `success' of the American side of the debacle in Southeast Asia was the advancement of military technology," Dickson observed in 1977. "Great advances were spurred in such areas as solid state electronics, ordnance, and helicopters, which were perfected as battlefield workhorses to the point that the Chinese are now talking about buying them from us. Old-fashioned dumb bombs gave way to laser- and TVguided `smart' ones and the computer metamorphosed from a lesser military tool into a major element of all sophisticated weapons systems."

Science Against the People

Not all American scientists, however, welcomed this continued era of military-subsidized research. In December 1972, a group of faculty and researchers at UC Berkeley who called themselves SESPA (Scientists and Engineers for Social and Political Action) published a booklet

entitled Science Againet the People: The Story of Jason-The Elite Group Of Academic Scientists Who, AA Technical Coneultante To The Pentagon, Have Developed The Latest Weapon Against Peoples' Liberation Struggles: "Automated Warfare." Naming names (and institutions) as part of their protest against the collaboration between military leaders and top scientists, SESPA argued that the future was "one of continual involvement of U.S. science in the proliferation of new weapons." Academics, SESPA said, would continue such a system, since it was economically beneficial to do so: "A former Berkeley professor, now a director of a major research lab and a member of Jason, once remarked that there is no such thing as an experiment that fails; if you do not get the results you wanted in the first program, take what you have learned and use it as the basis for a new, larger research proposal.

SESPA argued that Operation Igloo White and the military's goal of the electronic battlefield were designed not to ensure victory, but to keep wars running, in order to benefit the matrix of arms makers, research facilities, and other organizations whose continued funding depended on continuous war. "The technological wing of the military-industrial complex does not necessarily win wars," the SESPA writers continued, in a section called "The MacNamara Fence adapted to Eternal Warfare." "We have seen that it certainly can help prolong them. Each new gadget can be used as an excuse for a new escalation-as the laser-guided 'smart bomb' (though it had seen combat before) was presented as one of the justifications for the most recent bombing escalation in North Vietnam."

An apparent paradox, however, was that many of the scientists in the Jason Group would fall on the antiwar side, if pressed. Then why did they assist in technologizing the Vietnam conflict? "J. Robert Oppenheimer described his amorality frankly," SESPA's writers offered. " '... when you see something that is technically sweet you go ahead and do it and you argue about what to do about it only after you have had your technical success. That is the way it was with the atomic bomb. I do not think anybody opposed making it.' " The key, SESPA concluded, was something they called the "Kissinger complex." It is all about "being where the action is," they wrote. Scientist doves worked for Pentagon hawks, SEPSA argued, because they are "attracted by the secrecy, by feeling close to the real center of power, by the gratification of having been admitted, by the size of the appropriations being discussed, by the sense of urgency, by the thrill of making history."

The Electronic Battlefield

Clunky and expensive, Igloo White may have had a dubious contribution to the fighting of the war in Vietnam, but it signaled the future course of the American military, a vision that continues to shape of military practice today. At the time, military thinkers called this goal the "automated battlefield" or the "electronic battlefield." The future, they thought, would look something like Igloo White, but better. The waging of war would become increasingly centralized, computerized, and automated. The logic of airpowerdoing the most damage to the enemy's forces from the greatest distance-would extend throughout the operations of war, thanks to the information-gathering capabilities of computers and electronic technology. Increasingly, as Igloo White illustrated, war would be fought through a digital interface that would decrease casualties among American forces while it increased the effectiveness of operations against the enemy.

During Vietnam, General William Westmoreland, then Army chief of staff, outlined this

vision of the future of war in a speech given at the Sheraton Park Hotel in Washington, D.C., in October 1969. Westmoreland addressed the Association of the United States Army, an advocacy and support organization whose members include both active and retired military personnel. "I know you are dedicated to the maintenance of a strong, modern Army through military-industrial-laboracademic-scientific cooperation," Westmoreland told this group. "This team provides the Armed Forces with the best equipment science and technology can produce."

"We are on the threshold," Westmoreland announced portentously, "of an entirely new battlefield concept." Indeed, the practice of war had begun to transform dramatically during the 196os. The Army began Vietnam using the World War II-style tactics, but soon American forces had to adapt to new environment and style of opponent. Faced with guerrilla tactics in the jungle, simply locating the enemy became more important than ever; the old massed-troop formations of the mid-twentieth century and earlier gave way to smaller groups of units that "saw" their opponents with data from electronic sensors and air reconnaissance, deployed quickly and precisely in helicopters. Westmoreland envisioned this trend continuing: more electronic sensors, more mobility, and more communications. "On the battlefield of the future," he predicted, "enemy forces will be located, tracked, and targeted almost instantaneously through the use of data links, computer assisted intelligence evaluation, and automated fire control. With first round kill probabilities approaching certainty, and with surveillance devices that can continually track the enemy, the need for large forces to fix the opposition physically will be less important."

Though not mentioned explicitly, the public disapproval for the war's escalating American troop deaths clearly played a factor in developing this vision of the future. An Army that operated with greater intelligence-gathering and subsequent pinpoint deployment would mean fewer U.S. casualties and thus higher taxpayer approval-or at least, less broad-based protest. "I am confident the American people expect this country to take full advantage of this technology," Westmoreland told the crowd. U.S. citizens would "welcome and applaud the developments that will replace wherever possible the man with the machine." After all, they had seen it happen already at home, in their factories and offices.

American resistance to the war in Vietnam had a deep and lasting impact on the culture and practice of the nation's armed forces. In the span of merely twenty-five years, American public perception of its military devolved from the celebrated heroism of World War II into something far more morally contestable. The difference in the iconic image of each war testifies to this shift. Joe Rosenthal's photo of Marines raising the Stars and Stripes at Iwo Jima-U.S. forces victorious in saving the world from hideous barbarism-gave way to AP photographer Nick Ut's 1972 shot of crying children fleeing a South Vietnamese napalm attack, with armed American soldiers following behind them.

The earliest allegations that American forces themselves had committed genocidal acts and other war crime atrocities in Southeast Asia had begun to creep into American media in the mid-'6os. By 1967, philosopher and pacifist Bertrand Russell had held the first "International War Crimes Tribunals" against the actions of the U.S. in Vietnam, involving such leftist luminaries as Jean-Paul Sartre, Simone De Beauvoir, James Baldwin, as well as witness from North and South Vietnam, and American servicemen. By the fall of 1969, reports of the My Lai Massacre of March 1968, where American Army troops under Lt. William Calley slaughtered hundreds of Vietnamese civilians, mostly women and children, had began to trickle into the news. Although

journalist Ronald Ridenhour sent letters detailing the events at My Lai to the White House and Congress in the spring of 1969, a full report would not appear until November, a month after Westmoreland's "automated battlefield" speech.

Nevertheless, in his speech at the Sheraton, Westmoreland appears to refer to these early reports in a pointed caveat. "Recently, a few individuals involved in serious incidents have been highlighted in the news. Some would have these incidents reflect on the Army as a whole. They are, however, the actions of a pitiful few," Westmoreland told his audience. "Certainly the Army cannot and will not condone improper conduct or criminal acts-and I personally assure you that I will not. We will always regard the rights of the individual and acknowledge due process of law. But the Army as an institution should never be put on trial as we deal with the few." Westmoreland's language would foreshadowed the "bad apples" argument that the Pentagon would adopt after the discovery of torture photos from Abu Ghraib in 2004.

Westmoreland continued by evoking images from his ideal future of American combat. "I see battlefields or combat areas that are under 24-hour real or near real time surveillance of all types. I see battlefields on which we can destroy anything we locate through instant communications and the almost instantaneous application of highly lethal firepower," he said, verging into the rhetoric of prophecy. "I see an Army built into and around an integrated area control system that exploits the advanced technology of communications, sensors, fire direction, and the required automatic data processing-a system that is sensitive to the dynamics of the ever-changing battlefield-a system that materially assists the tactical commander making sound and timely decisions."

Nerd Power

"The computerization of society," Frank Rose writes in his 1984 history of artificial intelligence, Into the Heart of the Mind, "has essentially been a side effect of the computerization of war." Unbeknownst to the Pentagon, their flourishing network of research centers and university programs had indeed fostered an unexpected social side effect: the incubation of a freaky subgroup whose strange love of computer-research-for-computerresearch's-sake would someday flood the world with technological innovation and shape computer research toward more personal, consumer-friendly goals. Military dollars built a giant nursery for a new generation of very smart, revolutionary long-hairs. They called themselves "hackers."

In the ig6os, a "hacker" was not the same thing as the network-penetrating bugaboo of later years. To early programmers at places like MIT and Stanford, a "hack" was a virtuoso technical project performed for the sheer fun of showing off what you could do with a computer-at a time when so many functions of computers that we now take for granted were still unexplored. A programmer who was a hacker took obsessive pride in exploring these new possibilities; it was a spirit that mixed the scientist's love for exploring new knowledge, the engineer's joy at tinkering, and an artist's creativity and inspiration.

And it was not just about programming computers, necessarily; electronic structures of all kinds were targets of hacker curiosity. In the early i96os, student hackers at MIT engaged in a hack they called "telephone network fingerprinting." It involved exploring the MIT phone system by methodically dialing numbers and seeing where they led. The young hackers found that the

campus network, though local, reached into MIT's Lincoln Laboratories, a research facility operated by the Navy, Army, and Air Force that had developed the SAGE missile defense system in the i95os. Through the phone system at Lincoln Labs, the hackers could tap into a nationwide roster of defense contractors. No nefarious subversion ensued: the hackers were only interested in the accomplishment of knowing how to do it. But the anecdote serves as a metaphor for how closely enmeshed the hacker's haven was with the Pentagon; the military, quite literally, was right in their network.

In 1972, Rolling Stone reporter Stewart Brand visited Stanford's Artificial Intelligence Lab, in search of a legendary tribe of programming geeks rumored to worship at the image of Spacewar! His resulting article, "SPACEWAR: Fanatic Life and Symbolic Death Among the Computer Bums," relates the social scene he found at the lab, penned with a zippy countercultural brio. He describes "the youthful fervor and firm dis-Establishmentarianism of the freaks who design computer science," freaks who were using Spacewar! to turn on, boot up, and drop out (on off-hours, at least). "Reliably, at any nighttime moment (i.e., nonbusiness hours) in North America hundreds of computer technicians are effectively out of their bodies," Brand wrote, "locked in a life-or-death space combat computer-projected onto cathode ray tube display screens, for hours at a time, ruining their eyes, numbing their fingers in frenzied mashing of control buttons, joyously slaying their friends and wasting their employers' valuable computer time. Something basic is going on."

In honor of their devotion to Spacewar!, Brand had Rolling Stone sponsor the "First Intergalactic Spacewar Olympics," though the underwriting consisted of little more than beer and snacks. Photographer Annie Liebowitz tagged along to snap pictures of the event for the magazine.

What was going on certainly didn't look like a research center funded by the Pentagon. In a typical academic setting of fluorescent lighting and anonymous cubicles, Brand found "posters and announcements against the Vietnam War and Richard Nixon, computer print-out photos of girlfriends, a hallway-long banner SOLVING TODAY'S PROBLEMS TOMORROW and signs on every door in Tolkien's elvish Feanorian script -the director's office is Imladris, the coffee room The Prancing Pony, the computer room Mordor." The inhabitants were not the bespectacled, crew-cut Organization Men that would have been found in a similar lab only a decade earlier. "There's a lot of hair on those technicians," Brand observes, "and nobody seems to be telling them where to scurry." Many of the projects Brand sees the hackers working on have little to do with the national defense. One uses an off-hours computer to analyze the budget of his food co-op; another perfects on an astrology program. "These are heads, most of them," Brand explains. "Half or more of computer science is heads."

Like many of their fellow drug enthusiasts stationed in Southeast Asia, the Pentagon funded these heads. The hackers could thank ARPA, the Advance Projects Research Agency, which fell under the rubric of the secretary of defense. Originally the overseers of the space program, ARPA changed directions when the nonmilitary NASA took over those duties. In 1963, it devoted up to $8 million of its budget to a new initiative called Informational Processing Techniques, which sought to develop more advanced computing capabilities-a logical enough project, since at the time the U.S. Department of Defense used more computers than any other organization in the world-and within a few years had directed its research focus on interactive

graphics and pure theory. After a thirty-two-yearold ARPA director named Robert Taylor doubled IPT's budget in the late'6os, he thereby ushered in what Brand calls "a five-year golden age of computer research." According to technology historian Steven Levy's Hackers: Heroes of the Computer Revolution, Taylor "later admitted to diverting funds from military, `mission-oriented' projects to projects that would advance pure computer science."

Alan Kay, then of Xerox's commercial Palo Alto Research Center (or PARC), told Brand that "9o percent of all good things that I can think of that have been done in computer science have been done funded by that agency." Under Taylor's guidance, the agency became a major influence on the further development of computer technology. "Chances that they would have been funded elsewhere are very low," he says. "The basic ARPA idea is that you find good people and you give them a lot of money and then you step back." It was under Taylor that ARPAnet was born. Originally conceived of at Rand in the i95os as a distributed computer network that could withstand nuclear attack, ARPAnet would slowly grow into the global multimedia platform known as the Internet.

Not only did this new generation of Pentagon-funded hackers work on nonmilitary projects; in some cases, they were involved in the protests against the Vietnam War-the very event that was, in a sense, underwriting their way of life. Levy attests that "many of the hackers were sympathetic to the antiwar cause" at MIT and had done work on hooking up phone lines for protest centers and organizing marches. Brand speaks with a rare female hacker named Pam who left programming at Berkeley because she found the work "just too disillusioning." But she recalls that other members of her lab threw themselves into leftist antiwar activities. "During the Cambodian Invasion demonstrations in Berkeley a group of us got together and designed a retrieval program for coordinating all of the actions on campus," she tells Brand. "It was a fairly dead system, but what it did was it brought together people who had never worked together before and started them talking and thinking about how it was actually possible to do something positive with technology, when you define the goals."

The fact that this generation of countercultural computer bums had been produced within a military-subsidized infrastructure was not the only seeming contradiction inherent in their existence. Much of the greater anti-Establishment youth movement held an antitechnological bias, a back-to-earth neoLuddism that perceived computers as the Establishment's tools of conformity and control. This sentiment was not far removed from a commonplace suspicion about the computerization of society that one would find in any American of the period, among the uninformed of any age group or political persuasion. In the late '6os, this conflict came to head when an antiwar march in Cambridge, Massachusetts, ended with a protest at Technology Square, the ARPA-funded center for computer research activity at MIT, and subsequently a hacker haven. Brian Harvey, an MIT computer jockey who was active in the anti-war movement, reported back to his Tech Square colleagues "what low esteem the Al lab was held by the protesters," Levy writes. "There was even some talk at antiwar meetings that some of the computers at Tech Square were used to help run the war. Harvey would try to tell them it wasn't so, but the radicals would not only disbelieve him but get angry that he'd try to feed them bullshit." When the programmers heard that the march would culminate in an action right on their floor-to demonstrate how M IT's computer science affairs were implicit in the war-the lab's administrator installed bulletproof glass, reinforced hinges, and steel-reinforced barricades, fearing that the mob might destroy the millions of dollars worth of high-tech equipment.

Though the protesters were vaguely correct-the computer science labs did indeed exist thanks to ARPA largess, and there was even a CIA office in Tech Square, hidden under the fictional auspices of "R. K. Starling Associates"-the programmers asserted a professional separation from their funding source when pressed. "There's nothing illegal about a Defense Department funding research," MIT's legendary Al pioneer Marvin Minsky told Levy. "It's certainly better than a Commerce Department or Education Department funding research ... because that would lead to thought control. I would much rather have the military in charge of that ... the military people make no bones about what they want, so we're not under any subtle pressures. It's clear what's going on. The case of ARPA was unique, because they felt that what this country needed was people good in defense technology. In case we ever needed it, we'd have it."

"Spacewar serves Earthpeace," the young Brand exhorts in his Rolling Stone article, waxing long-hair poetic on the revolutionary potential inherent in the act of hacking, of playing around with a computer for its own sake. "So does any funky playing with computers or any computer-pursuit of your own peculiar goals ... The hackers made Spacewar!, not the planners. When computers become available to everybody, the hackers take over. We are all Computer Bums, all more empowered as individuals and as cooperators." Brand expressed a vision that everyday people would all become computer programmers, freeing their dependence on computers in favor of a digitalized democracy. And indeed, many of the idealistic, antiauthoritarian hackers of the kind that Brand profiled would leave the defense sector and branch out to build a brand-new realm of consumer and business technology, giving birth to the home PC and software industries, as well as the world of arcade and home video games.

But video games wouldn't remain outside the reach of real war for very long. In fact, hackers would grant the military a whole new perspective on warfare.

PART THREE

DIGITAL DEFENSE

PLAYING FIRST-PERSON WARFARE

"Even without knowing it, you're being prepared for a new age. Many of you already understand better than my generation ever will, the possibilities of computers. In some of your homes, the computer is as available as the television set. And I recently learned something quite interesting about video games. Many young people have developed incredible hand, eye, and brain coordination in playing these games. The Air Force believes these kids will be outstanding pilots should they fly our jets. The computerized radar screen in the cockpit is not unlike the computerized video screen. Watch a 12-year-old take evasive action and score multiple hits while playing Space Invaders, and you will appreciate the skills of tomorrow's pilot. Now, don't get me wrong. I don't want the youth of this country to run home and tell their parents that the president of the United States says it's all right for them to go ahead and play video games all the time. Homework, sports, and friends still come first. What I am saying is that right now you're being prepared for tomorrow in many ways, and in ways that many of us who are older cannot fully comprehend."

-Ronald Reagan, from a speech given at Walt Disney World's EPCOT Center, March 8, 1983

In the Zone

The most famous arcade games of the genre's golden age bear the names of their clever little characters, be they protagonists or foes: Pac-Man, Space InvaderA, Centipede, Defender. The title of Atari's ig8o tank gunner Battlezone, however, is different. It describes not a character, but a field of action-a new kind of space that provided the game's novelty appeal.

Freed from the side-shuffling flatland that had heretofore defined video game design, Battlezone evokes a sparse threedimensional world made from needle-thin neon-green lines. All items in view are decisively angled so as to appear to enlarge and recede as objects approach or grow distant, and the player has the ability to move not just right and left, but forward and backward as well. For the first time, the arcade screen becomes an ersatz window, as the player peers into an illusory depth created via Battlezone's wire-framed graphical perspective. Like geometric diagrams made from nothing but beams of light, enemy tanks prowl through a boxy, minimalist realm that stretches all around in 36o degrees, seemingly to infinity; on the horizon, jagged peaks of pyramidal mountains loom at an eternally receding distance, punctuated by a lava-spewing volcano.

In the arcade era, game graphics could be generated in one of two ways. Most games used raster displays. Like everyday televisions, a raster display creates visual patterns by assigning color to individual pixels, which are generated thirty (or more) times a second by a horizontal scanning beam. But a few, like Battlezone, used vector displays. Vector displays were the descendants of the Atomic-age CRTs, modified from radar oscilloscopes for use by the SAGE Missile Defense System, and later employed to generate the first games of Spacewar!. Instead of scanning a succession of horizontal lines in order to cover the screen, a vector system sketched images in a more direct manner, shooting its light beam back and forth to draw dots and lines, while the rest of the screen remained black. As Spacewarls developers knew, this default background meant that vector graphics were particularly suited for creating images of objects floating in the inky vacuum of outer space, an aesthetic that continued into the seventies and eighties. The classic 2-D space shooters Aeteroide and Tempeet were two other well-known arcade titles that used vector displays. Though grounded, Battlezone's barren landscape and pitch-dark sky still evoked an otherworldly emptiness: one of its working titles had been Moon Tank.

The means by which a Battlezone player moves through the game's bare-bones 3-D world held their own revelations. Unlike most games of the time, the player does not manipulate a little "guy" through 2-D space, puppetmasterlike, as if moving a piece on a board game; rather, the player perceives the action through the perspective of the fictional tank gunner himself: you see what the gunner would see. And since the game world extends left, right, and "in back" of you, it's possible to be shot at from outside your field of vision-from a tank attacking you from your blind spot, off-screen. This aspect makes Battlezone an ancestor of that now-ubiquitous video game genre, the firstperson shooter-games, like Doom and Quake and all their gory offspring, that portray the action through a killer's-eye view.

Though moving-image media had existed for almost a century, the movies and television never had much success with the first-person narrative format-Bugs Bunny and George Burns's fourth-wall-violating asides to audiences notwithstanding. Only the most ardent cinephiles recall the minor 1947 film-noir The Lady in the Lake, which adapted a Raymond Chandler novel so that "you" were gumshoe Phillip Marlowe. Pre-Citizen Kane, Orson Welles was ready to shoot

Joseph Conrad's Heart of Dark- ne&i entirely from (another) Marlow's literal point of view, but plans for the film collapsed during preproduction. Nor has television memory been kind to Hugh Hefner's 1969 Playboy After Dark, a swanky first-person talk show that posited the viewer as yet another partygoer at Hef's. After Hef welcomed you through the doors with a little chitchat, the camera tagged along with the smoke-jacketed publisher as he introduced you to guests like Roman Polanksi and Sharon Tate, Buffy Sainte-Marie or Don Rickles, and allowed you to sit down and listen in on their conversations. The interactive nature of video games, however, made the first-person a more exciting choice, elevating it above a mere awkward gimmick. You were not just a ghost in the narrative machine: you had the power to move through the fictional world and alter it. Your actions made you an actor in the game.

Even Battlezone's cabinet and controllers were specially designed to enhance its realism. Instead of a normal TV-style screen, Battlezone boasted a tiny porthole that mimicked a periscope's viewfinder window: gamers had to crouch down and press their faces against it, adding to its immersive feel. Standard joysticks and buttons were replaced by a unique two-joystick system meant to mimic real tank controllers. Since its vector display was monochrome, the game's colors were provided by cellophane overlays: green for the terrain, and red for a top navigational panel that held a crudely rendered radar-style map and scoreboard.

Battlezone's success at evoking a virtual world inspired some fanciful tales. According to a spurious gamer legend of the time, if a player's tank kept moving forward for at least an hour, it would finally reach these crystalline peaks, and within them find a fabled factory that was busy at work producing all those enemy tanks. In reality, any player who chose to drive away from battle in order to explore the zone would find himself zapped by a disciplinary missile, programmed for the express purpose of discouraging such a non-income-generating activity: after all, a pacifist player could potentially explore for hours on a single quarter. Atari game developer Lyle Rains reported another rumor, gleaned from a letter written to the company from a Battlezone fan, "who said that a friend of his had told him that if you drove far enough you finally got to the volcano, and if you drove over the top of the volcano, you could go down into the crater. And he said that inside the crater there was a castle, and that you could go inside and explore the castle. Of course, none of this was true."

While the immersive quality of Battlezone, enabled by its novel first-person perspective and the player's freedom of movement in a 3-D environment, may have seemed more strikingly realistic to players in i98o, such actions took place in a milieu that held some strangely unreal qualities. Battlezone evokes a world of tanks without drivers, an impossibly empty, clean, clear desert of cold geometric machines bereft of round, warm human bodies. When hit by an artillery shell, enemy tanks burst into a penumbra of isometric splinters, like a shattering pane of glass. The game is a vision of war without death, a purely mechanical battle, depicting nothing but a clash of data, creating the explosions of war without corporeal destruction.

Battlezone sparked literary imaginations as well. In 1982, British author Martin Amis-then an arcade-addicted laddie of barely thirty-two-published a now-obscure tome on coin-op games entitled Invaeion of the Space Invadere. A colorful, large format guide to conquering the top games of the time, it is written in an uncharacteristically poppy, enthusiastic tone. Amis has since all but disavowed the book (according to one account, mere mention of it in his presence summons a withering scowl), but it nevertheless stands as one of the earliest and more erudite

attempts to grapple with aesthetics of computer gaming. In it Amis confesses a love for Battlezone, describing it as a "futuristic tank game, with real tank controls, radar, enemy and terrain etched in diagrammatic silhouette, and wonderful accuracy of distance and perspective." According to Amis, its then-unique evocation of virtual space required a new way of thinking, of orienting one's self in its imaginary world. Battlezone, Amis writes, is "a game of special awareness.

"Admire, first, the cute controls," he suggests. "To begin with, I thought this was gimmickry-why not just a single joystick? But the double-fisted handlebars give a crucial sense of simultaneous forward and sideways movement, and give extra drama to the backward lurch. The radar gizmo is pretty perfunctory, but the screen is a gem, combining the look of op or pop art with the feel of a genuine battlezone: limited vision, nasty surprises, panicky adjustments while the enemy tank wheels slowly round to get you in its sights." (Another game-loving Brit, Steven Poole, corrected Amis's art-historical comparisons in his wellwrought 2000 study of game aesthetics, Trigger Happy. "Where pop art glories in colorful flat shading and razored curves," Poole coolly counters, "Battlezone evinces contempt for color, for material, for substance itself. Such qualities, it murmurs seductively, are illusory anyway: The edge is everything: the frontier where one plane meets another, where turret joins body, where missile meets flank.")

According to Amis, Battlezone drew in a particular breed of gamer, a little different than the average Pac-Man-fevered teen. "It attracts a relatively middle-class and elderly audience," Amis reports. "Its patrons and admirers are intense, thin-lipped characters, whose fantasy lives are clearly of martial bent. They certainly look like officer material to me." If this account can be read as more than mere parody, it would seem to match the stereotype of the hobby war gamer as a pasty, trembling milquetoast who nonetheless harbors an inner Napoleon, unleashed only through make-believe warfare-a character type perhaps even more well known in Britain than in the U.S. "These Rommels and Pattons of the arcades," Amis continues, "they seem to know exactly what is happening, they seem to know exactly where everything is. Enemy tanks fire at them, but they have judged the angle to perfection; the shells pass them by; they retreat, they manoeuvre, they come surging in again for their hit. They dream of North Africa, of carnage at Carthage, of Thermopylae. I haven't got the stamina, or the officer qualities."

PLATO's Maze

Though frequently remembered as the progenitor of firstperson shooters, Battlezone was not in fact the first game to use such a perspective. Racing games like Atari's 1976 Night Driver and Vectorbeam's 1979 Speed Freak had provided first-person views earlier, although neither of these allowed the player much leeway in maneuvering through their barely-there virtual environments-created through a few downward-moving dots meant to represent the merest outlines of a road in darkness. And they definitely did not involve any guns. But even earlier in that decade, two pioneering first-person games emerged independently of one another, created within the online networks used predominantly by American research and educational facilities.

A game variously called Maze War (named perhaps as a takeoff on Spacewar!), Maze Ware, The Maze Game, or just Maze was invented in 1973 by two student programmers interning at Ames Research center. Operated by NASA, the Center was located at Moffet Field, then a major naval air base, nestled in Silicon Valley. In Maze Ware, a first-person protagonist wandered

through the walls of a wire-framed labyrinth, shooting (or being shot by) a cadre of robot enemies. Constructed from bare-bones graphics, Maze War looks like a mouse's-eye view of a laboratory experiment. By the mid-seventies, the game had spread through the academic programming world. It became such a craze that DARPA banned Maze War from its ARPAnet because more than half the monthly traffic on the Net was being eaten up by online Maze War matches.

A year after geeks first started blasting their way through Maze War, programmers at the University of Illinois concocted a different first-person game, created for play on the now largely forgotten PLATO Network. Initially funded by the Army, Navy, Air Force, and the National Science Foundation, PLATO was a unique network, initiated in the i96os and distinct from ARPAnet, developed specifically for creating new possibilities in education and training. By the mid-seventies, the PLATO Network extended to over a thousand educational facilities around the U.S. The network's communications capabilities enabled the invention of a number of types of applications that wouldn't see widespread impact on the Internet until the i98os and 199os: in the early seventies, PLATO users were already using early versions of instant messaging, bulletin board services, and chat rooms. Former PLATO users today fondly recall its distinctive orange-screened flat-panel "gas plasma" display monitors, which allowed a level of graphical sophistication which unmatched by the Internet until well into the 199os.

Thanks to its advanced display capabilities, PLATO also became a fertile seedbed of early online, multiplayer games. Most of these were created and distributed in an unofficial manner, as university geeks explored the potential of PLATO's innovative, graphics-friendly programming language. In the PLATO environment, the sharing of information over a wide network engendered a quickly evolving ecosystem of groundbreaking software, and a subsequent community of committed gamers, a number of whom would go on to populate the commercial industry.

While the Air Force was still blasting dots in Thailand, for example, PLATO users were playing an improved, networked version of Spacewar!. One of the earliest games native to PLATO was Empire, a team-based graphical game of intergalactic conquest, initially programmed by John Daleske and Silas Warner and based loosely on Star Trek (the original teams were named Federation, Kazari]or Klingon], Romulan, and Orion). Programmer Jim Bowery became inspired by Empire to code a 3-D version of the game in 1974, which he called Spaeim, or SPASIM, in the all-caps nomenclature of early coders. The name was short for "Space Simulation," though its players ended up pronouncing it like "spasm." Created for a new kind of communications network, SpaAim in turn visualized a new kind of online phenomenon-a phantom 3-D world, an imagined but shared reality. It can be seen as the ancestor of massively multiplayer online games of today like Ultima Online, The SimA, or World of Warcraft. "To see a dynamic mathematical space open up in full perspective visuals for the first time was an intoxicating experience," Bowery later recalled in his online account of SpaAim's genesis. "As most authors must experience when they are possessed of their muse, it felt like I was simultaneously creating and discovering a new universe."

Sp"im did indeed open up a new universe. Bowery argues that there is an "intellectual genealogy" running from SpaAim to several other networked 3-D games on PLATO, which in turn would inspire some of the first well-known 3-D arcade titles. After studying the Sp"im code,

Warner modified it into Airace, a multiuser game that gave players a first-person view of an aircraft cockpit, through which they could view a basic landscape and the planes of other players as they raced one another. Airace evolved into a game called Airflight. According to Bowery and others, Airflight in turn inspired programmer Bruce Artwick to develop the 1979 game Flight Simulator, the first such product marketed for home computer use. After several successful versions of Flight Simulator, it was redesigned for the first generation of IBM PCs, becoming the massively popular Microsoft Flight Simulator series, one of the longest-running, most influential, and successful game franchises of all time.

"White hat" hacker Carolyn Meinel describes the immersive, surreal experience of an early PLATO flight simulator game that was probably Airfight: "Cyberpilots all over the US pick out their crafts: Phantoms, MiGs, F-1o4s, the X-15, Sopwith Camels. Virtual pilots fly out of digital airports and try to shoot each other down and bomb each others' airports. While flying a Phantom, I see a chat message on the bottom of my screen. 'I'm about to shoot you down.' Oh, no, a MiG on my tail. I dive and turn hoping to get my tormentor into my sights. The screen goes black. My terminal displays the message You just pulled 37 Gs. You now look more like a pizza than a human being as you slowly flutter to Earth.' " In another anecdote, Meinel remembers her surprise at seeing a model of the starship EnterpriAe entering the war space, which destroyed all the other aircraft and then vanished. "PLATO has been hacked!" she recalls thinking.

PLATO also provided an incubator for Battlezone's ancestor, a tank simulator called Panther PLATO. In 1977, programmers at the U.S. Army Armor School modified Panther PLATO into an obscure prototype training system for tank gunners called Panzer PLATO, which reportedly boasted highly accurate cannon ballistics. (It is not fully clear from the scant anecdotal records of PLATO's game roster whether Panther PLATO was a modification of Panzer PLATO, or vice versa: a detailed history of this parallel Internet remains to be written.) According to Bowery, Panther PLATO was the direct inspiration for Battlezone; he claims that Atari had PLATO accounts, and therefore its employees would have experienced Panther PLATO prior to the brainstorming sessions that led to Battlezone's development.

Electric Youth

Martin Amis's sardonic assessment of Battlezone's fan base turned out to be more spot-on than he probably realized. In 1980, representatives from the Army's Training and Doctrine Command (or TRADOC) approached Atari, expressing interest in having the company produce a modified, more realistic version of Battlezone that could be used as a trainer for the Bradley Infantry Fighting Vehicle, a new tanklike armored transport and battle unit that had been introduced just that year. It was the first potential government job that Atari had been offered; after all, it was a worldwide, youth-oriented consumer brand, then operating at the peak of a cutting-edge industry, not one of the stodgy military contracting firms of the mainframe era. The olive-green uniforms of TRADOC's generals must have seemed like an unlikely match for the polo-shirt, jeans, and tennis-shoe scene of Atari's offices. At many other technology companies, a potentially lucrative defense contract would be met with enthusiasm. But at Atari, where many still held to the countercultural hacker ethic of the sixties and seventies, the prospect caused rifts between programmers and management.

Today, video games are produced on the collaborative model of Hollywood filmmaking, with

numerous teams of individuals working together to create a single game. But in i98i, the situation was far more auteurist: commercial games were typically the creation of a lone programmer, or maybe a team of two or three, although the game's initial concept might have been hashed out in a larger brainstorming session. In Battlezone's case, the auteur in question was hotshot designer Ed Rotberg, who was not happy about the idea of his innovative arcade hit becoming a military application. "I didn't think it was a business that we should be getting into," Rotberg later told games historian Steven L. Kent in The Ultimate Hietory of Video Gamee. "You've got to remember what things were like in the late 1970s, and where those of us who were in the business came from-our cultural background. There were any number of jobs to be had by professional programmers in military industries or in military-related industries. Those of us who found our way to video games ... it was sort of a counter-culture thing. We didn't want anything to do with the military. I was doing games; I didn't want to train people to kill."

Nor did Rotberg want the baggage of government protocols and regulations entangling the California-style programmers' paradise atmosphere of Atari's heyday. He recalls that his protests led to a shouting match with his division's president, in front of some of Atari's highest-level executives. Nevertheless, the company remained adamant about going through with producing a prototype for the Army. Subsequently, Rotberg insisted that if his game was going to be recoded to fit the Army's specifications, he himself would have to be the one to do it-even though the Army's timetable demanded that he complete what became known as Army Battlezone (sometimes remembered as Military Battlezone or simply the Bradley Trainer) in a mere three months. According to Rotberg, the Army hoped to introduce a working model of Army Battlezone at an upcoming international TRADOC conference, where it would be publicized by a global satellite broadcast. "Since Battlezone was my baby, and it was Battlezone that they wanted to convert, and there was a deadline to get it done, I agreed to do the prototype," Rotberg remembers. However, he stipulated that his bosses "promise that I would have nothing to do with any future plans to do anything with the military. They gave that assurance to me, and I lost three months of my life working day and night and hardly ever seeing my wife." Soon after producing Army Battlezone, Rotberg left Atari and formed a new company with some other Atari alumni.

Modifying the coin-op Battlezone into an accurate training system proved to be an extensive job, involving numerous intricate alterations to both software and hardware. "First of all, we were not modeling some fantasy tank, we were modeling an infantry fighting vehicle that had a turret that could rotate independently of the tank," Rotberg told Kent. In Battlezone, the tank could only shoot in one direction: forward. In order to replicate the Bradley's true range, Army Battlezone needed to allow the player to aim within a much larger field of action. The game's new artillery were modeled on the actual weapons the Bradley carried, down to the number of rounds available before reloading. "It had a choice of guns to use," Rotberg recalls. "Instead of a gravity-free cannon, you had ballistics to configure. You had to have identifiable targets because they wanted to train gunners to recognize the difference between friendly and enemy vehicles. So, there were a whole slew of different types of enemy vehicles and friendly vehicles that had to be drawn and modeled. Then we had to model the physics of the different kinds of weapons." The opposing forces' tanks were designed to reflect the characteristics of Soviet-made tanks of the time. In the original game, flying saucers occasionally buzzed into the frame and could be shot down. These were replaced with Soviet helicopters. Also added were U.S. and NATO tanks; prospective gunners had to learn to tell the difference between allies and enemies, avoiding friendly fire.

Army Battlezone also departed from the two-joystick console of the original. Replacing the arcade controllers, Rotberg and his team installed a strange H-shaped "yolk" controller that looked like a stripped-down steering wheel, modeled to replicate the actual controls of a Bradley in miniature, as well as a series of switches and buttons to control range, choose weapons systems, and other functions-a far more complicated arrangement that anything found at the local pizza parlor. Though the gaming public would never have a chance to shoot down the Soviet menace in Army Battlezone, its unique controller did make its way out into the market. During Rotberg's final days, he worked on another first-person-perspective vector game, tentatively named Warp Speed, but left before completing it. Just around then, Atari finalized a deal to produce branded games with Lucasfilm, and so Warp Speed was finished as the 1983 arcade game Star Ware, using the Army Battlezone yolk controller. Little did young Star Wary fans know that as they zapped away at wire-framed TIE Fighters zooming past the Death Star, their hands were wrapped around a carefully constructed replica of a Bradley Infantry Vehicle's steering wheel.

What happened with the actual working models of Army Battlezone, however, remains something of a mystery; it appears Atari produced no more than a couple of prototypes, and there is no indication that the system was ever used for real training purposes. For decades, the fate of these few consoles remained legendary within the tiny world of arcade game collectors; despite the testimonies of Rotberg and others, some game buffs weren't convinced that the prototypes had ever been built, or had they been, speculated that they had been quickly dismantled.

One Army Battlezone console may have perhaps been in use as late as 1983, when a reporter from the ChrLi tian Science Monitor attended a conference for the Association of the U.S. Army in Washington, D.C., which included what the paper called an "arms bazaar" of over two hundred booths showcasing the latest wares of major defense contractors. "Nearby, a young civilian executive concentrated fiercely on Atari's Battlezone video game set up by one arms merchant," wrote the reporter, who was harshly critical of this convocation of Cold War capitalists; the youthful exec at the video game seemed to sum up his sentiments. "Somehow, as one surveyed this essence of national security at its most commercial," the reporter continued, "the words of Herman Melville came to mind: `All wars are boyish, and are fought by boys.' "

However, in 2002, an arcade video game collector named Scott Evans obtained one of the original Army Battlezone sets, and posted images of it on his Web site, Atari Games Museum (atarigames.com). According to the photos, it looks like a typical Battlezone console, complete with porthole-style viewer and colorful cabinet side-art depicting orange, purple, and blue stars streaking upward against a cartoon tank. A forward-facing panel of buttons, switches, and the Bradley yolk, however, had replaced its joystick shelf. Above the screen, its marquee title sign had been altered: where it usually reads BATTLEZONE, the horizontal display instead says BRADLEY TRAINER, in militarystyle block lettering above the cartoon of a shooting tank. An anonymous ex-employee of Atari e-mailed Evans about his find. "I am really curious where you got it," he writes. "As far as anyone knows (or is willing to admit) there were only two made. One went to a conference at Ft. Eustice [the Virginia site of TRADOC's Training Support Center] and was never seen again. The other is in my old boss's barn."

Pushbutton Warfare

By the early ig8os, video games had been around for over a decade, and had never strayed too far from the world of defense technologists. What, then, did the Army hope to achieve from Army Battlezone? According to Rotberg, its addictive game play was a major factor: valuable training could be embedded into a pleasant pastime that might actually encourage soldiers to hone their skills on their own. "The idea was that such a simulator could be made into a game that would encourage the soldiers to use it," Rotberg told an interviewer in the mid-nineties. "They would learn not only the basic operation of the IFV [Infantry Fighting Vehicle] technology, but would also learn to distinguish between the friendly and enemy vehicle silhouettes."

"The idea is to take an existing game system or `device,'-I don't like the word `game'-modify it as a modern weapons system and build necessary skills into the device," TRADOC project manager Capt. Steven J. Cox told the Philadelphia Inquirer in 1982. "If the trainee fires just as well on the real tank as he did on the device, then we've acquired a device that produces the same result as training on the tank for considerably less cost," a device that could successfully "test psychomotor skills" before the student had even stepped inside a real tank.

General Donn A. Starry, TRADOC's commanding general in the early eighties, oversaw the Atari collaboration. A general who led combat operations in Vietnam and Korea, Starry headed TRADOC from 1977 to 1981, and in later years helped draft the plans for Operation Desert Storm. While at TRADOC, he perceived a need for new methods of training that were more in step with experiences of soldiers who had grown up in an electronic age. "They've learned to learn in a different world," he stated in a lecture at TRADOC's 1981 commander's conference, "a world of television, electronic toys and games, computers and a host of other electronic devices. They belong to a TV and technology generation. In an era that has seen such fantastic technological achievements, how is it that our soldiers are still sitting in classrooms, still listening to lectures, still depending on books and other paper reading materials, when possibly new and better means for training have been available for many years?" (In addition, Starry may have seen at least some of this electronic generation learning from computers via ARPAnet and the PLATO Network, both of which could be found at military educational facilities at the time.)

If Starry's ideas sound more like Marshall McLuhan than Douglas MacArthur, then keep in mind a speculation made by the former thinker. The Canadian critic argued in Understanding Media: The Extensions of Man that while gunpowder had been known about for centuries, the notion that the substance could be used to propel a missile through space toward a target only came about once artists had mastered linear perspective in painting. McLuhan's claim is in fact historically false-firearms existed at least a century before the early i5oos, when Filippo Brunelleschi rediscovered the lost classical system of creating the illusion of depth through compositional lines that converge in a vanishing point-but his larger message remains relevant. For although the Army Battlezone project would never see full fruition, the virtual 3-D space opened up by Rotberg's Battlezone sparked a few military minds at TRADOC to imagine a new kind of learning for battle. As in McLuhan's technofable, an artful representation influenced the art of real war.

Some game histories have speculated that the Army intended to get around normal procural protocols by purchasing Army Battlezone units from Atari not officially as training systems, but as just another time-killing distraction for Army commissaries, thus sneaking a bit of valuable education into the soldiers' recreation time. While this rumor remains unverifiable, a profile of

early eighties training systems in the magazine Army mentions that "the Army plans both formal and informal use of specially programmed arcade-type games," further reporting that the Army's Armor School at Fort Knox, Kentucky, "plans to furnish day rooms and other off-duty gathering spots on the post with arcade games based on M6o and Mi tank trainers to provide amusements that will have practical value and stimulate competition in basic gunnery and command skills."

For Starry, Army Battlezone might have also pointed the way to the future of Army recruiting. After all, if operating a tank were really so much like playing a video game, then the malls of America were filled with prospective enlistees. "All of the people in those arcades are volunteers," said Starry. "In fact, they are paying for the use of the machines, and two-thirds of these games are military in nature-aircraft versus air defense, tank against antitank and so forth."

Starry's estimation of how many arcade games circa ig8i were military-themed is a bit high-players at that time were more likely to be jamming through the fantasy worlds of Centipede, Frogger, or Donkey Kong. Nevertheless, there were indeed a significant number of titles that enacted military scenarios, even if they were typically packaged within a science-fictional context. Researchers at TRADOC's Training Support Center in Eustis, Virginia, thought that more than a few of these had a potential for real defense training applications. In 1981, TRADOC told Army that they had conducted a wide-ranging study of the arcade game scene and concluded, "many of the popular arcade games already have features that would be useful for training purposes."

According to TRADOC, many of the same games that had been designed for the primary purpose of extracting quarters from teenagers' pockets held within them an unrealized potential for educating future generations of American soldiers. Red Baron, for example, was another first-person vector game that had been developed by Atari programmers, designed to run on Battlezone's hardware. According to Army's report, this game, which placed the player in the cockpit of a WWI dog-fighting biwing plane, might have "something for helicopter gunners," while Atari's legendary Missile Command "has controls very similar to the Army's forward-area alerting radar (FAAR), the warning set for low-altitude air-defense systems." Another game that the article refers to as Ambush might "be used to teach junior noncommissioned officers squad tactics." (The writer may be referring to either the arcade game M-79 Ambu.eh or the home console game Armor Ambush, both 2-D, third-person tank shooters.)

Imagine the strangeness of the scenario: TRADOC's generals trolling through the local arcades, clipboards in hand, peering over the shoulders of teenagers in order to observe the finer points of the latest joystick shoot-'em-up. But would that really have been so unusual? As video game history shows, the direct ancestors of these bleeping eighties playthings had emerged from a mainframed world whose existence directly depended on America's Cold War military needs. Even if games had been invented as a side effect of military research, it took barely a decade for them to end up back at the home base, so to speak. Army Battlezone was only one instance of this interplay between the zones of fun and war; as a pilot program, it presaged many ideas about integrating video games into soldier training that would take hold in the 199os with newer, more flexible technologies.

Quarter Masters

General Starry's offhand depiction of arcade games as overwhelmingly war-themed may have been debatable, but was, in fact, in line with a growing popular sentiment-among concerned parents, at least-that the games were unnecessarily violent, even militaristic. As video games became fixtures in living rooms around the world, and children absconded to local arcades with rolls of quarters in hand, the first wave of nowfamiliar anti-video game backlash emerged. Frequent newspaper editorials of the time express such fears from parents' groups, and in 1985, media scholar Terri Toles ventured into a local arcade to see for herself. Though probably situated to Starry's political left, Toles nevertheless shares the general's outlook in her report "Video Games and Military Ideology."

"The connection is apparent to observers who merely walk into an arcade," Toles writes. "Glancing at the names of the gamesnames like Mi.s.sile Command, Battlezone and Space War- and the drawings of swooping fighter planes, imposing tanks and colorful explosions painted on the machines seem to prove the point. When the observer turns to see who challenges 'Is there no warrior mightier than I?' in cultured tones only to discover that the voice emanates from a machine, her suspicions are confirmed. It's not even necessary to be near an arcade to uncover the trend. Merely reading newspaper articles about video games introduces one to the worlds of 'electronic sadism,' 'martial space arts,' and 'space soldiers' that populate the arcades."

Though perhaps not as flashy as their futuristic fantasy counterparts, real soldiers were to be found at some of these game parlors. Military recruiters began visiting arcades in search of fresh enlistees; a handful of newspaper articles from the time testify that Army, Navy, and Marine recruiters all claimed to target video game players, either as official policy or otherwise. A 1982 article from the Philadelphia Inquirer introduces us to one Marine recruiter who frequented the teen hangouts of Woodbury, New Jersey.

> Like a hunter .stalking deer in a thicket of wood.s, John Fisher entered the pinball arcade at the Deptford Mall. His ,epit-shined black shoes were as quiet as cat.' pawn as he weaved his way through a maze of video warriors, their lightning fast teenage fingers zapping horde of apace invaders and homicidal robots with pulsating laser beams. Dressed in neatly pressed, buff colored khakis, Fisher watched the action in silence, while the youngsters tested their reflexes. When there was a lull in the action, or when a youth ran out of quarters, he would move with the grace and swiftness of a matador. With an engaging smile and an open right hand, Fieher would introduce himself.• "Hi. I'm US Marine Sgt. David Fisher. If you have a few minutes, Id like to tell you some of the things the Marine Corps can offer a young man like yourself."

Another article from the same paper profiled Chief Petty Officer Julia Reed, the Navy's 1981 recruiter of the year, who was based in California. "When they play those games, they are thinking of defense and challenge," Reed claimed. "It's really no different than war. I hate to put it that way, but it's true.... A lot of these kids are technologically oriented, and a lot of them join up because they know the way of the world now is not a master's degree but solid training in data processing."

"I get to the arcade about 4 in the afternoon, warm up and watch them play," Reed told the reporter. "Then, maybe I'll play a game with them, and buy'em a Coke. If I'm winning the sales job, I don't win at the game. If they're being a jerk and I can win, I try to overcome them. When

we talk, I try to do 'blueprinting': find out what they are doing, what they'd like to do ... then ask them about the Navy and whether they've ever thought about sonar or radar. Sixty percent of them will take a test. Overall, they scored a lot higher than others."

In interviews, the recruiters cited the parallels between playing video games and operating weapons systems as prime reasons to target joystick warriors. "The multi-directional locater ball on the Missile Command game is pretty close to the system I use for air defense," an anonymous Navy weapons specialist told the same reporter. "You have enemy aircraft defined on the screen by radar. You have your sight as an electronic cursor directed by the ball. You push a button, the missiles fire, and `poof' no more aircraft."

Vincent Mosco's Pushbutton Fantasies, a 1982 academic study of the social impact of emerging video technologies, offered an account of arcade recruitment from a young gamer's perspective. The statement is attributed to one of Mosco's own undergraduate students, who was evidently a bit of an arcade whiz.

> Last year I worked in a pinball arcade. As an attendant I had access to all the free pinball, in my case video games, I could play. Soon, with my combined previous skills and added accelerated skilLe, I have become an expert player. A.e a result, I have been approached on at least twoseparate occaAionA by military personnel giving meseriouA pitches to join the Armed Forces. My best offer came from a Major General while I was on vacation in Florida. He waA Ao astounded by my play on the [Aic] Missile Command that he offered to perAonally see that I would by-pass all the time-conAuming preliminarieA, Auch aA boot camp, and insignificant, low-paying assignments, and start at a highly-Akilled, high-paying job in ballistics. I was Akep- tical so I questioned hiA presence in the arcade, but he produced proper identification and explained that he regularly brought his grandchildren to play.

The dream of joystick jockeys becoming real warriors bubbled up into pop culture. No less an authority on i98os adolescent entertainment than Steven Spielberg deployed this notion in his preface to Amis's Invasion of the Space InvaderA. "The aliens have landed, and the world will never be the same again," the mogul-auteur writes. "You've got to believe it-there's a war on, and the strange thing about this war is if you should once make the mistake of volunteering, you'll find active service hopelessly habit-forming."

This fantasy of a secret, permeable membrane between warthemed video games and real war can also be seen in the 1983 thriller WarGameA, in which a nerdy-cool young hacker taps into the Pentagon's missile command system via his home PC; thinking he has merely uncovered a mother lode of cool military-themed games, he starts playing one called "Global Thermonuclear War" and thereby unwittingly initiates a simulated attack, nearly triggering World War III.

A kiddie sci-fi movie from 1985, The Laet Starfighter, bears a related premise. Alex, a young arcade hotshot who lives in a California trailer park, is visited by an emissary from another planet, who abducts him to help an alien race battle their enemies in deep space. Turns out that the teen's favorite game was actually placed on Earth to train potential star fighter pilots; the aliens had been tipped off to Alex's skills by monitoring his high scores. Soon Alex finds himself zapping a very real collection of space invaders. Though it boasted some of the earliest uses of

CGI in its battle sequences, The Laet Starfighter remains a hokey Star Ware derivative, hitching its fortune on the video game gimmick; but like some of the more famous teen comedies of the era, it poses Alex's challenge as an opportunity for selfrealization. In ads for The Lant Starfighter, Alex appears on the side of an empty highway at night, the road disappearing on the horizon behind him. "He didn't find his dreams," the film's tagline reads. "His dreams found him."

Graphic War

TRACOC's souped-up Atari shooter has survived in gamer lore as an oddity; many remember it as a dead-end project whose legacy, at best, involves serving as an unwitting ancestor to contemporary military video games like Americae Army. But in fact, the story of the Battlezone Bradley trainer is hardly singular. Ed Rotberg's hesitations notwithstanding, the video game industry from its very beginnings had never been fully discrete from the activities of military-sponsored computer research. And even if Army Battlezone never saw full fruition, it existed as part of a larger post-Vietnam shift within the U.S. military that emphasized a greater investment in peacetime training, especially via simulation. The confluence of these tendencies would reach new levels of activity in the 199os, as technological and commercial advancements in computing brought the U.S. and the world into the throes of what publicists trumpeted as the digital revolution. What had been sporadic, even chance interactions between military research and popular videogaming would strengthen substantially in a conscious effort to bring these two very different realms together for mutual benefit.

For many years generals had used games as tools for strategy, leadership skills building, and the analysis of past battles; but large-scale games could also be useful for training troops. As their ancestors had done with the tiny blue and red armies of kriegspeil, generals divided up their own soldiers into similarly named teams, set them into some artificial environment, and had them engage in mock battle, as if ordered into elaborate matches of human chess. In the early years of World War II, for example, a soldier in training before shipping off to Europe may have felt slightly ridiculous when he found himself brandishing a wooden gun and storming a supply truck that had been cheaply costumed with a canvas-and-frame to resemble a German tank. For most of the history of warfare, however, these kinds of educational theatrics were relatively rare. Until the late nineteenth century, conventional military wisdom held that the only real classroom for a soldier was the live battlefield. The graduates of this deadly academy would be graded as much by fate as prowess; war was the ultimate immersive learning experience.

But in the early years of the twentieth century, a new idea began to emerge, better suited for the age of mechanized warfare. It was the notion that a lone soldier might learn by interfacing with a solo game or personalized electronic contrivance rather than a set of other soldiers; for the first time, a combatant's relationship to his machine might prove as crucial as his relationship to his fellow soldiers. The advent of the airplane-whose speedy militarization became widely known via the celebrated World War I dogfights of Eddie Rickenbacker and the Red Baron-brought with it a unique training problem: how could aerial pilots be taught quickly and efficiently without risking their lives? In 1934, for example, almost a dozen Army Air Corps pilots perished in crashes during a single week of training. The reason: the Air Corps (the ancestor of the modern Air Force) taught its pilots to fly by watching the ground, and that particular week had brought a bout of cloudy, visionlimiting weather. In response, the Air Corps

contracted Edwin Link, an aeronautics aficionado and inventor, who had constructed a novel means of teaching pilots how to fly not by orienting themselves to the ground, but instead by learning to interface intuitively with the airplane's control panels.

The son of a piano and organ manufacturer, Edwin Link grew up during aviation's pioneering days. Passionate about flight but unable to afford full flying lessons, the young Link practiced with a friend's airplane by taxiing it on the runway, trying to get a feel for its controls with his hands and feet until the system became second nature. Like other types of hacking, it was an activity that must have seemed obsessive, if not slightly pathetic, to outside observers. But it was during these faux forays that Link came upon the idea for a device called the "aviation trainer," which he soon constructed. Made of blue-painted wood, the aviation trainer looked like a miniature hobbyhorse airplane with a wingspan of twelve feet, mounted on a short, squat pedestal. The prospective pilot sat in its almost full-sized cockpit, which held a complete and realistic set of controls.

When operated like a real airplane, the "blue box" trainer's internal system of electrically powered vacuum pumps and bellows-jerry-rigged out of the guts of musical instruments from his father's Link Piano and Organ Company-moved the device around to simulate an airplane's pitch and roll. It was not essentially new-simpler models had been used as early as World War I-but it was the first to take into account the rapidly increasingly complexity of the modern airplane's controls, and the first to teach prospective pilots the skills to "fly blind," or operate the plane primarily through interacting and responding to the airplane itself, rather than orienting one's self with the land and sky. In a crude but effective manner, the Link trainer was also the first step toward training through a virtual environment.

Link's device caught on slowly. In the early 193os, he operated a successful Link Flying School in upstate New York, but after the Depression depleted his business, the blue box found a new role as a mere midway attraction at Coney Island's amusement park. It wouldn't remain a kiddie ride for long. Following the Air Corps' training disaster of 1934-and a virtuoso stunt by Link, who flew to meet them without incident through what seemed to be an impossibly blinding storm, according to his company's official historythe Army ordered six of Link's trainers for $3,500 apiece. Other requisitions soon followed, from both commercial and military sources. During World War II, Link Aviation Devices Inc. supplied blue boxes to every aviation facility operated by U.S. and Allied forces. Link's company reportedly produced over io,ooo trainers during the war years, pumping out one blue box every 45 seconds. Today, Link Simulation & Training exists as a division of L3 Communications, a major aerospace, surveillance, and communications contractor to the Pentagon, Department of Homeland Security, national intelligence agencies, and other entities.

After World War II and the birth of the modern computer, what would become known as "simulation training" would serve a growing role in American military culture, and consequently became an increasingly lucrative business for high-tech contracting firms. Certain elements of the wartime economy became persistent business during the Cold War; as the emphasis switched from the engagement in active warfare to the cultivation of potential power-both through the arms race and the maintenance of gigantic, combat-ready standing armiestraining took on a new prominence, especially since a dizzying array of new weapons systems required rapid reeducation, even if few of these nifty killing machines would never see battle.

The push to computerize simulation training came quickly. While World War II raged on, the Navy approached MIT about using computers to build a more adaptable version of the Link trainer. The idea became Project Whirlwind, and its goal was to create a computerized control panel screen that responded instantaneously to the pilot's input. Unlike the Link trainer, the Whirlwind trainer would be able to be reprogrammed to adapt to any number of different airplane configurations. But once MIT's researchers got deep into the project, the Whirlwind computer they created evolved far beyond its original purpose as a flight simulator. In the process, MIT's engineers ended up inventing most of the components of digital technology-including the display screen, the light gun, networking, the transmission of data over phone lines, magnetic core memory, and numerous other components-and the project soon morphed into an even more ambitious attempt to create a global missile-defense system, code-named SAGE. The first real-time digital flight simulator would not be realized until the i96os, with the advent of the Link Mark I computer, designed for this purpose.

In the subsequent decades, computerized training simulations proliferated through all ranks and branches of the military. The earliest, like flight simulators, were best suited to train for the operation of tanks and submarines-systems that already included a mediated interface with the outside world in their actual functioning. But as audiovisual technologies developed, a growing multitude of electronic devices were introduced for military training purposes, educating soldiers in everything from firing missiles to wiring electrical panels: the interactive, high-tech descendants of WWII instructional films. Videogame pioneer Ralph Baer, for example, developed a groundbreaking series of interactive video systems at Sanders Associates that used interactive videotape and, later, videodisc, to train soldier rifle marksmanship, antitank artillery, and even automotive repair, all employing a regular commercial television set as monitor.

Until the i98os, these simulators were almost exclusively stand-alone systems, created to teach specific tasks and specific systems. And they were expensive. In the late 1970s, a single cutting-edge flight simulator could cost as much as $35 million, and a tank simulator $i8 million. In some cases, simulators could cost more than twice as much as weapons systems they were simulating. As a result of this research, the Department of Defense was the largest underwriter of the development of computer graphics technologies until the 199os.

Consensual Hallucination

The descendants of the Link trainers-up to and including the Army Battlezone project-had a significant shortcoming: Hollywood conventions notwithstanding, wars aren't fought by lone tank gunners or pilots flying solo. They're won by armiesgroups of individuals working together in a complex network of protocols and decision-making. While early simulators might have helped strengthen the man-machine interface, they didn't do much in the way of teaching the crucial man-to-man interface of real combat. Sure, group interactions might have been relatively easy to teach in the days of foot soldiers, but in an age of mechanized infantry and air assaults, doing so became nearly impossible; the only adequate means of training seemed to be actual warfare.

In 1983, Major Jack Thorpe began thinking about how to create a simulator that allowed individual trainees to work together inside a shared virtual environment. Thorpe had proposed a similar idea back in 1978, when he was developing flight simulator technology with the Air

Force. At the time, such a system seemed prohibitively expensive, and would probably have required an impossible amount of computing power for the necessary graphic generation. But now Thorpe was working at DARPA, and the quickly growing ARPAnet seemed to hold a solution. Why couldn't it be built as a distributed network, like ARPAnet then, or the Internet today? In this model, the intensive data processing would take place at each users' end, in individual consoles that would produce an image of that trainee's "perspective" within a common imaginary space, rather than emanating from a single massive central computer. Thorpe called the project SIMNET, for simulation network.

Working models were hashed out in the i98os, and SIMNET became fully operational in 19go. DARPA supplied 238 network simulator units to the Army. By then, SIMNET could handle hundreds of individual users at once, all operating in a real-time share environment, each representing any number of different vehicle types. "William Gibson didn't invent cyberspace," Wired magazine wrote in 1997, "Air Force Captain lack Thorpe did."

The Army put SIMNET to use as the Close Combat Tactical Trainer (CCTT). From the outside, the CCTT resembles a series of large grayish-green fiberglass boxes, as featureless as sensory deprivation chambers. Inside, each is an elaborate life-size mock-up of the interior of a fighting vehicle-an Abrams tank, maybe a Bradley or even a Humvee-whose "windows" are screens looking on to the SIMNET world. Adding to the claustrophobia of the unit's tiny interior is a series of sound effects to enhance the realism of the training: the faked noises of engines, guns, tank treads, or turrets rotating. The total experience can be intense enough to engender "simulation sickness" in newbies-a nauseating variant of sea- or airsickness, caused when the brain becomes confused over what's really happening versus what's being simulated.

Some sources have suggested that SIMNET was influenced by the Army Battlezone project, even though the date of Thorpe's original Air Force proposal predates this. Whether PLATO Panzer or the networked games of the PLATO network in general inspired Thorpe is unknown. Undoubtedly, the concept of a shared virtual world was one that emerged in multiple ways in the 197os and 8os. William Gibson's Neuromancer imagined a sustained, 3-D world in 1985 (famously written on a manual typewriter) and, as Wired notes, introduced the word cyberspace into the lexicon.

But another science-fiction novel of the 198os became even more influential to the military's simulation visionaries, many of whom today cite it as an important inspiration. Orson Scott Card's 1985 Enders Game posits a future Earth endangered by invasion by an insectoid alien race, the Buggers. In order to develop a strong class of warriors, the government sends its best and brightest children into space for battle training, which takes the form of video games, both two-dimensional and holographic, as well as laser-tag style low-gravity faux-death matches. The protagonist, Ender, proves to be a minimaster at these games, and rises ever higher within the ranks of this complex academy, taking on increasingly elaborate simulations and tougher training regimens as he ascends. Eventually, after an enormously trying computer-generated battle, Ender discovers the secret of the system in which he has flourished. The most recent games were not simulations at all: he was in remote control of real battalions of warships. Without realizing it, he had destroyed the entire race of Buggers and saved the earth.

Doom Generation

Back in the world of commercial video games, things had been changing, too. The rapid rise of personal computing and the development of CD-ROM storage brought PC games to a new level of popularity and design sophistication. Of course, games had always been an element of personal computing from its earliest days in the 1970s, when primitive versions of chess and Minesweeper were imported from ARPAnet and PLATO. But now a slew of more advanced titles were developed specifically for use on desktops and laptops. With PC games, the first-person shooter came home.

The genre's groundbreaker was Wolfenstein 3D, a 1994 military fantasy that popularized the first-person shooter, thereby providing a structure for video games that continues to dominate today and has pushed the form ever closer to the visual complexities of cinema. The WolfenAtein franchise was not new; the first in the series, a 2-D adventure game called Caetle Wolfenetein, had been released in 1981 for the Apple 11, and was written by Silas Warner, who had created key games on the PLATO network, and was followed up in 1984 by Beyond Caetle Wolfenstein. Though popular in their day, these fairly simplistic affairs couldn't touch the impact of their 1994 grandchild, Wolfenstein 3D, created by id Software.

Like Battlezone a decade earlier, Wolfenstein 3D gives the player the same perspective as the game's protagonist. In this case, though, the hero is not an anonymous tank gunner, but American World War II seargeant William "B. J." Blazkowicz, who must escape from the eponymous Nazi-infested stronghold, whose structure resembles a better-rendered the high-walled labyrinths of Mazewar. Several Wolfen-etein 3D innovations have become conventions of first-person shooters today: the placement of the protagonist's gun or weapon in the bottom center of the frame; the use of the "heads-up display," a kind of console panel set apart from the 3-D virtual world of the game, indicating life force, score, and other data (a concept, not incidentally, borrowed from flight and tank simulators); the inclusion of "medical kits" that can be picked up to renew Blazkowicz's life; and the progression of increasingly powerful opponents on new levels, each culminating with a particularly tough "boss" (on the final level, Adolf Hitler himself).

In keeping with the graphics capabilities of 1994, the Nazis of Wolfen,etein 3D are literally cartoon baddies, 2-D figures in a simple 3-D architecture, with the short, chunky bodies and large heads of anime characters. There is something both creepy and funny about seeing the perpetrators of the Holocaust reduced to icons of near-cuteness: the walls of the castle are decorated with pokey bitmapped paintings of swastikas and eagles; attacking German shepherds seem almost cuddly; and Hitler appears outfitted with a comic-book-worthy robotic attack suit. (Fanciful or no, the use of Nazi symbols and the real Nazi Party's anthemic HorAt Weehel Leid as theme music resulted in the German government banning the game within its borders.)

Though popular, Wolfen.stein 3D only paved the way for id's watershed 1993 title Doom, which brought the first-person shooter to a new level of complexity and popularity. In Doom, the player takes the role of a lone "Space Marine" exploring human outposts on Mars after they have been taken over by demonic alien creatures. The earliest versions of Doom may seem graphically crude today, but they were revolutionary advancements over their predecessors. The architecture of the Mars outpost is rendered through better texture mapping, and the first-person perspective moves fluidly through its environment (even if opponents sometimes appear as 2-D figures, like trompe l'oeil cardboard cutouts). More powerful than this graphic sophistication is the player's

ability to freely explore the spaces inside the game. Finish killing off the hissing demons and flying skulls, and your Space Marine can simply poke around the dungeons, trudge through underground rivers, and look around for previously unseen elements. In fact, "secret areas" hidden in each level encourage the player to do so. In this sense, the world of Doom allows for nearly as much freedom to explore as Grand Theft Auto or Halo today.

Mod World

Another innovative aspect of Doom was that it was released via an internet-savvy approach, long before such techniques became the norm. Samples of the game were posted online for free; once players got a taste, they could purchase the full version to access all of the game's levels. As new versions of Doom were created, id distributed the original version of Doom free online, and made the unprecedented move of releasing its source code for free, allowing players to tinker with the game as they saw fit. At the encouragement of Doom's publishers, players soon took advantage of the game's modifiable nature.

Within a couple of years, there were thousands of WAD files (so called for their unique ".wad" file extensions), many of which remain available today online. While most were simply added homemade, harder levels, some went farther to customize the look and content of the game, its architecture and characters. The cultural references embalmed in these homemade environments remain frozen in mid-nineties pop culture. You can download and play a Batman-themed Doom, or, of course, a Star Trek- or Star Ware-themed Doom. Or you can download a WAD that transforms the giant killer flesh-lumps into that jovial purple dinosaur Barney. There are Simpsons themes, Army of Darkne,e.e themes, and Pulp Fiction themes. There are even triple-X themes that switched out the normal walls for crude, pixelly hard core porn loops. Young guns could blast away bad guys with a rifle while wallpapers of porn stars undulated behind his kill. Experienced today, these porn DoomA feel like morbid folk art, depicting an ultimate death-fuck journey into the id.

Even creepier are the student-made mods that replaced Doom's Martian outposts with accurate layouts of real schools and universities. Curious garners can still point their browsers to the archives on doomworld.com, and download decade-old WADS that allow the player to decimate demons while wandering through the medieval colleges at Cambridge and Oxford. Or they could slaughter the denizens of certain obscure high schools: Unionville High School, outside of Toronto, remains available, as does Yarmouth High School of Yarmouth, Maine, whose programmer's commentary claims it is based on "original blueprints" of his school. The more technically minded may wish to "frag" demons while patrolling the virtual grounds of the Center for the Study of Optics and Lasers at the University of Central Florida, or the Engineering campus at Purdue University.

Doom's literally visceral quality, its splatterpunk gore, contributed greatly to the powerful effects of the game. Shoot an opponent, and a gush of red spray blossoms out from his chest. Corpses accumulate on floors in crimson heaps. If a fallen alien happens to land inside a door's frame, the portal closes with a disgusting equieh. One particularly nasty monster looks like a giant lumbering lump of naked pink flesh, and requires numerous shotgun blasts to exterminate. With all these bleeding bodies, the Doom series is a particularly morbid enterprise.

In a blunt sense, Doom is about a brutal mastery over flesh; the gamer, whose muscles atrophied slowly as he sat near motionless at his PC for hours on end, became a disembodied gun, floating through tombs and destroying every warm body encountered. Film critic Andre Bazin once noted that death is but the victory of time, but Doom makes time malleable. So this highly addictive game was not just about killing time; it also felt like it killed death, at least momentarily. It was about stopping the flow of time, shutting out the rest of the world, in order to become enmeshed in the eternal, adrenaline-pumping Now of constant warfare. The death of enemies affirms one's own continued existence; even if defeated, the game can always start again.

In her 1965 essay "The Imagination of Disaster," Susan Sontag writes that atomic age sci-fi movies like Godzilla and Thin Leland Earth provide "the immediate representation of the extraordinary: physical deformity and mutation, missile and rocket combat, toppling skyscrapers" and thereby invite viewers to "participate in the fantasy of living through one's death and more, the death of cities, the destruction of humanity itself." Thinking of Doom, it would be easy to argue that Sontag's observations are even truer for first-person video games. For here one may live through the fantasy of one's own death over and over again. Science fiction films attempt to absorb the viewer through a sense of awe-even if it is through the flawed sublime of giant monsters and otherworldly visitors. Doom does the same through firstperson immersion, putting you in the action. The first time you find that seemingly unstoppable demon, you must experience death by its attack several times before you can determine how to survive. Each time you die, your character lets out a gurgled scream, and his point of view drops quickly to the ground.

Or maybe, Charles Bernstein suggests, "the death wish played out in these games is not a simulation at all." In "Play It Again Pac-Man," his prescient pre-Doom essay from 1991, Bernstein offers, "maybe it's time that's being killed or absorbed-real-life productive time that could be better 'spent' elsewhere." While killing time, the player feels active: moving through corridors, exploring buildings, destroying enemies. But much of these actions are in fact reactions, and in a larger sense, the player is being trained according to a larger narrative already determined by the game's programming. It feels like free play, but the story cannot change; in fact, the game trains you to desire its rewards, to move up its levels, to find its treasures. Your character's self-actualization is contingent on your abilities to obey the directives of the game, and in a larger sense, to complete the program's circuit, to satisfy its algorithms. It is a bondage that feels like freedom; you must get with the program to survive.

The game's designers couldn't have chosen a better name: "doom" is a bone-chilling Anglo-Saxon word that in its very pronunciation recalls the clanging of a death knell. It's a very old word, stretching back well before A.D. 1000; originally meaning an act of legal decree or pronouncement, it took on more ominous eschatological connotations of divine reckoning and inescapable fate as the centuries progressed. "Doomsday," for example, began as the earthy English term for the Day of Judgment; Doom arrived in an era that many saw as no less apocalyptic, as J. C. Herz notes in her 1997 pop-Kulturschrift Joystick Nation. "Even the word 'doom' is resonant," she writes, "Especially when you factor in all the scary technology lurking around the late twentieth century and the threat of rogue dictatorships blowing up Seattle with surplus Soviet nukes. In Doom, you get to resolve that sense of moral decay, political instability, and technophobia. You get to be global supercop, Blade Runner, and Oral Roberts, all rolled into

one."

"You, and only you, are the hero," Herz writes. "No teamwork, no delegation, no profit sharing ... We in America like this." And if Doom fans took on a role very much like the one-man vigilante badasses who busted their way through innumerable eighties action flicks, they were spurred on by an enemy that deserved certain death. Like the terrorists, Nazis, and KGB agents of other games and films, the alien enemies of Doom are incontrovertibly extermination-worthy, freeing the trigger-puller from any moral compunction. "You get to visit a place where there is no way to humanize the enemy because the enemy is, by definition, Evil," she offers. "Not just bad. Not misunderstood. Not the victim of childhood abuse, ethnic discrimination, faulty antidepressants, or low self-esteem ... We all crave the perfect enemy. Political leaders employ squads of propagandists to create these monsters-the Evil Empire, Manuel Noriega, al-Qaddafi, Saddam Hussein-so that we can fly over and stomp on them. The makers of Doom understand how deeply satisfying this concept can be."

The perfect enemy is a component of the perfect war, or the Just War, the moral ideal that Herz alludes to in her litany of America's foreign bugaboos. The fact is that Doom and virtually a I I of its progeny fall into step with this framework, issuing forth an endless stream of zombies, robots, aliens, Nazis, robotic zombies, zombie aliens, and robot Nazis as oozing, creeping targets for righteous destruction. A few video games have played with reversing this notion, putting the player in the role of the bad guy. In Exidy's visually primitive 2-D arcade game from 1976 called Death Race (inspired by the premise of Roger Corman's 1975 exploitation classic Death Race 2000), players earned points by running over little stick-figure people; even though the company claimed the victims were supposed to be "ghouls," the game cause, the first widespread public outcry against violence in video games. (Interestingly, Atari during this same period is said to have had an explicit policy that none of their games would include the destruction of recognizably human characters.) More recently, Bungie's highly narrative first-person shooter Halo 2 (2005) takes a surprising turn midway, when suddenly the gamer is playing missions from the perspective of one of Halo's main enemy race, the reptilian Covenant.

But Doom wasn't just about the lone hero, even if this is how many gamers experienced its play. In fact, one of its most notable features was the option for networking; up to four individuals could join forces, over a local area network or the higherspeed Internet connections available at colleges and institutions at the time, and blast the demonic forces using teamwork: the roots of the wildly popular practice of online gaming, via PC and console, available today. To win the game, players could think like police or soldiers, coordinating their efforts in ways that increased enemy death counts.

No wonder, then, that in 1997, a few Marines began to take Doom very seriously.

The Few, the Proud, the Networked

A decade after Battlezone, General Starry's vision of deploying video games proved remarkably prescient, if a little too ahead of its time; in the early 198os, building thousands of stand-up arcade systems would have been exorbitantly expensive, even if they ran off of Atari's preexisting technology. Though theoretically cheaper than conventional trainers, Army Battlezone stand-ups would have still cost around $5oo,ooo each.

With the fall of Soviet communism and the abrupt end of the Cold War, the Pentagon began to rethink the massive spending on essentially in-house technology development that it had pursued since the beginnings of World War II. New directives in the early 199os stressed the need to run a more economically efficient military, a military that was run more along the lines of standard business practices, rather than the old reliance on Pentagon largess. Laws were passed that made it easier for private companies to sell supplies and goods to the military, encouraged competition for bidding, and reassigned lowest priority to programs unique to any one service branch. A more fiscally accountable military had all the more reason to interface with a global corporate culture.

But the PC revolution offered some new opportunities for drastic cost reduction. Heretofore, military computer simulations employed for training were expensive, relatively clunky affairs, whose programming focused primarily on reproducing pinpoint fidelity to realistic situations. An Mi tank trainer in the early eighties, for example, as produced by Chrysler or General Electric, would have run $6 to $7 million per unit. Running exclusively on high-priced, specialized graphics workstations, these ponderous tools were developed either in-house or by specialized military contracting firms. SIMNET came with a lower per-unit price tag-around $ioo,ooo for each subsystem-but by the time that thousands of SIMNET trainers were in place, the whole program ran up to $85o million.

Another shortcoming with early military simulation was their lack of user-friendly engagement and "playability." In a nutshell: they were no fun, and this shortcoming was seen as inhibiting their training potential, particularly for a new generation who grew up with joysticks and controllers firmly in hand.

In the early nineties, the Marine Corps Modeling and Simulation Management Office had been given a new budgetary directive from the annual Marine Corps General Officers Symposium: find ways to use commercial, off-the-shelf software for internal training purposes. Never the most lavishly funded of America's Armed Forces, the Marines had a long tradition of making do with little, and the U.S. military in general had been attempting to move toward more streamlined fiscal models. Marine Corps commandant Gen. Charles Krulak saw this fiscal necessity could be dovetailed with an increased emphasis on critical thinking that he saw as the future of the corps. Krulak wanted to "reach the stage where Marines come to work and spend part of each day talking about warfighting: learning to think, making decisions, and being exposed to tactical and operational issues," and he foresaw PC-based solutions for this goal. "The use of technological innovations," he wrote, "such as personal computer (PC)-based wargames, provide great potential for Marines to develop decision making skills."

The men at MCMSMO hit software stores and developed a study called the Personal Computer Based WargameA Catalog, which analyzed and reviewed over thirty military-themed strategy PC titles like Operation Crusader, Patriot, Harpoon II, and Tigers on the Prowl for usability as training systems. "The intent of this effort," they wrote in the Catalog, "was to examine the available wargames that are on the market and determine if any have the potential to teach a better appreciation for the art and science of war straight out of the box, with no modifications required." These Aemper fi tech-heads, however, found that nearly all these titles held scant value for their purposes. Though popular in military and gaming circles at the time, these PC battlers were little more than electronically enhanced versions of old tabletop war

games. Operation Cruaeader, for example, employed kriegspeil-style hexagonal maps; Harpoon II updated the idea with late-twentieth-century radar displays that were nonetheless just as abstract. At best, these were games suited for learning command-level strategy or air defense, not the leatherneck-with-a-rifle warfare that is the Marines' forte. They were pastimes best suited for armchair generals and History Channel aficionados, not real-life Marines who needed practice working together, at ground level, on the battlefields of the future. "No wargame," the Catalog reports, "was capable of producing a robust simulated combat environment."

But one title in the Wargames Catalog proved fruitful. In 1997, Lieutenants Dan Snyder and Scott Barnett took advantage of Doom Ifs modding capabilities to produce a new WAD with the needs of the Marines in mind. Doom's world was stripped down and streamlined. The labyrinthine Martian dungeons were transformed into a sparse, dust-colored plain punctuated by small brick bunkers, foxholes, and barbed-wire barriers. Gone were the otherworldly aliens and demons, replaced by very human-looking opposing forces, clad in simple khaki military uniforms of a vaguely Communist/Nazi cut (according to technology historian Tim Lenoir, Marine Doom's enemies were fashioned from scans of GI Joe action figures). The players' artillery choice was reduced to realistic weaponry (out with the electric plasma guns, in with the M-16 Al assault rifle, the M-249 squad automatic weapon, and M-67 fragmentations grenades); liferefreshing power-ups disappeared. With lower life levels and no chance to raise them, the player died quickly, after only a couple of hits. Thus was born Marine Doom (also known as Marine Corps Doom or simply MCDoom). It was Army Battlezone for the PC generation, a boots-on-the-ground combat simulator.

With Marine Doom, two pairs of Marines could engage in networked play in order to practice teamwork operations as a standard four-man fire team. Marine Doom didn't train for marksmanship; it trained for cooperation. The teams could set up fields of fire, conduct flanking maneuvers, and enact "leapfrog tactics" in which some team members pin down an enemy with gunfire while others advance ahead. "While weapons behavior is not extremely accurate," Marine Doom's Web site read, "sound tactical employment of these models should give the desired effect." Old-style simulators had cost hundreds of thousands of dollars to do similar things: Marine Doom cost a mere $4995 for the original game, which was then altered with Snyder and Barnett's marinel.wad freeware file. The Marine Doom WAD was soon trading furiously through numerous Doom-dedicated BBSes and online forums, and quickly became in turn cannibalized for the fantastical WADs of other modders.

In early 1997, official word about Marine Doom went out in the January 27th ALMAR, a newswire sent by the commandant to all Marines worldwide, along with news that jarheads would soon be permitted to play the game on government computers, as long as they adhered to copyright restrictions. "As programs are developed, I challenge you to seek opportunities to include an element of stress," General Krulak recommended. "Decisions made in war must frequently be made under physical and emotional stress. Our mental exercises in peacetime should replicate some of the same conditions. Leaders can generate stress by placing time limits on decisions, by conducting games immediately following a strenuous PT session or forced march, or requiring decisions during a period of sleep deprivation."

For a brief moment, the Marine Doom teams were tech-world rock stars. Marine Doom racked up scads of attention, both within the military, where it was seen as an intriguing innovation, and

in the mainstream press, who saw in it the seeds of some cyberpunked future. Wired Magazine gave the mod its April 1997 cover, with a headline that read "Doom Goes to War: the Marines are looking for a few good games," over an image of the scowling face of Doom's Space Marine, clad in twentiethcentury brown camo helmet. But despite the hype and rockbottom cost, Marine Doom was never an official part of training, and was never implemented on a widespread basis; its developers eventually left active duty to pursue commercial software jobs. Snyder, for example, worked as a consultant on GT Interac- tive's 1998 game Nam, a Vietnam War-themed shooter that boasted realistic weaponry.

More importantly, Marine Doom signaled a new interest in the use of commercial games for official military training. A couple of years later, Spectrum Holobyte (best known for importing Tetri..e to the U.S.) modified the PC game Falcon 4.0, a networked flight simulator, for use in training real F-15 pilots. The U.S. Naval Academy shanghaied Electronic Art's Jane:e Fleet Command for training purposes; the game was developed by Sonalysts, who in turn have a long history of military commissions, and needed no modification for the Navy's purposes. In later years, Novalogic modified Delta Force 2 to train for the Army's Land Warrior system, the Navy taught a modified version of Micro.eoft Flight Simulator, and Ubisoft worked with the Army to redesign Tom Clancy;e Rainbow Six: Rogue Spear for urban combat training.

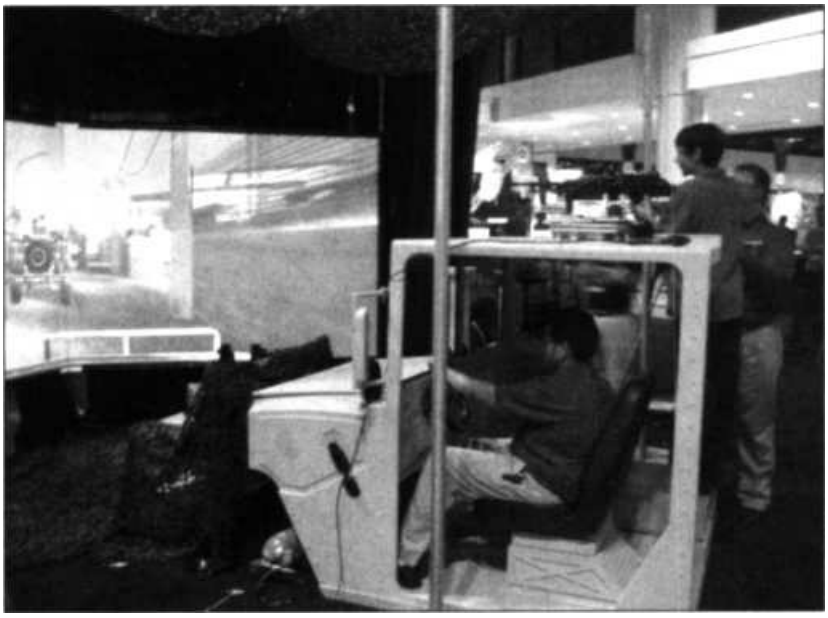
Mak Technologies, a defense contracted software film founded by former SIMNET designers, specialized in desktopbased simulation trainers, producing two games for the Marines that were also released commercially: Spearhead, a multiplayer tank sim, and Marine Expeditionary Unit Woo, a strategy title. MEU2000 "isn't about influencing young people's view of the military, but it can be helpful to people who want to learn more about the military," the game's lead designer, Patrick Brennan, told Gaming NewA Network in 1998. "We have discussed the recruiting and public relations potential of a game like MEU2000 with the Marines."

In 2000, the Joint Chiefs of Staff commissioned Rival Interactive to create a game called Joint Force Employment, a turnbased strategy game to simulate how officers might react to a terrorist crisis. Its title references the modern military concept of "jointness," or cooperation across all military branches. A year later, Rival released the game to the public in two parts, Real War and Real War: Rogue State.i. In the game, players battle a fictitious group called the Independence Liberation Army, a terrorist outfit who has obtained weapons of mass destruction. Its distributor, Simon & Schuster, attempted to drum up sales after the advent of September iith; free giveaways with the game included a copy of Sun Tzu's The Art of War and cell phone ringtones that bleeped "America the Beautiful." "It's a very pro-American game that shows how powerful the U.S. military is," a Simon & Schuster Interactive spokesman told the Hollywood Reporter. "And it's cathartic to blow up terrorists."

Trashed by gaming reviewers as clunky and outdated, the Real War series bombed. But by the time the War on Terror rolled around, both the military and the commercial sector were working on much bigger projects together.

An early game of war from ancient Egypt. Illustration by James Fotopoulos, adapted from a satirical papyrus, from iioo B.c., now held at the British Museum.

Korean Minister of War Yun-Woong-Niel plays a game of Go in this image from a 1904 stereogram by Underwood & Underwood. (Courtesy of Library of Congress Prints and Photographs Division)



At 1/ITSEC 2004 in Orlando: America:e Army adapted for use as a convoy trainer.

I/ITSEC attendees try the latest urban combat simulator from Dynamic Animation Systems, designed with a Middle Eastern theme.

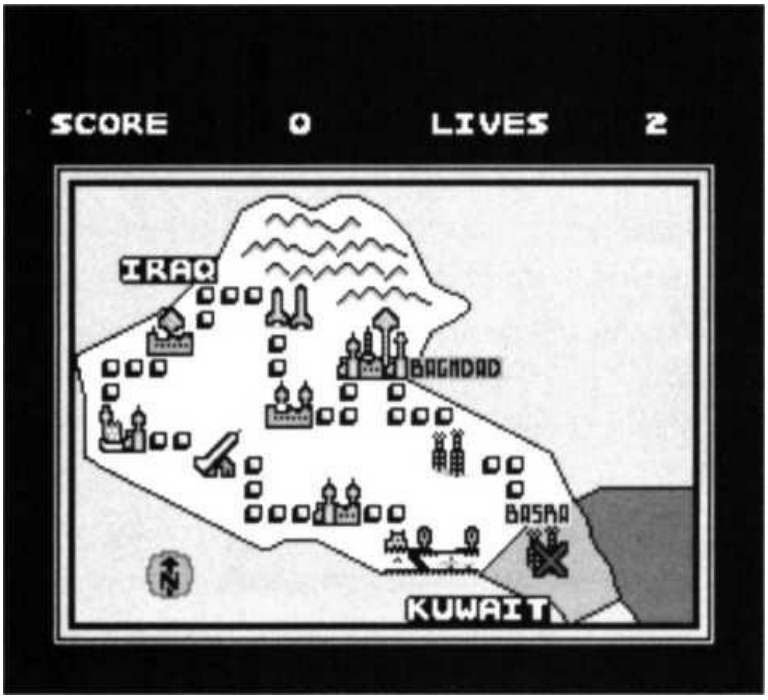
Dynamic Animation Systems decorated its "I/ITSEC booth" with this illustration: a melding of game-style graphics and War on Terror bravado.

Virtual Iraq, seen in a Flatworld prototype at the Institute for Creative Technologies, USC.

Recreating realistic natural radiance in Paul Debevec's workshop at ICT.

Another Flatworld prototype, this one viewable in 3-D when seen through polarized lenses.

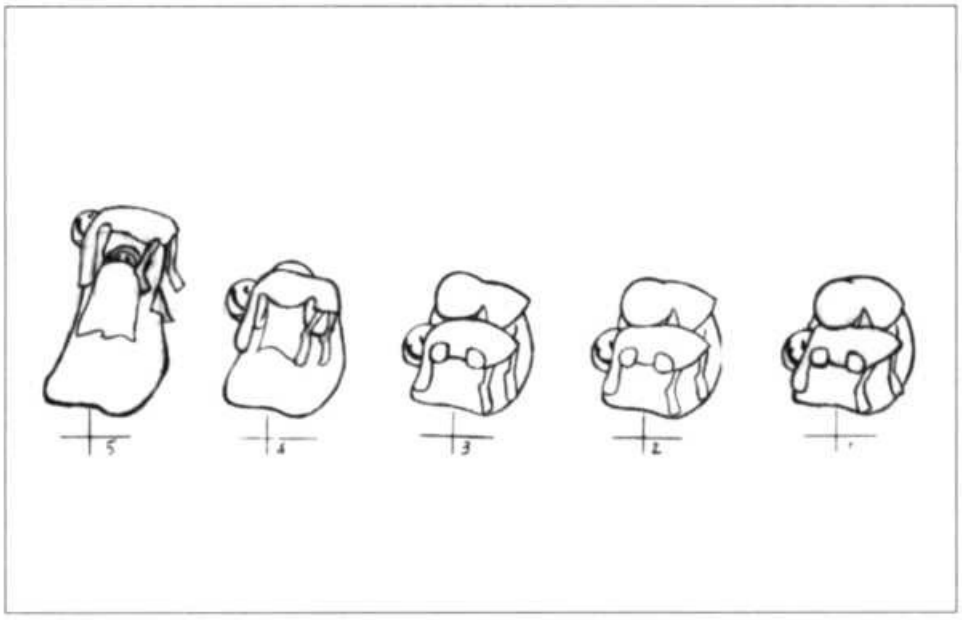
Two screenshots from Operation Secret Storm (1991), created for the NES by Color Dreams. It was one of the earliest video games to depict a contemporary war. (Courtesy of Vance Kozik, StarDot Technologies)



History as battleground: box cover art for Conflict: Deeert Storm (2oo2) and Vietcong: Purple Haze (2004). (Courtesy of Take-TWo Interactive Software)

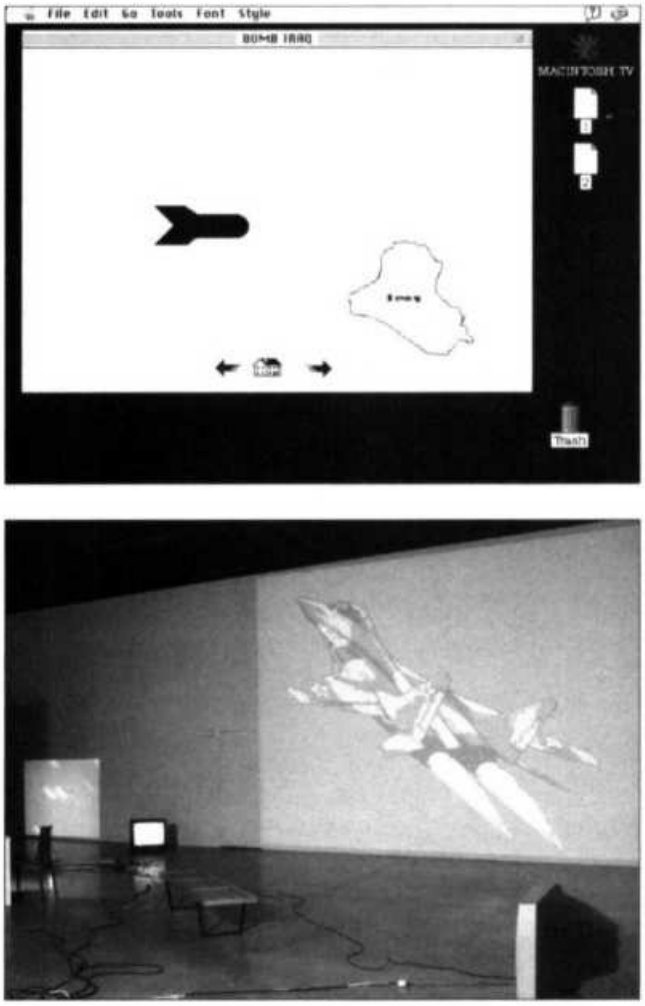
Cheapo Chinese handheld Laden ve. USA (2001), released weeks after September iith. (Photo by James Fotopoulos)

An Arab perspective: poster for UnderSiege (2oo5). (Courtesy of Radwan Kasmiya, Afkarmedia)



Animation sketch for a mourning villager in September 12th, a toy world (2003). (Courtesy of Gonzalo Frasca, Newsgaming.com)

The website for Jason Huddy's game Blood of Bin Laden (2003). (Courtesy of Jason Huddy)



Two artworks by Cory Arcangel from 2006: Bomb Iraq and MiG-29 fighter and cloud., installed at PaceWildenstein Gallery, New York City. (Courtesy of PaceWildenstein Gallery)

PART FOUR

THE DREAM WAR

LINKING ENTERTAINMENT AND DEFENSE

> And for pleasure, there was the simulator, the most perfect video game that he had ever played. Teachers and students trained him, step by step, in its use. At first, not knowing the awesome power of the game, he had played only at the tactical level, controlling a single fighter in continuous maneuvers to find and destroy an enemy.... It was exhilarating at last to have such control over the battle, to be able to see every point of it.
>
> -Orson Scott Card, Ender's Game, 1985

> Virtual reality opens new spaces for exploration, colonization, and exploitation, returning to a mythic time when there were worlds without limits and resources beyond imagining.
>
> -Henry Jenkins, "Nintendo and New World Travel Writing," 1995

In late March 2003, Fox News anchor Brit Hume interviewed Secretary of State Colin Powell, less than a week into the U.S. invasion of Iraq. The national mood was queasy. The tense lead-up to the invasion had threaded through the color-coded emergencies, duct tape mania, global

protests, and terroristproduced video messages that comprised the year and a half of events since the destruction of the World Trade Center. Already fine-tuned into both a barometer and instrument of the national anxiety, television dove into the Iraq war with immersive twenty-four-hour coverage; the pyrotechnic bom- bastics of shock-and-awe quickly switched to the thickly pix- eled mobile cameras of embedded reporters, providing unprecedented real-time visions of battle that were both chillingly immediate and strangely unreal, like Webcams peeping into an outer circle of Hell. Now, accounts of troop deaths and American POWs began to punctuate press reports, the stock market descended, and even conservative news outlets began speculating whether America's strategy might have been deficient.

Hume asked Powell to take the pulse of the moment. "Well Brit," he replied, "people have to understand that this isn't a video game. It's a war. A real war."

In its very offhandedness, Powell's comment pointed to how commonplace the comparison of modern warfare to video games had become. Whether consciously or not, he echoed his former commander, General Norman Schwarzkopf, who had made a similar statement more than a decade earlier, during the first Gulf War. In a press conference in Riyadh, Saudi Arabia, on February 28, i99i, Schwarzkopf reminded the press corps that "the kind of thing that's going on out on that battlefield right now is not a Nintendo game. It is a tough battlefield where people are risking their lives at all times, and great heroes out there, and we ought to all be very, very proud of them."

From its beginnings, the Gulf War had been dubbed "the first Nintendo War" by the media, and Schwarzkopf wished to disabuse them of such notions. Nevertheless, the metaphor proved incredibly sticky-so much so that, years later, many seemed to think that Schwarzkopf himself had coined the phrase. It was a perfect expression for a war that appeared on television screens as night raids resembling the z-D light blips of Arkanoid or Tetrie, and fought through an increased array of electronic interfaces. It was a war that touted the so-called "surgical strike," enabled by superior American technological know-how.

"For a generation of soldiers, sailors and fliers raised in the era of the computer chip," the Boston Globe wrote in January i99i, "this has been their kind of war: the Nintendo War. Indeed, many of the screens that military operators use to launch weapons and spy on air traffic look eerily like something plucked from a video arcade." The Globe writer invokes the image of the video arcade, not the more domesticated home computer. Even as late as the early nineties, the popular vision of the arcade remained that of a seedy, violent, and immature realm of games like Street Fighter II and Mortal Kombat. In the public imagination -and in run-down areas of recession-era cities nationwide-the arcade remained an overly testosteroned, juvie-populated zone of cheap cologne, gang fashions, and sketchy dudes selling butterfly knives to middle-school roughnecks. Eerie indeed.

From Schwarzkopf's to Powell's war in Iraq, Americans became acquainted with a far greater array of digital technologies-not just the rise of the Internet and the spread of increasingly powerful home computers, but also several generations of video game console systems, each more powerful than its predecessor. Game graphics fleshed out from boxy diagrams to rounded bodies; 2-D scrolling adventures gave way to first-person wanderings through unpredictable landscapes. Even the presentation of television news became more an Internetish, gamelike info-

panel. What were all those creeping news items, stock tickers, and information geegaws that began to crowd the screens of CNN and Fox News but a kind of heads-up display for the state of the world, keeping tabs on the global equivalents of energy, ammo, lives and the score? "Any time death is imminent, life is exciting," Andy Rooney kvetched to his fellow predigital geriatrics on the March 30, 2003, edition of 6o Minutee (and unwittingly evoked the thrill of games like Doom and Halo) "and we're watching this war as though it was a video game. On television, it's hard to know where to look to find out what you want to know. There are pictures on top of pictures, moving print on top of those. There's more than the eye can see, or the brain comprehend."

But though generals and pundits may wish draw lines in the sand between warfare and video games, a closer look at developments in the world of military technology for training and recruitment in the last five years reveals a very different relationship. As the digitization of war evolved along with the new media boom, its interfaces and visual logic became increasingly homologous to what civilians might find on their PC or Xbox. Simulation has become big business, and the worlds of entertainment and defense have entered a new era of synergy. Early one-off efforts like Army Battlezone and Marine Doom blossomed into full-blown collaborations among game companies, Hollywood, and military contractors.

Press Start to Continue

In one corner of a football-field-sized convention floor crammed with corporate display booths, representatives from VirTra Systems stand at the entranceway to their company's exhibition tent. Different videotaped military and security training scenarios play inside, unfolding within a virtual environment formed by a series of synchronous, interactive projections covering five walls of the hexagonal structure. The stories' images, for the most part, aren't computer-generated. They contain real actors, recorded on low-budget sets or outdoor locations, the no-name types one might see in a corporate training video, complete with costumes and ersatz facial hair. A rep walks to the center of the near-circle of giant video images, clutching a realistic-looking laser pistol, as one of several preprogrammed narratives begins: An Al Qaeda terrorist has taken an American engineer hostage, and the rep needs to shoot the bearded villain down as soon as a pair of doors fly open on one of the video screens. The rep's laser pistol fires loudly, but misses its mark, hitting instead a pack of explosives strapped to the terrorist's chest. The walls glow with a fiery, CGI blast-the mechanized floor, in fact, vibrates like an enormous video game controller-and the scenario ends. The whole event has taken less than two and a half seconds. The other rep turns to the name-tagged conventioneers clustered around the tent's opening. "See, this is what our military and law enforcement have to deal with on a daily basis," he declares.

"Now, you can also use this to enhance the experience," the VirTra rep continues, fastening a thick, black device around his waist. The "threat-fire belt," he explains, issues a stunning electric shock to the trainee if he or she is "hit" by the imaginary bullet of a virtual assailant, who might appear anywhere on the semicircular screen. "If you get hit in the back, trust me, you'll remember it. This one will bring you to your knees. The whole idea is to fight through the pain, and keep on going, just the way that you've been trained." Enveloped inside massive video screens and booming surround sound, the trainee is placed within the story in a viscerally literal way. If implemented, perhaps VirTra's pain trainer will precipitate a new medical condition: pre

traumatic stress disorder, arriving before the war fighter even hits the battlefield.

Later, another participant-this time, a college-age National Guardsman in uniform-dons the threat-fire belt and enters a different scenario. He plays the role of a police officer who has stopped a drunk driver. Onscreen, an actor playing the driver exits her car, staggering and jabbering slurred nonsense, then begins fumbling through her handbag, muttering about looking for her license. "Ma'am, put your hands up. Put your hands where I can see 'em!" the soldier orders the video image sternly, "Ma'am, I will use lethal force!" The woman stumbles to the left of her car, gesticulating and protesting her innocence, and the soldier in turn keeps his weapon aimed at her image. Suddenly, a loud, cracking BANG issues from the soldier's right: an armed man had appeared without warning outside of the soldier's line of vision, and shot him. The soldier grabs the threat-fire belt around his waist as it zaps his body with an extremely real shock. "I think it's a little bit better to feel a little bit of pain when you get shot so you can learn from it and not want to get shot again," he says afterward, with a casual smile. "It's a little easy to be Rambo when it doesn't hurt."

VirTra was one of hundreds of private contractors and military agencies showing off the latest in media-based training systems at the December 2004 edition of I/ITSEC, the cumbersomely named Interservice/Industry Training, Simulation, and Education Conference held annually in Orlando, Florida. I/ITSEC exists to bring together the different branches of the U.S. military, related government agencies, private contractors, and academia to showcase new and future developments in simulation-based training-military lingo for the technologyenhanced, serious-minded make-believe that provides the cornerstone of modern preparation for battle. I/ITSEC began three decades ago, when simulation training meant mechanical airplane cockpit mock-ups with blinking electronic lights, or live play-acted war games of the red-versus-blue variety. Way back in the i98os, it introduced the first versions of SIMNET to the military-industrial community.

Such antique practices have now merged with cutting-edge developments from the worlds of science and entertainment. Today, attendees are more likely to engage with something along the lines of VirTra's immersive virtual theater: the souped-up, grown-up cousins of video games, tailor-made to teach the new media generation how to fight America's war on terror.

War on the Floor

At first glance, the convention floor seems like a dot-com era throwback. Elaborately decorated walk-through displays pack a hall the size of a football field, each stuffed with monitors, flyers, and logo-printed giveaway trinkets. Some bear familiar names-Saab, Boeing, Hewlett-Packard, Silicon Graphics. Sound tracks to corporate videos bleed into one another, punctuated by newscaster-cool voice-overs, corny synths, and adrenalinepumping guitar riffs. Many representatives wear matching team outfits: One group mingles in white lab coats; another in Red Sox jerseys, commemorating the team's recent World Series win. A smiling female booth staffer offers ice cream in exchange for dropping a business card in a fishbowl, as a polo-shirted man silently creeps by on a Segway scooter.

But it's 2004, not 2000, so the business at hand is fighting war and defending the homeland. Suits are as plentiful as desert camo; some displays are swathed in army-green netting. Near the

floor's entrance, a giant plasma screen shows a pilot's-eye view of a bombing run over a computer-generated desert landscape, where digital explosions blossom to the tune of Led Zeppelin's "Whole Lotta Love." In one booth, a female model marches in place, wearing a blue leotard covered with motiontracking white dots. Above her, a real-time computer-generated image of a male soldier follows the movements of her body.

A company called Dynamic Animation Systems shows off its urban-combat-themed marksmanship trainer prototype in six shooting-gallery style stalls equipped with video projectors. In each stall, men in suits or uniforms pick up laser rifles and blast away at CGIed Arab insurgents, who jump out from behind cars and rubble in a digital mock-up of an Iraqi city, complete with fading posters of Saddam Hussein on the sides of buildings. To the casual observer, the trainer's graphics would seem indistinguishable from those of the latest Iraq-themed game for Playstation or Xbox-and how cool would it be if home console systems came with full-size artillery? A woman in jeans and a pink shirt grabs a gun and starts picking off hooded villains with ruthless precision. "Oh man, she is cold!" laughs a soldier standing behind her.

A few paces away, a grinning man who could be Dick Cheney's stunt double-late-fiftyish, balding, dark-blue suit and tieperches atop a mock armored vehicle, inside another dome of video projections, machine-gunning down computer-generated terrorists as a barren, sand-colored landscape rolls around him. Smoke pours from his mounted gun, and real metal shells fall onto the carpeted floor. "They use real blanks instead of an air pump," explains a booth staffer, "so that he can get the full range of motion, and feel a realistic recoil." In a nearby display made to look like half of a two-story home, crafted from raw plywood, two teenagers sway silently in virtual-reality helmets, waving rifles. On the screens positioned above their heads, the crowd can see the fantasy environment the teens are patrolling inside their minds. Visitors pour out of an enclosed metal chamber, following a taste of patrolling the desert in a virtual Humvee; they smile and laugh, as if they've just gotten off a roller coaster.

To a blue-state civilian outsider, the scene might at first seem surreal-or, perhaps, all too real: the ultimate convergence of digital entertainment and the war on terror, a vision worthy of Paul Verhoeven or David Cronenberg, a dystopic sci-fi cliche come to life. And if the I/ITSEC conventioneers appeared unusually buoyant at a time when the ultimate outcome of war in Iraq remained uncertain, it may be because business was booming. An estimated 16 percent of the current U.S. defense spending goes toward training, and the dollar amount has escalated sharply since 9/11. In iooo, about $3 billion was spent annually on the MS&T (modeling, simulation, and training) industry; now, the figure is closer to $6 billion, thanks to increased demand from both domestic security and conflicts abroad. By all accounts, the U.S. armed forces today devote far more time, money, and research on soldier training than any other military in the world, and as a result, support a nexus of academic, corporate, and military interests collaboratively devoted to pushing new media technologies forward.

Military-industrial complex? The concept seems so quaintly Cold War, so hopelessly last century. Journalists and academics have bandied about a number of new catchphrases to describe the burgeoning world of simulation technologies. The most successful would be one coined by cyberpunk author Bruce Sterling in the early nineties: the "military-entertainment complex." Megatrende futurist John Naisbitt proposed "Military-Nintendo Complex" in his 1999 book High Tech, High Touch-despite the fact that Nintendo is probably the only game company that does

not seem to have ever been involved in military affairs; others have used "militainment" or "the military-industrial society." Certain leftist circles prefer political scientist James Der Derian's term: the "Military-Industrial-Media-Entertainment Network," or MIME-NET, expounded in his 2001 postmodernist road trip through this brave new military world, Virtuoue War. Therein, the author finds that his digestion of Continental philosophers like Paul Virilio, Guy Debord, and Jean Baudrillard seems to have especially prepared him to face the future shocks dealt by his visits to I/ITSEC and elsewhere. "I drew from some thinkers who well understood the seductive powers of simulations," Der Derian writes, "who consider hyperbole to be a pragmatic response to the hyperreal."

Indeed, I/ITSEC would be a perfect opportunity for any Europhile thinker who wished to mourn the collapse of the real and the simulated, and it offers numerous opportunities such a figure to opine on la folie americaine to boot. One company called Strategic Operations Tactical Training gave out DVDs to press while promoting their facilities: an eleven-acre outdoor film studio in San Diego, where they promise, as the company's Web site touts, "the `magic of Hollywood' to simulate a real world training environment for tomorrow's threat" and "the application of modern day movie making techniques combined with Simunition® to create a sense of realism for your training needs." Their DVD shows clips of bloody playacted battles performed in the California scrub: men and women dressed as Middle Eastern villagers run as U.S. troops and tribal gunmen clash amid the sounds of gunfire and explosions. In an episode focusing on "Combat Trauma Training," a mixture of hired actors and actual Marines can be seen in the footage; a number of freshly wounded troops lie on the ground, awaiting medical evacuation, their faces and leg stumps covered in fake blood and ash as they pretend to writhe in pain. Some of these wounded, the company's rep says, were real-life veterans who had lost legs in combat. Strategic Operations' press kit, emblazoned with HYPER-REALISTIC TRAINING in red military-stencil lettering, includes a testimonial from an unnamed Marine Corps battalion commander: "The wounds created by the make-up artists were so realistic," he states, "that one amputee role player, that was simulating having his leg blown off, was stuck with an IV by a corpsman who believed it to be a real injury caused by a training explosive gone awry."

Orlando Magic

The technologies that shape our culture have always been pushed forward by war: not just computers and video games, but cell-phones, transistors, microwave ovens, and even canned food all emerged from wartime research. In the long term, then, Orlando may be shaping our collective futures more than Hollywood or Silicon Valley. But what kind of future is it calling forth?

Drive through the city's superwide, highwaylike streets, crammed with gaudy, oversized buildings mostly thrown up in the last decades: an limitless sprawl of gigantic chain stores and minimally, everywhere lined by imported palm trees, all so sparkling new that they make California seem superannuated in comparison. Turn on the car radio, and the stations alternate between born-again Christian programming and dirty-South hip-hop, conservative talk radio and Latin pop. Then go back inside the gargantuan Orange County Convention Center, revisit I/ITSEC, and watch teenagers tear through imaginary bullets, firing machine guns at life-size and computer-generated Iraqis.

The conference's Orlando location bears significance. Defense and entertainment are among the most robust industries in Florida, which has seen significant economic growth in recent years, much of it centered around the state's "high-tech corridor" in central Florida, which includes the Army's office for Simulation, Training, and Instrumentation Command (known as PEO STRI, formerly STRICOM), the University of Central Florida's Institute for Simulation and Training, and Lockheed Martin Missiles and Fire Control, which employs more than 7,000 Floridians. Over a hundred firms are tenants at the Central Florida Research Park, the majority of them top military contractors like Anteon, Boeing, CAE Systems Flight & Simulation Training, Cubic Defense Systems, Excalibur Defense Systems, General Dynamics, L-3 Communications, Saab Training, Raytheon, Titan, Sonalysts, and United Defense, as well as individual training and simulation offices representing the Army, Navy, Air Force, and Marines. Not far afield are Walt Disney World, EPCOT, Sea World, and Universal Studios. It's no wonder that I/ITSEC attracted more than i,8oo representatives from over forty nations, eager to check up on what the world's most technology-heavy military was up to.

"The question is how to integrate Idefensel with the world of entertainment," former Disney animator Bob Allen told the Boeton Globe in 2003. Allen's production company, Integrity Arts & Technology, created a simulation trainer called Battle Station for the Navy; the concept reportedly emerged out of a meeting at Starbucks between a Navy reservist, Allen, and a Universal Studios exec. "There is an intuitive sense," Allen says, "that this will be the next big thing."

"Modeling, simulation, and training" is cited as one of the six target industries whose growth is supported and fostered by the Florida High Tech Corridor Council, a consortium of academic and governmental interests established in 1996. For example, one of the council's initiatives, the Modeling, Simulation, and Training techCAMP, brings in local middle and high school educators to inform them of the many Florida job opportunities available in the field, from defense to theme parks. Their visit includes tours of Universal Studios' Shrek, Jimmy Neutron, and Spiderman themed rides as well as a comprehensive overview of the military simulation sector. "I didn't realize how much engineering and technology was involved in the theme park industry," the council's April 2005 press release quotes a visiting high school teacher as purportedly saying. "And I didn't realize that Orlando was the center of simulation and in need of employees."

University of Central Florida professor Christopher Stapleton was on hand at I/ITSEC, representing his school's Media Convergence Laboratory. Located within UCF's Intitute for Simulation and Training, the Media Convergence Laboratory researches "new ways of making memories that will last a lifetime," according to its Web site; it's "about making creative leaps in experiential media innovation." In other words, it's a research lab for interactive virtual reality systems, the kind of immersive digital environments that not only draw elements from the technology of both video games and military simulation, but could be seen as the future of both forms.

Stapleton is a soft-voiced, wide-eyed man with a freckled face-not the type you might expect to run into at a hard-edged military conference. Before his position as director of the lab, his resume included stints producing entertainment, marketing, and educational technology for clients like Universal Studios, Nickelodeon, Disney, and Sanrio, the Japanese company known

worldwide as the purveyors of Hello Kitty. On the lab's Web site, scroll a cursor over his head shot, and it changes to a black-and-white photo of himself as a smiling boy. "Central Florida," he explains "is the world capital of experiential entertainment." Here, he continues, "you're going to find the best, most intensive entertainment that you experience in 3D. Reallife, real-time interactivity. The headquarters for the simulation research for Navy, Army, Marine Corps, and Air Force are here." From Stapleton's standpoint, events like 1/ITSEC are only the merest beginnings of the potential technological synergy that could be unleashed among these fields.

During and after World War II, the Pentagon funded research labs at MIT and Stanford; a new historical moment is visible in the underwriting of the Media Convergence Lab, whose partners range from PEO STRI, the Office of Naval Research, and the Naval Postgraduate School's MOVES Institute, to Universal Studios, Canon, and Nickelodeon. This melding of corporate, academic, and defense interests could be seen as one "convergence" of the lab's name; the other is the many forms of media and technology that come together to create the various forms of imaginary theater under construction. As a result, Stapleton has his digital fingers in any number of virtual pies. "We're doing experiential media with mixed reality for experiential movie trailers," Stapleton says. "We're working with marketing for car dealers. We're applying it to marketing and tourism. We just had a field test at the Orlando Science Center, where we had a dinosaur exhibit come to life with mixed reality and computer graphics and physical exhibits, with interactive games within the physical space with virtual content. So we're playing to the info-educational market, which is larger than the home game market."

Though diverse in scope, the Media Convergence Lab has an I/ITSEC presence because it's also deeply involved in military applications for simulation technology. One of its major projects, MR MOUT, explores ways to use "mixed reality" to train for MOUT, or Military Operations in Urban Terrain-the kind of fighting that American troops see in Baghdad, Falluja, or Kabul, a corollary to the age of asymmetrical warfare. "The future of war is going to be in urban terrain," Stapleton says. "With the superior military force of the US, I don't think any opposing force is going to go out in the field and start fighting us. They'd be dead. The only advantage they do have is in urban terrain, where it's very difficult to do the analysis process, because the American military approach to fighting is you want to minimize casualties, and maximize efficiency."

MR MOUT involves a combination of virtual realities and physical architecture. With tiny specialized VR headset in place, a trainer wanders through a theatrical set of imitation buildings whose doors and windows are blue screens. The helmet chromakeys three-dimensional images onto those blue spaces, creating the illusion of an environment beyond the set. To the outside observer, the soldier moving through MR MOUT looks like an actor in an American Playhouse rendition of Lawnmower Man. "With real and virtual reality intertwined, it becomes the closest thing we have to the concept of the holodeck," the Lab's MR MOUT Web site states, citing the virtual reality chamber seen in the series Star Trek: The Next Generation. "It is like a theme park on steroids."

Unlike the mythic MIT hackers of the i96os, Stapleton does not see the U.S. military as merely a ponderous source of funding, some kind of unwitting cash cow for subversive nerds with a yen for creative exploration at their employer's expense. Rather, he sees the military themselves as active partners and technological visionaries in their own right, at least in the field

of simulation. According to Stapleton, working with the military means being involved with the forefront of simulation technology, having access to projects far more advanced and forward-looking than anything happening in the pure entertainment sector. "I'm from the entertainment industry," Stapleton explains. "I spent twenty years doing Broadway, theme parks and so forth." And from his experience, Stapleton dismisses the popular notion that America's cutting-edge entertainment industry-whether Hollywood or the gaming worldrepresents the apex of experiential technologies. "I think the entertainment industry is the most reluctant adopter of innovation, and they are still conceptually in the dark ages."

Stapleton says he sometimes needs to explain this to military types, who go ga-ga over the exciting graphics produced by Microsoft, Sony, or any number of game developers. Commercial games, he says, are "really good at the visualization. So of course the military people come up to me and say, 'Oh the game industry, it looks so cool! Why does it look so cool?' And I ask them, how many artists do you hire? Because engineers and scientists have been developing military simulation, and the entertainment industry has been getting artists. On the same token, artists are hacking away, making it look beautiful, and it looks great and so forth, but what's under the hood is really what's going to matter in the future." Modern-day labs like Stapleton's seek to bring digital artists and war fighters together; it's the kind of high-paying synergy that art schools might not tell you about. While military technology may make simulations realistic, Stapleton says, it's the artists of the entertainment world who can make them compelling.

Even if Stapleton thinks military technology could learn from entertainment's visual whiz-bang, he argues that it's the entertainment side of things that's holding the technology back from its ultimate possibilities. Hollywood is only interested in the most superficial aspects of image generation, and the game industry, he says, "is not looking at is the real science and art beyond the obvious reactive, thumb-twitching kind of experience that has some kind of titillation to it. And so that's why I transferred from the entertainment industry into working with military research, because military are the people who are asking the tough questions, and the deep questions that will matter twenty, thirty years from now."

"The military," Stapleton stresses, "are actually the visionaries of experiential media."

All but War Is Simulation

Even if Stapleton's team is busy perfecting technologies of interest to both the Navy and Nickelodeon, it doesn't mean that the interactive trainers on view at I/ITSEC are mere super-sized playthings. At least that's the view of Michael Macedonia, the affable and boyish fortysomething technology officer of PEO STRI, the Army's Orlando-based office for Simulation, Training, and Instrumentation Command, who wants to stress that the large-scale shoot-'em-ups on display at I/ITSEC are definitely not just kids' toys. PEO STRI's promotional materials, distributed at the conference, display the office's name in futuristic, silver lettering, reminiscent of the title design for the Terminator films. The office's emblem is a round shield: green cartoon soldier's torso joined to a lightning bolt are set against a red, white, and blue target; underneath, a stylized laurel wreath bears the motto ALL BUT WAR IS SIMULATION.

Macedonia is obsessed with training through simulation; he is a man whose career is clearly his passion. "We used to say in the army, the only two things we do before war is we train and

maintain," he says. "When we go to war, we train and we fight. Essentially it never stops, it's like an endless cycle." PEO STRI's motto, he explains, "sort of sums up the philosophy ... Everything is preparation for war. Everything we do is practice for war-it's getting ready for combat. And until that point, it's all simulation; it's still an abstraction. Until you're in combat, it's all in your head. It's virtual. And the only real war is really what you experience in combat." The trick, then, is for training to approximate war as closely as possible: the ultimate goal must be perfect simulation, and therefore getting inside those soldiers' "heads" is key.

With a round, impish face and an ever-ready grin, Macedonia is a busy man not only at I/ITSEC; he often represents the Army at any number of conferences devoted to what academics and others are beginning to call "serious games"-the use of video games for education and training. Raised in a military family (his father, Ray Macedonia, was instrumental in reviving the use of war gaming at the Army War College in the i96os), Macedonia holds a Ph.D. in computer science. He is a Gulf War veteran and essentially a veteran of the War on Terror: he was inside the Pentagon on September 11, 2001, when terrorists killed 125 people by crashing American Airlines Flight 77 into the building. In conversation, he may quote Herbert Marcuse or Plato, or explain the moral significance of Pixar's animated film The /ncrediblee. He seems to gravitate toward movies that celebrate the national character. "I used to be the president of the film society at West Point," he says. "We had James Cagney come up, for Yankee Doodle Dandy. We had George C. Scott come up, for his role in Patton. We had a John Ford series. I learned so much about John Ford movies, and I learned that they're really about the Irish immigrant experience in America."

While espousing a cultivated love of art and entertainment, of culture both high and pop, Macedonia argues that military simulations and video games are essentially different. "First of all," he sound bites, "the object is not to entertain you, but to train you." He continues, "The reality is, if you really look at some of these things, they would actually be quite boring to your average game-player," noting that many simulations are created to train for unglamorous, mundane skills, like machine maintenance. "I've been in a lot of flight simulators, and the thing is you realize, they're just like the plane. And if you don't know how to fly, you're going to crash it. So it's not an amusement ride."

Macedonia brings up the case of Full Spectrum Warrior, a much-publicized video game developed by the Army with the help of a commercial gaming company. A popular, consumerfriendly version was released for Xbox in the summer of 2004, to critical acclaim and healthy sales. A related but different form is currently used as a console-based tactical trainer within the Army. "If you play the Army version-which is the only one that the Army endorses, by the way-it's actually very realistic, but it's really hard. People complain that they get killed in five minutes, and can't figure it out. Well that's because we're trying to get as realistic as possible. It's about training, and so it's about making it hard."

Such high-tech training, Macedonia contends, is part of the modern military's post-Vietnam paradigm. Before 1970, the U.S. Army "trained through blood," he says. "Technology for training was considered expensive. People were cheap. Essentially, we could draft them and send them over, and train them for six weeks, and send them into combat, and if they survived their first combat patrols, they were going to live for the rest of the year. That attitude changed dramatically with Vietnam. They got back and essentially said, no we're smarter than this, we're

not going to do this again. We're going to invest in the technology for training. And we're going to go with volunteers and not draft people against their will." A new emphasis on training, then, coincided with Westmoreland's vision of the electronic battlefield. Both ideas would ensure a military that would, in theory, yield fewer U.S. casualties, encourage a more dedicated force, and by extension, garner public support more easily.

But even if military simulation and commercial gaming are different species, Macedonia sees one important area of confluence. "Essentially entertainment and games, that is, entertainment and training have an intersection: it's about making memories. It's fascinating now what we're learning about the human brain." He cites the work of UC San Diego neurologist V. S. Ramachandran, the author of a book called PhantomA of the Brain, a rumination on how the mind functions through examining brain disorders. "One thing he says is that we are our memories," Macedonia says, grinning with the wide-eyed enthusiasm of an academic enamored by a beautiful idea. "And we don't think about that too often every day, but you see that evidence in Alzheimer's patients, in stroke patients. So a lot of what we're trying to do in training is creating memories. Memories that last forever."

There, Macedonia believes, lies the true overlap with entertainment, and art. "The ultimate artist," he continues, "is somebody who leaves you with a memory long after-'Rosebud' all that sort of stuff. V. S. Ramachandran says that we have this virtual reality program in our head. I thought that was interesting. In the training world, we try to create a virtual reality around the virtual reality program in our head. And I think in a sense is games try to do the same thing, not realizing it. It's not intentional. That is, we're trying to mess with that program a little bit, so you remember long afterward that experience. So that when you're confronted with it in combat, or some other particular situation, you recall that." He talks about the birth of literature as the beginnings of a new kind of memory. "You can almost say that the Greeks were the developers of simulation," says Macedonia. "The oral tradition of Homer and the story with the war of the Trojans," he says, could be seen as "an experience that was really passing down knowledge, and understanding of not only history, but war fighting."

Creating memoriee: an unintentionally disturbing phrase, reminiscent of the replicants in Ridley Scott's Blade Runner, who are androids fitted with manufactured recollections of childhoods they never had. Forget the deep consciousness of early-twentieth-century thinkers like Freud and Jung, who described a precious and mysterious Self that many still cling to today: training mavens like Macedonia and Stapleton favor a more contemporary, cognitive approach, one that sees consciousness as a result of complex, but ultimately tweakable, informatic systems. And indeed, the idea of the brain as a kind of reprogrammable computer-a philosophical conceit that stretches back at least as far as Norbert Weiner's cybernetic theory of the mid-twentieth century-provides the operative metaphor behind Macedonia's spiel. In that thumbnail vision of how the mind works is also a desire, a hope, that technology could create a form of education that direct, and that powerful, and that certain. In an era of mood-altering drugs and genetic exploration, it would seem like a perfectly rational notion.

The ultimate goal of simulation training, as Macedonia sees it, would be to create these perfect, false memories, manufactured moments of deja vu that would help the soldiers of the future. The need to train through battle would be lessened, because-not unlike Orson Scott Card's Ender-they would have been fighting near-real virtual battles for years. Macedonia likes to

illustrate this by recounting a scene from one of his favorite films, Patton.

In what Macedonia sees as the film's greatest scene, the general, en route to the battlefield, tells his driver to turn right. The driver says that's the wrong way. "Don't argue," George C. Scott commands, "I can smell a battlefield." Arriving at an empty spot, Patton makes a cryptic speech. "The battlefield was here," says Scott. "The Carthaginians defending the city were attacked by three Roman legions. They were brave, but they couldn't hold. They were massacred. Arab women stripped them of their tunics and their swords and lances. The soldiers lay naked in the sun, years ago. I was here." Macedonia recites these lines almost verbatim; he says he has seen the film "a thousand times over."

"We have a term in virtual reality research we call presence," Macedonia explains. It is a term describing a kind of ineffable sense of reality-not necessarily produced through visual fidelity, but from a gut feeling of being there. "You ever go to a foreign country and you get that sort of creepy feeling? Like, I'm in a different place, I know where I am but ... ? When Patton gave that speech, I got that sort of creepy feeling. Because what he was saying is, I know about this battle. He says, I was here. I fought this battle, I studied this battle. I know all about this. I read it in Latin, the stories of that battle.

"The thing is," Macedonia continues, "that's what we're trying to do with these soldiers with these training systems. When they go out there, they'll think, I was here. I've been here before. I know what I'm supposed to do. And that's the essence of it."

A cynic might say that Macedonia has a rather lofty metaphysical vision to describe training systems that teach soldiers to fire laser rifles at computer-generated Iraqis, or instruct them how to repair the engine of a Humvee. But that kind of rote response is not what he's talking about. It's about instilling patterns of actions, and making those patterns second nature. Anyone who has played video games for days on end can feel this happening-how not just button-moves and territory maps become internalized, but tactics, approaches, ways of thinking about a crisis.

Call it brain-hacking, or, the triumph of empiricism: all the inchoate, mysterious processes that ebb and flow within subjective experience can and should be understood as purely objective systems, mere nervous mechanics, and once understood, rebuilt as easily as a new microprocessor, reprogrammed like software. For all its logical gloss, it is a philosophy of mind that resonates with the superficial, gaudy, and cartoonish architecture of Orlando: it is about bringing everything to the surface, bringing everything under control, making everything familiar. Like the chain-mall architecture of central Florida, nothing will remain foreign, nothing new; everything will be known. It a perhaps unforeseen end product of cybernetic theory of the i96os, the same urge that drove the early utopian hackers at MIT and Stanford. The mind is one of the last American frontiers, and military thinkers are eager to scout out and claim a territory that the world of entertainment had almost stumbled upon. We've moved from geological frontiers to virtual ones. All that is complicated and messy will someday be made clean, orderly, and new. A brand-new super-sized subdivision where there once was nothing but swamp-or desert.

Targeting Terrorists

Macedonia's arguments notwithstanding, fun does seem to have its place in military simulation training, at least judging from some of the players at I/ITSEC.

Specialist Samuel England, a fresh-faced nineteen-year-old stationed at the National Training Center in Fort Irwin, California, came to the conference to showcase the Engagement Skills Trainer 2000, along with a handful of other servicemen and women who came to demonstrate the technology for attendees. England also appears in the EST 2000's video as an actor. Produced by Cubic Defense Applications for PEO STRI, the EST 2000 looks like a simpler, more portable version of the VirTra Systems trainer. It consists of a small theatrical staging area, here decorated with a little scrub and rubble for effect, and a single flat-screen projection that runs interactive movies meant to train for "shoot / don't shoot" decision-making, marksmanship, and collective squad tactics. In one of EST 2000's scenarios, a truck full of Arab male POWs drives through the desert, and then stops for a moment. A few of the prisoners suddenly grab guns and start shooting toward the screen-that is, toward the squad of trainees facing the screen. England and his fellow soldiers shoot back with realistic-looking light-gun rifles. Each accurate hit registers as a tiny, bright red dot.

"Making it was actually pretty fun, just like, I guess, any sort of Hollywood-style thing," England says, grinning. At 1/ITSEC, he and two other fellow soldiers shot at the EST 2000 video screen with mock rifles, trying to take down images of actors playing Iraqi insurgents. England explains that "the Iraqis are actually paid people from Titan," a major military contracting firm. "They actually get Iraqi civilians, ex-Iraqi police, and Iraqi military, and they move over to the States. They act in the films, and they work at NTC." (Although Titan reps were unavailable to confirm England's statement, representatives at the National Training Center said that if such a video were produced at NTC, then their on-site Iraqi employees would likely be involved.)

At the display for America'e Army-the highly publicized, globally popular online game developed as an Army recruitment tool-local teenagers scrambled to play with the America :a Army Vehicle Convoy Trainer, which looks like an armed, wheelless Humvee placed in front of an oversized video game screen, depicting yet another virtual Iraq filled with digital insurgents. Though Americae Army was originally developed as a recruitment aid, it was now being retooled into a training device as well, not only for the military, but also potentially for other agencies like the Secret Service. This means that, when implemented, a gamer could go from playing America'e Army at home, to signing up for the Army, and then train on the same familiar gaming platform. The game might have been "creating memories" for him long before he had even decided to sign up.

"Fun is central," says Colonel Casey Wardynski, originator and director of the America:& Army project who has become a familiar figure in the gaming world with America :& Army's success. "A `fun' training system means keeping soldiers engaged voluntarily. This situation makes for better training, and can even extend the training day into the barracks where soldiers could continue to train in their off-time."

Already, the game's official site, AmericasArmy.com, touts that two of the game's development teams, America's Army: Government Applications and America's Army: Future Applications, will feed tidbits of new innovations back onto the free game, to whet the appetites of its devoted online following. Preliminary materials tout the product as a good "return on

investment" for a game that initially cost $7.5 million to develop. "The country is at war and to the extent that Americas Army can play a larger role it should," Wardynski stated in a post-I/ITSEC e-mail interview. "For example, America's Army incorporates a fairly extensive set of game missions in which players learn and demonstrate their understanding of the ABCs of lifesaving. In the game, successful completion of these scenarios qualifies a player to serve as a medic. In real life, these missions convey baseline lifesaving skills that anyone who is a first responder could use to save a life. By putting this content into the game, players of Americas Army can obtain lifesaving skills to address trauma ranging from an accident to untoward terrorist activity."

"We know there is no silver bullet for homeland security," Wardynski writes. "In this case America's Army can serve two purposes for one taxpayer investment-communicate with young adults about soldiering and provide Americans with skills to address immediate consequences in a first responder situation." So instead of wasting time battling demons and aliens, kids might learn CPR for fun.

According to Wardynski, the drive to expand America'e Army came from requests from within different branches of defense and intelligence. "The decision to repurpose elements of the public version of America's Army was really demand-driven," Wardynski says. "Last year, the U.S. Secret Service expressed interest in working with Americas Army to improved virtual training afforded to their agents. Since that time we have delivered a variety of assets to the Secret Service for their virtual training environments. At the same time, agencies within the Army approached our team about using the game for a range of applications from cultural awareness and adaptive leadership training to virtual weapons system prototyping and training embedded in new weapons systems."

Wardynski cites several reasons why other organizations were looking to take on their own versions of Americas Army for training. First, he says, Americas Army is realistic and engaging. "This makes training fun," he says. The games team playing style is perfect for mission rehearsal. Most importantly, unlike trainers like the EST zooo, which rely on recorded scenarios, Americas Army can be used as a "virtual classroom," allowing players to practice responses to "new enemy tactics, techniques or procedures" inside the game, using their soldier avatars: in effect, a cheaper, more engaging SIMNET. "This can greatly reduce training costs, development risk, increase frequency of game updates and allow the game to be highly adaptive to human behavior since humans are driving the virtual interactions rather than relatively inflexible Al scripts," he says. Americas Army, then, could transform from a flashy recruitment tool into a kind of Sim National Training Center.

"It has the ability to overcome the limitations of the physical world," Wardynski says. "In the game environment, you can place a trainee in an infinite variety of situations from their physical setting, to weather and light conditions, level of complexity, level of chaos and then you can replay their performance or alter training conditions."

The fusion of playtime with wartime seems perfectly natural to some of the folks at I/ITSEC. Many of the participating companies play both side of the fence, to some extent: VirTra Systems makes both immersive training devices and theme park attractions, though the former have overtaken the latter in the past four years. "Education, entertainment, training-they're all the same

thing," argues Stapleton. "They're all in the same business of making memories for a lifetime. When you get down to that, it's not really about the technology as much as-even though it gives us more capabilities-it's about the impact it has on us."

Hooah for Hollywood

On the other side of the continent lies Marina Del Rey, a little seaside corner of Los Angeles County area that, like Orlando, has begun replacing its outlying, unkempt natural landscape with rows of boxy new condominiums, clustered between the shore and the highway. It's best known for its man-made, 6,ooo-slip recreational boat harbor-reportedly the world's largest-and the headquarters of ICANN, the nonprofit organization that roughly approximates a governing body for the Internet. During the dot-com boom, Marina Del Rey was home to numerous, now-defunct high-tech start-ups, but another generation of new media has already moved in. Above the palm trees lining Lincoln Boulevard looms a corner-straddling, glasscurtain office box emblazoned with a red "EA" on its side, gleaming in the sun: it's the SoCal satellite of Electronic Arts, the northern California-based video game-publishing titan whose fortunes continue to ride high on the success of franchises like EA SportA, The Lord of the RingA, Harry Potter, The Sim.A, and SSX-as well as war-themed series like Battlefield, Medal of Honor, and Command and Conquer. With annual sales exceeding $3 million, EA remains the biggest video game publisher in the world. Millions of people know their slogan, which can be heard, voiced in an awed whisper of a child, as their logo appears before the beginning of one of their products: EA GameA. Challenge Everything.

Just down the road from EA is another anonymous, squarish office building, with dark blue windows set inside thin columns of concrete white. At its top sits a rather small sign, with a less recognizable logo: the letters i c t, lowercased, italicized, and red. A pedestrian-level placard at its base displays the tenant's full name: The Institute for Creative Technologies. In a city dominated by an entertainment industry that's currently lurching into a brave new world of digital culture on multiple fronts, its name could indicate many things: an animation studio, an academic research center, a video game developer, perhaps a specialeffects house. In fact, it is indeed a combination of all those things-add to that list military think tank-and it owes its existence to an unprecedented collaboration among Hollywood, Silicon Valley, and the Pentagon.

In October 1996, the National Research Council hosted an exploratory conference about fifty miles south of LA, in Irvine, California. The topic, "Modeling and Simulation: Linking Entertainment and Defense" was the suggestion of Michael Zyda, a polymathic, visionary teacher at the Naval Postgraduate School, who would eventually oversee the development of Americae Army at the school's MOVES Institute. Zyda perceived that the military, the entertainment industry, and digital technology were all quickly changing, and their point of convergence could be found in simulation. The creation of convincing, make-believe worlds connected Hollywood special effects, the new generation of ever more visually complex video games, and the elaborate multimedia theatrics of theme parks to military interest in simulation training and virtual interfaces for remote warfare.

Videogames were becoming increasingly cinematic, with ever more realistic graphics, Hollywood actors providing voices for characters, and production budgets reaching into the

millions. Movies, conversely, were evolving into gamelike spectacles, boasting extended digitally enhanced landscapes, effects, and characters. Since Pixar's Toy Story, computer-generated animation was quickly squeezing out its hand-drawn predecessor.

That such an unprecedented powwow was initiated from the military side is significant. During the tail end of the Cold War, the Reagan policy involved pouring massive amounts of money into defense spending, effectively bankrupting the Soviet Union through an increasingly expensive arms race. As a result, the U.S. military of the i98os led the world in many technological fields, including computer graphics and simulation training: at a time most civilians had never even heard of the Internet, SIMNET was the most advanced multiuser virtual environment around. But in the 199os, when Pentagon budgets constricted and the commercial computer and video game industries boomed, suddenly the military found its simulation technology losing ground to Lucasfilm, Sony, and Nintendo. "We'd show our stuff to generals," Zyda told the New York Timee in 2004, "and they'd say, 'Well, my son is playing something that looks better than that, and it only cost $50: "

Zyda's conference was a convergence of some very different worlds. In one camp were the military thinkers, from DARPA, the National Guard, the Defense Modeling and Simulation Office, the Office of the Secretary of Defense, the Army, Navy, and Air Force. They collaborated in workshops with representatives from Disney, Pixar, Paramount, George Lucas' Industrial Light & Magic, virtual reality theme park attraction designers Illusion, Inc., video game developers Spectrum Holobyte, and Internet content providers Total Entertainment Network. SIMNET visionary Jack Thorpe rubbed shoulders with Alexander Singer, an award-winning producer-director who worked on Star Trek: Deep Space 9, Star Trek: Voyager, and many other hit television series.

The conference was thus as much social experiment as it was fact-finding mission, and its participants considered it a great success, even if some of them approached with initial skepticism. "You know, the Hollywood people were like, work with the military? I'm not so sure. And the military people were like, work with the Hollywood folks? Not so sure," says Diane Piepol, an ICT creative director whose computer graphics background includes visual effects for features like True Lies, Speed, and Super Mario Brothers. "But get everyone in the same room, and everyone walked out with their stereotypes destroyed."

In their resulting report, published by the National Research Council, Zyda's committee suggests that "though the two communities differ widely in their structures, incentives, and motivations, opportunities may exist for the entertainment industry and the defense modeling and simulation community to work together to advance the state of the art.... By sharing research results, coordinating research agendas, and working collaboratively when necessary, the entertainment industry and the DOD may be able to more efficiently and effectively build a technological base for modeling and simulation that will improve the nation's security and economic performance." The report predicts that defense and entertainment could potentially find mutual benefit toward the research and development of four specific goals: photo-realistic, immersive worlds; multiuser networked environments; standards for interoperability between different systems; and convincingly "intelligent" computer-generated characters.

In just under two hundred pages, Modeling and Simulation is relatively brief (that is, as

government reports go) but comprehensive in its arguments. Even given its cool, semibureaucratic tone, the writing can't help but exude a bit of dot-com era upbeatness as it catalogs the vast technological possibilities at hand. And the ideas do seem exciting and innovative: it is undoubtedly the only government publication in history to include a serious investigation of the merits of Walt Disney World's Aladdin ride, video games Doom and Command and Conquer, movies like ForreAt Gump and Disclosure, and even Neal Stephenson's science fiction novel SnowcraAh in order to illustrate challenges to national defense.

Research Areas of Interest to the Entertainment Industry and the Defense Modeling and Simulation Community

Technologies for Immersion

• Image generation-graphics computers capable of generating complex visual images.

Tracking-technologies for monitoring the head position and orientation of participants in virtual environments.

Perambulation-technologies that allow participants to walk through virtual environments while experiencing hills, bumps, obstructions, etc.

Virtual presence-technologies for providing a wide range of sensory stimuli: visual, auditory, olfactory, vibrotactile, and electrotactile.

Networked Simulation

Higher-bandwidth networks-to allow faster communication of greater amounts of information among participants.

Multicaet and area-of intereet managerA-to facilitate many-to-many communications while using limited bandwidth.

Latency reduction-techniques for reducing true or perceived delays in distributed simulations.

Standards for Interoperability

Virtual reality tranefer protocol-to facilitate large-scale networking of distributed virtual environments.

Architecture for interoperability-network and software architectures to allow scalability of distributed simulations without degrading performance.

interoperability AtandardA-protocols that allow simulators to work together effectively and facilitate the construction of large simulations from existing subsystems.

Computer-Generated Characters

Adaptability-development of computer-generated characters that can modify their behavior

automatically over time.

Individual behaviors-computer-generated characters that accurately portray the actions and responses of individual participants in a simulation rather than those of aggregated entities such as tank crews or platoons.

Human representations-authentic avatars that look, move, and speak like humans.

Aggregation/disaggregation-the capability to aggregate smaller units into larger ones and to disaggregate them back into smaller ones without sacrificing the fidelity of a simulation or frustrating attempts at interoperability.

Spectator roles-ways of allowing observers to watch a simulation.

Tools for Creating Simulated Environments

• Database generation and manipulation-tools for managing and storing information in large databases, to allow rapid retrieval of information, feature extraction, creation, and simplification.

Compositing-hardware and software packages that allow designers to combine images taken from different sources (whether live-action footage or three-dimensional models) and to facilitate the addition or modification of lighting and environmental effects.

Interactive tools-hardware and software systems that allow designers to use a variety of input devices (more than mouse and keyboard) to construct models and simulations.

Source: Modeling and Simulation: Linking Entertainment and Defense, National Academies Press, 1997, PP. 2-3.

The report also stresses the need for involvement by academia, saying that both the Pentagon and the entertainment industry will need to "foster the establishment and expansion of education programs to train students in the technical and nontechnical underpinnings of modeling, simulation, and virtual environments." Such an academic base, the report offers, "not only will produce these students but will also generate many of the technical advances upon which future entertainment and defense systems will be built."

With this in mind, Zyda spent half a year drafting a proposal for the Institute for Creative Technologies, which was subsequently created at the University of Southern California in 1999 with an initial $45 million five-year investment from the Army. The Army saw USC as an ideal partner for a number of reasons: it is home to one of the world's top film schools, enjoys an obvious proximity to major players in the entertainment industry, and like many large universities has a long history of defense-funded research. (The Modeling and Simulation report also led to the creation of the Naval Postgraduate School's MOVES Institute in 2000, where the America;e Army project was developed.) The Army appears to think that ICT has been a successful venture: in 2004, the Army renewed its support more than twofold, this time with a $ioo million grant.

The initial personnel lineup for ICT drew from the same intersection of Hollywood, the gaming industry, academia, and the military that had marked Zyda's NRC conference. The staff's resulting eclecticism is worthy of a reality television show. Some of the most well-known names include Randall Kleiser, a USC film school alum and director of pop-camp classics like Greaee, Blue Lagoon, and Big Top Pee-Wee; John Milius, director of such grim eighties fantasies as Red Dawn and Conan the Barbarian, whose screenwriting credits include Apocalypse Now and Clear and Present Danger, several members of the Sims support team, just as that franchise was beginning to gain a mainstream following; and Ron Cobb, production designer on films like Star Ware, Back to the Future, and Alien. Executive vice president of Paramount Television Group Richard Lindheim was drafted as ICT's executive director.

Even the institute's interior bespeaks a pop culture pedigree: it was crafted by Herman Zimmerman, the production designer of seven Star Trek films and three of the franchise's TV series. Jack Valenti, decorated WWII veteran and then notorious president of the Motion Picture Association of American, spoke at ICT's opening dedication and press conference. "Los Angeles is not the `entertainment capital of the world,' " Valenti joked to the mixed gathering, "Washington, D.C., is the entertainment capital of the world."

Thinking Like Terrorists

The institute made headlines a month after September ii when Variety reported that ICT had hosted a series of meetings between intelligence officials and Hollywood screenwriters and directors (FEDS SEEK H'WOOD'S HELP, the original story declared). The Tinseltown creative types were there to brainstorm possible future terrorist scenarios, drawing on their vast experience crafting blockbuster scripts. The talent pool was a mix of high and low art: brutalist David Fincher (Fight Club, Se7en), erstwhile music video and skateboard-tape director Spike Jonze (Being John Malkovich), ICT creative consultant Randall Kleiser, the screenwriters of The Rocketeer, and a bevy of action specialists: Die Hard's screenwriter, MacGyvere TV scriptwriter, and director Joseph Zito, the helmer of such flicks as Delta Force One, Mi,neing in Action, InvaAion USA, and Friday the 13th: The Final Chapter.

With the nation still nerve-racked from the East Coast attacks, the item was picked up by papers nationwide, prompting both anxious commentary about the encroachment of a new militarized America into the heart of pop culture, and skepticism that Hollywood dream merchants would have anything to offer toward something as serious as the War on Terror. A few days later, Variety's editor in chief, Peter Bart, weighed in on the reaction. "This war may go on sporadically for years," he wrote. "If that's the case, the key players better find a way to sustain audience involvement." But he ended on a more congratulatory, if cynical, note: "Let's applaud the writers and directors for giving it a try. They're accustomed to brainstorming on demand.... Now they face a new cast of characters: self-styled holy men who finance their operations peddling heroin; weirdos slipping anthrax into newsrooms; nihilists who've been brainwashed into thinking they have a ticket to paradise. On reflection, all this may be too surreal even for Hollywood."

The attacks on New York and Washington did seem like scenes from Hollywood blockbusters: in a devastatingly unwelcome way, life appeared to imitate art. In trying to process something deeply unfamiliar and nightmarish, Americans-and observers worldwide-fell back on

the imaginary versions of destruction our minds knew best. "The blockbuster's lingua franca is violent action," New York film critic J. Hoberman observed a few weeks after the attacks. "Thus, the deja vu of crowds fleeing Godzilla through Lower Manhattan canyons, the wondrously exploding skyscrapers and bellicose rhetoric of Independence Day, the romantic pathos of Titanic, the wounded innocence of Pearl Harbor, the cosmic insanity of Deep Impact." If such was the case, who better to predict what might happen next than the blockbuster creators themselves?

That first conference sparked an ongoing project at ICT with the CIA, reports Catherine Kominos, director of administration at ICT and former deputy director of research at the Pentagon. The current effort consists of three-day workshops with directors and writers "just coming up with scenarios for issues they're looking at. Brainstorming sessions, basically, about plausible stories. It's mostly for training. They find it very valuable." The CIA, she explains, is "trained in a certain way; there's not much out-of-the-box thinking. So this helps them."

The Next Generation

The interior of ICT feels creative-corporate; it could be the digs of an animation studio or advertising agency. Surfaces are sleek and rounded, everywhere covered in blond wood; even the ceiling curves like the roof of a Parisian arcade. The circular, multitiered coffee-break nook looks like it might take off into orbit. Large glass windows look out onto repetitive rows of new condos. Many of the offices are designed with built-in beds. Near the elevators are small lobbies; copies of the Hollywood Reporter and Variety lie beneath screens that display ICT promo videos, filled with digitally rendered soldiers and men working at computer terminals. On one floor there's a modest-sized, tiered amphitheater with canvas-covered seats augmented by stacks of colorful pillows. There's brain worker clutter here and there: a SIGGRAPH presentation mounted on foamcore lies in the corner of a hallway. An old strategy game from the i96os called Twixt lies out on a table of a common area, partially constructed: it looks like the kind of abstract logic puzzle they would have obsessed over at Rand back in the day.

Affixed to the door to the graphics laboratory with a strip of black gaffer's tape, a sheet of white paper bears a laserprinted message: "PleaAe do not enter. Rad experiment in progreee . . ." Inside is the workshop of Paul Debevec, ICT's executive producer for graphics research, who's famous in digitaleffects circles as the inventor of "bullet time:" the balletic 3-D slow-mo effect that became popularized through the Matrix films, and has by now become used so many times, it's become a digital-effects cliche. Debevec is soft-eyed, goateed man in his thirties, sporting a black button-down shirt, tucked into belted khakis. At ICT, he has been investigating ways to replicate within virtual environments the many ways light falls on objects in real life. To this end, he and his team have been working since Zoos to complete the world's most exact virtual replica of Athens' Parthenon, both in its current form and how it would have appeared 2,500 years ago, in all its original glory. Photos and news clippings of the ancient monument are posted around the workshop; in a corner near his office lays a plaster replica of what appears to be a portion of the Elgin Marbles.

An exacting digital re-creation of the Parthenon might seem like a strange goal for an institute primarily funded for the needs of national defense with taxpayer dollars; at the very least, one assumes, the Army will be utterly prepared if we need to occupy the Acropolis. But Debevec

sees the choice as pragmatic. "It seemed the most appropriate to keep the team inspired, to be able to bring in interns who would be thrilled to work for free on these kind of things," he says. "It is something that was of international importance and everyone agreed that this was an excellent idea for demonstrating and pushing forward a lot of these techniques."

As an elaborate test case, the process of creating a digital Parthenon, ICT believes, will advance 3-D computer graphics toward greater verisimilitude. The government, academia and the entertainment industry, Debevec explains, each have their "own need for photorealistic computer graphics, and also interesting immersive environments, to be used specifically for education, for training and for entertainment." It's a perfect example of the onceaccidental defense research inspiring the commercial sector, now planned from the get-go as creative synergy.

While Debevec works in a realm of almost pure research, he's very cognizant of the high-tech tradition in which he operates. "The sponsorship of computer graphics research goes all the way back to the military in the 1940s and the i95os," he says. "Computer science itself is the result of military funding in World War 11 to originally calculate mathematical equations. A lot of what is going on with computer graphics was pushed forward with flight simulator research, to create virtual views of an airplane flying over terrain, so the people sitting in a fake version of the airplane cockpit could see what they're supposed to see out there. And as a result of this, those algorithms that were developed in the seventies and the eighties, these are now in the computer graphics cards that you use to play video games with today."

In one corner of the graphics lab sits a ten-foot-tall device that resembles the skeleton of a geodesic dome, with light fixtures set into its black metal framework, pointing inward. It looks like something out of The Matrix itself. When an intern steps inside the sphere, Debevec demonstrates how the apparatus is able to replicate specific kinds of light, some of which had actually been recorded on location. It could be arranged, for example, to look like the light as it appears falling on a person near a lake at one o'clock on a cloudy day. "This is a very powerful lighting technique," Debevec explains as he fiddles with the device's controlling workstation, "because what we can do is we can load a real world lighting environment. This is light that was captured in a cathedral." Suddenly the student's face is lit with a warm, dusky glow. "It shows all of the right shadows and shading. You can even see some of the light from the altar, which is a little yellowish of the right side of his face." The same light patterns, Debevec explains, could be loaded into a virtual environment as well, be it a video game, military simulation, or Hollywood CGI character.

"Everything that we do is about being able to create a simulation of something that happens in the real world, or might have happened in the real world," Debevec explains. "And in those particular kinds of applications, there's a great need for it to look very realistic. There's a great need for it to be very accurate. You don't want to train on something that is not a good representation of reality. If it's not accurate, then you may make the wrong decisions in the real environment. So it's a great motivating factor for doing what we can as realistically as possible." True, but one can't help but wonder if a military training simulation is significantly enhanced by such an exceedingly subtle effect; perhaps the Hollywood tail is wagging the Pentagon dog, at least in a budgetary sense.

Jonathan Gratch is another slightly shy, brainy type that you might not expect inside a military institution. He's tall and a bit gangly, with sandy hair and glasses, wearing a casual, California ensemble. Inside his sunny office, the bookshelf above his workstation holds titles like William James's Pragmatism, Heidegger for Beginners, and a book by Will Durant, as well as technical volumes on cognitive science. He's a psychologist who studies emotional interaction between people, and he's trying to use his skills to perfect the way that computer-generated characters might be modeled to interface more naturalistically with real people.

One project he's working on is the Mission Rehearsal Exercise (MRE) program, a new kind of simulation trainer. Because modern military operations frequently occur in urban or semiurban locales, and involve more interaction with local civilians on a face-to-face level-think of the "policing" of Iraq, for example-the concept is to create a system that simulates a spoken interaction with virtual humans. "Even seemingly mundane interactions, such as a traffic accident between a civilian and a military vehicle, can unravel an operation," Gratch writes with fellow USC researcher Stacy Marsella in a 2003 issue of The Brown Journal of World Affairs, "To function effectively and to avoid misunderstandings that could have unintended consequences, it is important that soldiers understand the customs, norms, habits and taboos of the local population and they need to be exposed to the thorny dilemmas and decisions that may await them." In order to achieve a workable trainer of this kind, programming needs to be in place that can realistically emulate an incredibly complex range of possible human emotional responses.

Gratch himself has gone through a learning curve with some of the local population of ICT. "I come from a family tradition of old school Democrats," says Gratch, "so I've always had a fairly stereotypical view of the military." Once he started working with ICT, however, his view changed as he interacted with more military representatives. "We have a lot of access to people at all levels. The secretary of defense was here once, and high-ranking generals, as well as soldiers. One thing that I realized is that there's quite a diversity within the military, a lot of self-questioning.

"I assumed that the military was about war," Gratch adds. "And I think that many people in the military do see the military as about war." But after exposure to the military figures who work with ICT, Gratch believes that "increasingly at the high levels, they're trying to avoid war. They're thinking about everything they can do to not get into the battle. So I was surprised at how much there's a growing awareness that one needs cultural understanding, and alternatives to war. That there's a lot of statesmanship that's involved. But that's also in conflict with the standard military culture. It's an interesting time to be in the military."

Flatworld and the Holodeck

Inside a squat brown-brick former television studio in another corner of relentlessly sunny Marina del Rey is Flatworld. No, it's not a mathematics-themed edutainment center run by the Army. It's an ICT project not unlike UCF's MR MOUT; the goal is to create a fully immersive, life-size, photorealistic virtual environment, ultimately peopled with convincingly intelligent computer-generated characters. In other words, another variant on Star Treke Holodeck.

On a press tour with Diane Piepol, Flatworld's project director, the first stop is an introductory

video, done in the style of a corporate presentation, that explains the origins of the concept in Hollywood "flats," or portable bits of painted scenery used to create a make-believe environment when filmed. Flatworld translates the idea into "digital flats," or portable, large-scale screens equipped with top-mounted digital projectors that throw an image on the back of the flat's transparent surface. Combined with props, these flats will be used as a portable, flexible system of virtual reality. Or as the video's voice over actor intones, "a mixed reality world, where the physical and the virtual seamlessly exist." Flatworld is part of ICT's raieon d'etre; Piepol explains this bluntly: "The Army said, 'We want a holodeck.' "

Piepol leads her visitors through a little wooden room, constructed so recently that the smell of sawdust fills the air. On the floor bits of wrecked furniture cover a Middle Eastern carpet, as if a struggle had just occurred. To the left, the bottom portion of one wall is covered with a short fence. The rest of the wall is a giant video screen, picturing a computer-generated city street, complete with the burning wreck of a car in the middle of the road. This scenario, Piepol explains, will be about a food delivery mission gone awry, but right now it's just an unpeopled cityscape, created through the Full Spectrum Warrior game engine. Eventually it will be populated by virtual characters, integrated from Gratch's Mission Rehersal Environment study. Another researcher is working on a "scent collar" for an even more comprehensive illusion of reality. (Perhaps the entertainment synergy here is the influence of cult filmmaker John Waters' scratch and sniff "Odorama" cards for Polyester.)

Piepol's assistant taps a handheld tablet computer and a tiny flying-saucer drone buzzes through the imaginary space outside. Then he opens a real wooden door, and a life-size computergenerated Army officer appears on the other side. "You slimy scumbag," the character yells, "get on your face and give me twenty-five!" It's a line from Stanley Kubrick's Full Metal Jacket.

Unlike many of the techno-theatrical gun huts showcased at I/ITSEC, Flatworld isn't a marksmanship trainer, although in later stages it will be responsive to light guns or some other sort of ersatz artillery. It's more a social game, says Piepol, designed to teach "decision making and leadership issues that enlisted men would be facing on site." Sure enough, upon leaving the little wooden room, the visitors hear the recording of a child actor's accented voice calling to them from a high-up corner of the studio. "Hey, USA! Over here!" It's emanating from a life-size digital animation of an olive-skinned little boy, wearing a striped shirt and baseball cap, waving to the people below. Trainees, Piepol explains, might have to decide whether something like this is "a threatening character or not."

Turning the corner, the visitors don polarized glasses to watch the image of a tank in 3-D. Behind them, a tour group from Singapore is starting to watch the Flatworld introductory video. They're a delegation from the Singapore Discovery Center, a family attraction on the island nation, interested in purchasing some cool tech. "1 am convinced," Piepol says as the polarized glasses are collected into a red plastic bucket, "that all this will feed back into the commercial world."

Thinking out of the Xbox

While the experiments under way in Flatworld and the Graphics Laboratory won't have effects

on the civilian realm for quite some time, one of ICT's most high-profile projects has been available to consumers for a couple of years. In collaboration with Sony Imageworks and game developers THQ and Pandemic Studios, the ICT Games Project produced a unique training aid for Army squad leaders in the form of a console-based game. As part of the deal, THQ was able to release a modified version of the game to the public. The resulting title, Full Spectrum Warrior, hit stores in the summer of 2004, enjoying brisk sales and critical acclaim from gaming publications.

"The military prefer the term `commercial platform training aids,' " says Jim Korris, who as ICT's creative director oversaw the Full Spectrum Warrior development. "I think in their view `video games' sounds frivolous." Learning military language patterns is relatively new to Korris, who came to ICT from the entertainment side. An Ivy League graduate, Korris made his name as a writer and producer for film and television; his credits include various forms of cop shows like Miami Vice; Knight Rider; Murder. She Wrote; and Magnum, P.I., and a stretch as producer at Ron Howard's Imagine Films. Prior to joining ICT in 1999, he had chaired a program at USC's film school, the Entertainment Technology Center, which researched standards for the digital exhibition and distribution of film, among other topics. His demeanor is that of a hip boomer dad with a patriotic twist.

Korris says he has been "fascinated" to observe "the interaction of these two domains, the military world and the entertainment world," at ICT. "Initially, I think there was a certain reserve, maybe even distrust, suspicion. I think that a lot of people in the entertainment field believe that military people are literal, they have a lack of imagination, maybe even not so intelligent. And on the military side, I'm sure they think a lot of people in the entertainment industry are flaky and crazy."

Unsurprisingly, Korris is bullish on institute's track record to date. "The evidence so far is that it has worked," he says. "Perhaps it's because of the fact that this is a nation at war, that we have a large number of troops on the ground in Iraq for example. The urgency, you know, the need for training large numbers of people rapidly in new ways has really accelerated what really had been a slower process."

"The development process on Full Spectrum Warrior was fascinating," says Korris, "because it was first and foremost an experiment that sought to determine if a meaningful training aid could be made for a game console." In 1999, Michael Macedonia's PEO STRI (then called STRICOM) approached ICT with the concept of developing a console-based training system. ICT in turn arranged to work with motion picture effects lab Sony Imageworks and video game developers Pandemic Studios, who had previously enjoyed success with tank and combat themed PC and console games. Sony Imageworks and Pandemic formed a new partnership corporation, Future Combat Systems LLC, which then became the recipient of a $4.4 million contract from the Army to develop Full Spectrum Warrior, administered via ICT's Game Project. An early prototype flier from Future Combat Systems promoting the project uses a cartoon image of an Xbox controller decorated in forest camouflage; the headline reads "Meet Your New Platoon Sergeant."

Why train soldiers on a video game console? Familiarity was one reason; a new generation of recruits who had grown up mashing buttons on Tomb Raider and Sonic the Hedgehog would already be versed in the equipment, and any officer could see that video games were among the

most popular pastimes with younger members of the forces. And because of this, as one Marine commander put it in a 1999 issue of National Defenee magazine, "Generation X is very comfortable operating in a simulation environment." Another factor, says Korris, was the high standard of reliability for console systems. "What most people don't realize is that inside an Xbox is a Windows 2000 computer," he says. "It's optimized for games and graphics, it's got a wonderful rendering system, and compared to office personal computers, it's very stable."

It's the Joint

The game began at ICT as a project called C-Force, and was originally intended to take place in a fictitious Eastern European urban environment, a kind of digital make-believe Kosovo. By early 2003, however, the game had been renamed Full Spectrum Warrior, and the setting was switched to an imaginary Islamic country, called Zekistan in the commercial version, or Kazar in the Army training version, that looks vaguely Central Asian or Middle Eastern.

Most civilian players would never know that the game's title springs from the goal of "full-spectrum dominance," introduced in 2000 through the Joint Chiefs of Staff's blueprint for the next two decades, Joint Viaion 2020. Full-spectrum dominance refers to the ability of U.S. military forces, alone or with allies, to defeat any adversary and control any situation, across the "full spectrum" of possibilities, ranging from nuclear threats to terrorist activities to bands of low-tech tribal warlords. In the words of Joint Vi.eion 2020, full-spectrum dominance will be "achieved through the interdependent application of dominant maneuver, precision engagement, focused logistics, and full dimensional protection.... However, material superiority alone is not sufficient. Of greater importance is the development of doctrine, organizations, training and education, leaders, and people that effectively take advantage of the technology." Fullspectrum means "that US forces are able to conduct prompt, sustained, and synchronized operations with combinations of forces tailored to specific situations and with access to and freedom to operate in all domains-space, sea, land, air, and information."

Full Spectrum Warrior may have been created primarily to train soldiers, but even civilians playing the consumer game would learn a few things about modern combat. The commercial version opens with a quote from General Charles Krulak that dovetails with the notion of full-spectrum dominance. "In one moment in time," the title reads, "our service members will be feeding and clothing displaced refugees-providing humanitarian assistance. In the next moment, they will be holding two warring tribes apart-conducting peacekeeping operations. Finally, they will be fighting a highly lethal midintensity battle all on the same day. All within three city blocks. It will be what we call the three-block war." Krulak had developed his concept of the "three-block war" from the experience of American operations in Haiti, Somalia, and Bosnia. Conventional ideas of wartwo nations' armies attacking one another on the field of battle-had become a thing of the past. The norm, Krulak saw, would become what's termed "military operations other than war," humanitarian or peacekeeping operations that had the potential to get rough-perhaps very rough-around the edges. Others would describe the tactical needs as "military operations in urban terrain," or MOUT, since most of these events would occur in cities or other urbanized zones.

That the current operations in Iraq are a textbook example of Krulak's three-block war, so it should come as no surprise that Full Spectrum Warrior, at least in its consumer incarnation, has

created a fantasy version of Iraq as its setting. When troops enter Zekistan, they are told that the nation's leader, Mohammed Jabbour Al-Afad, is being "removeld] from power" by NATO forces, following "confirmed reports of ethnic cleansing and terrorist sponsorship." (Further mirroring the situation in Iraq, Full Spectrum Warrior's 2oo6 sequel, Full Spectrum Warrior: Ten Hammere, will take place in a Zekistan after Al-Afad's fall, in which "various insurgencies fight against the Western forces and ... longsuppressed ethnic hostilities erupt in violence.")

In terms of its design and game play, Full Spectrum Warrior is an exceptionally good game, but it's hard not to shake the feeling that it has been created as a kind of stealth recruiting toolsomething both Michael Macedonia and Korris categorically deny. The game's Web site, for example, included a link to the Army recruiting site on its front page for many months, which was eventually removed. "There's no propaganda produced here," Korris says. "I don't think that Full Spectrum Warrior makes people look and think that the war in Iraq is a good thing because of it. In fact, if any, if anything ... What I'm proud of is that we don't sugar-coat this stuff. We never suggest that it's fun. It's a nasty, difficult business." Even so, it's clear that the commercial product has been calibrated to provide a wholeheartedly positive portrayal of the American military; for example, Full Spectrum Warrior involves clear-cut good guys and bad guys, and civilians are never in the line of fire. Nasty business, perhaps, but never anything but morally unambiguous.

In the game, you command a squad of two fire teams, one of five men, the other of four. Full Spectrum Warrior is not a squadbased shooter along the lines of many other military-themed games, however. Macedonia likes to call it a "first-person thinker." You command your troops to maneuver through the city, usually through leapfrogging moves across city streets, carefully positioning your men behind barriers or having one team pin down the enemy while the other team passes safely past. The beginning of the game introduces the squad's characters: they're like a twenty-first-century version of a World War II movie's troop, ethnically and geographically diverse, but united in their love of the service. There's the smart-ass Jewish guy from Philly, a white southern "gun nut," a gruff New York ex-cop, and a vegetarian Muslim who "joined to piss off his parents." There's even an Asian-American "Leet-speaking gamer" who has "nine tattoos of anime characters," perhaps recruited as an in-joke for the hard-core gamer crowd-or, a cynic might wonder, as a bid to get them thinking about signing up.

Part of the ICT-style synergy behind Full Spectrum Warrior was the Army would get a great-looking, great-playing game for use as a new-generation-friendly training aide, and the commercial partners would get a product to sell. While Pandemic and THQ couldn't slap an Army logo on Full Spectrum Warrior (the Army cannot legally endorse products), they could say that the game was used officially by the Army. In fact, consumers buy that very version, perhaps unknowingly: every commercial copy of Full Spectrum Warrior also contains the Army version, which can be unlocked using a cheat code. That code-the strangely unmacho string "HA2PiPYgTUR5TLE"-was available on gamer Web sites within hours of the title's release in 2004. "Before it was published," Korris explains, the Army "reviewed the application exhaustively to determine that there was no operational security risk of having this falling to anybody's hands, including our enemies'. Because it's a common mistake people make: They think if you have a field manual then you can be an American soldier. The reality is that there's a lot more that goes into training a soldier." The Army version looks very much like its commercial counterpart, but most of its dramatic music has been removed, and there's less

assistance available through game play. The overarching narratives have been replaced with short, episodic ones: one scenario takes place on the eve of Kazar's first free elections. "Frankly what I believe is that THQ anticipated that having an authentic training aide lincludedi would make people interested in it," Korris says.

When interviewed in zoos, Korris appeared to be more than satisfied with the outcome of Full Spectrum Warrior. But earlier that year, a nonpartisan watchdog group called Taxpayers for Common Sense issued a report criticizing the project as nothing but "full spectrum welfare" that spent millions of taxpayer dollars on developing a game for a commercial company. Full Spectrum Warrior, they argued, was a subpar training aid, even if it had become a hit video game, and the "Holodeck" project a "fraud" that was entered into knowing it could not be achieved. In one of the newspaper articles spurred by that report, Lt. Col. Jim Riley, chief of tactics at the Army's infantry school at Fort Benning, Ga., said that his school almost never uses Full Spectrum Warrior because it fails to provide an accurate simulation of urban combat, while designers who worked on the game said that the commercial partners cut corners and disregarded Army directives in order to create a more marketable product.

Maybe Taxpayers for Common Sense aren't looking at this the right way. ICT stands in a long tradition of defensefunded think tanks, and now that the subsidized sector is the entertainment industry, one might consider it a new form of massive funding for the arts. Via the Department of Defense, the government is generously underwriting some of the most avant-garde aesthetic techniques imaginable. While studies of virtual light, computer-generated emotive gestures, cutting-edge video games, and 3-D projections are being funded with Army money for experimental training projects, the results will undoubtedly percolate out into popular culture. Debevec's findings will make movies and video games look more realistic than ever before, in subtle but powerful ways. Gratch's work will impact the way in which AI-controlled characters in a game can communicate to the player, or even the way that people can manipulate their avatars in a massive multiplayer online game to converse with each other. Movies in coming years will have photo-crisp, emotionally convincing computer-controlled actors, thanks to this. Or maybe one of the missions in Grand Theft Auto XIII will be able to make you cry, thanks to ICT.

Then again, there's an easy, market-based argument against this: the healthy commercial sector, burgeoning underground game field, and freethinking world of arthackers are already pushing the boundaries of how to represent war in video games, and they're doing it without subsidies.

PART FIVE

ON THE HOME FRONT

COMMERCIAL GAMES AND UNDERGROUND INTERVENTIONS

> "In a world being torn apart by international conflict, one thing ie on everyonee mind ae they finish watching the nightly news: 'Man, thte would make a great game.' We agree."
>
> -Kuma Reality Games

The MPG-4 download is a news clip, crafted like a low-budget rendition of Fox News, complete with adrenaline-pumping rat-atat-tat theme music and swooshing swipe edits. Poised in front of glowing-green world map, an anchorman explains in detail how American soldiers of the elite ioist Airborne Division killed Saddam Hussein's sons Uday and Qusay during a siege of their compound in Mosul, Iraq. Footage from July 2003 shows the two Husseins' corpses lying on gurneys, their eyes closed, loins covered by thin blue hospital sheets, torsos pockmarked with red and black gunshot wounds. The brothers have hard, shiny skin, like gruesome mannequins. In a subsequent clip, a wedge of Iraqi men on the street cheer to the camera; the newscaster says they are celebrating this brutal and direct evidence, joyous that their dictator has been undoubtedly removed from power.

The anchor then introduces retired major general Thomas L. Wilkerson, a former Marine commander, who's on hand to offer commentary on how the raid transpired. Wilkerson is followed by a second, very different commentator: Jax, a twentysome- thing hipster woman in a ringer tee, who, the anchor says, will provide a "walk-through." As the anchor describes the events of that day, the illustrating images shift from actual news footage to computer-generated simulations of actions inside the compound-pictures taken from a first-person shooter game created to reenact the raid. Wilkerson expounds tactical reasons why powerful antitank artillery was brought to bear on the brothers' villa. Jax, the "Game Analyst," subsequently explains .your mission": to sweep the area of enemy combatants who might interfere with the missile support troops before they take out the compound. "While we've modeled the real world terrain and chronology closely," Jax says, "we've revved up the opposition considerably." She smirks slightly to the camera. "Enemies are everywhere, and you should consider anybody with an AK to be hostile."

"Well, there you have it," the anchor concludes as theme music swells. "A key turning point in Operation Iraqi Freedom and a milestone in the War on Terror. It's a difficult and critical mission. From all of us here at Kuma, best of luck."

Consumers once had to wait years for a conflict to become a video game: now one company transforms war into playable entertainment in a matter of days. Launched in 2004 by Kuma Reality Games, Kuma\War melds news reporting and online gaming: it's a series of military games based on recent news events from conflicts worldwide. Kuma\War descends from the traditions of historical war gaming, but shrinks the temporal gap between event and simulation to match the pace of the Internet and 24-hour cable news networks, whose look and feel it aspires to. Rather than providing a single sprawling scenario like most PC and console games, Kuma offers a constantly updated selection of minigames on a subscription model. For a little under ten dollars a month, players can download new firstperson "missions" based on the latest military operations. The news video just described, for example, is available as part of the supporting materials for mission number one, "Uday and Qusay's Last Stand."

A year into the service, Kuma offered a library of over sixty scenarios, ranging from Marine patrols of Fallujah and clashes with the forces of insurgent cleric Muqtada al Sadr in Najaf to the anti-Taliban Operation Anaconda and battles outside the caves of Tora Bora. All but one of the scenarios is gamed from the American perspective, and a majority deals with the current war in Iraq. Each game arrives with a multimedia dossier of information: a Kuma-produced quicktime "newscast" detailing the case at hand, a detailed chronology of real-world events, a rundown of weaponry deployed, evaluative tactical essays by CIA agents, military figures, and other subject matter experts (including one of Marine Doom's creators, Dan Snyder), and links to further information from government and news sites. The games themselves, Kuma says, are created by combing through news reports, satellite photos, and declassified government documents for information. The whole package is designed to give an in-depth, if largely tactical, experience of a wartime event, delivered as a form of entertainment. It's almost embedded gaming.

In addition to games highlighting up-to-the-minute news, Kuma includes a few historical conflicts as well, including a 1996 incursion of North Korean spies into South Korea, and American military attempts to free the hostages in Iran in 1979. During the 2004 presidential election, Kuma even concocted "John Kerry's Silver Star," a re-creation of his 1969 Swift boat

mission, giving prospective voters the chance to decide for themselves whether or not Kerry could have really earned his medals. The Iran hostage mission also adds an alternative-history spin; it allows players to explore an original Pentagon plan for Delta Force operatives for liberating the embassy hostages that wasn't followed when the U.S. staged its actual botched attempt.

Kuma's Tora Bora scenario asks a more recent what-if, allowing players to successfully surround and capture Osama Bin Laden with U.S. Special Forces. Titled "Osama 2001," the game was uploaded in December 2004. In Kuma's "Osama 2001" newscast, the actress elsewhere appearing as lax returns as serious anchor, now donning a conservative red suit and credited as "Jacqueline Schecter." She highlights how John Kerry accused George Bush of letting Bin Laden get away by farming out the job to Afghan militia; Kuma's game, Schecter says, will allow players to test Kerry's theory and see if U.S. Special Forces could have actually gotten the job done.

Like America :& Army, but without the overarching government stamp of approval, Kuma offered virtual glimpses of the front lines at a time when detailed visual representations of the war seemed scarce; it fed desires for knowledge with playable diversions for curious minds. In hoping to capitalize on the overlapping obsessions of (mostly male) game enthusiasts and news junkies, it focused on the exciting aspects of war-open conflicts-over the more mundane day-to-day realities that troops face. In this respect, Kuma doesn't stray so far from the practices of mainstream news reporting, which also highlights moments of death and conflict over the tedium of war's long slog. Unlike news, however, Kuma packages no games around human-interest stories.

In one of its initial press releases, parent company Kuma Reality Games promised that it would put "players in the frontlines of real international conflict." At the end of 2004, Kuma Reality Games released fifteen of the contemporary missions as a retail game to stores, packaged as Kuma\War: The War on Terror. Its packaging reads, with a laddish excitement more typical of its game experience, "ACTUAL MILITARY EVENTS! You've seen it on the news, now play it!" In publicity statements, the company has indicated that it might use its subscriptionbased news-gaming model to present other themes, like sports or true crime, but as of the end of 2005, Ku ma's only product was repackaging real war.

Play It Again, Uncle Sam

Though it offers one of the more extreme examples of a contemporary game based on real war, Kuma\War is far from unique in the reality-war gaming genre. Strategy games and first-person shooters meticulously based on real historical conflicts-particularly World War II-have long been part of PC gaming, but tended to appeal to a more specialized audience: an older demographic than the Super Mario/Tomb Raider set, more tuned into the History Channel than MTV. The mainstream console games of the 199os preferred fantasy, sci-fi, and adventure themes; even games with terrorist or war themes like CounterStrike offered fairly anonymous villains with vague political affiliations, or at best, cartoonish Nazis.

After 9/11, however, the content of commercial games shifted sharply. At first, companies altered or delayed games with war themes, fearful of consumer reactions in a heightened

postattack atmosphere. Microsoft issued a patch for Flight Simulator 2000 that removed the Twin Towers from its virtual New York, while Ubisoft delayed the release of Tom Clancy;e Rogue Spear: Black Thorn, apparently to make changes to its antiterrorist plotline. Other companies with games set in New York changed marketing to remove references to the World Trade Center. Unsure of where public opinion was headed, game companies chose to avoid anything potentially controversial. "Consumer spending on entertainment tends to go up in times of crisis but it is really too early to say what will happen," Molly Smith, director of public relations at Sony Computer Entertainment, told Financial TimeA in a September 2ooi piece about the immediate effects on the game industry.

But soon, as the coast-to-coast blossoming of American flags seemed to slide in meaning from stunned solidarity to Go-USA cheerleading, the advent of the War on Terror inspired a slew of mainstream titles for console systems and PCs that not only evoked real war, but often specific historical battles. Representations of real war entered video games around the same time they reentered Americans' daily life. Artist Eddo Stern has observed that prior to September iith, video games were populated by comic-book scenarios "organized around a dichotomy of Western/Commando/Technological/Organized/Advanced/Cop/ Marine/Good vs. Eastern/Southern/Primitive/Chaotic/German/ Russian/Arab/Central American/Drug Dealer/Terrorist/Evil." But the gaming industry had to position themselves within a new ideological climate in which terrorists and war weren't vague fantasies any longer. "After 9/11, specificity hit hard," Stern says. "People suddenly knew about terrorists. They know about the terrorist list land] within that rhetoric a very clear enemy had been created, which is, at this time, very politically correct to kill.... The political climate shifted radically, and the game industry responded. Now you play games where everything is specific and neat, and you can go to Iraq and kill a lot of Iraqis and hey, if it's on TV, why couldn't we do it?"

In the fall of 2002, a little more than a week before Congress authorized President Bush to send military force to Iraq if Saddam Hussein did not hand over his weapons of mass destruction, Gotham Games released Conflict: Deaert Storm, a squad-based shooter that takes place during the Gulf War. Players can choose to act as either U.S. Delta Force or British SAS; missions include disabling Scud missiles meant for Israel with C4 explosives, and sniping "General Aziz," a mustachioed Saddam look-alike (no relation, company representatives claimed, to Iraq's foreign minister at the time, Tariq Aziz).

The timing of Conflict: DeAert Storm in the lead-up to Operation Iraqi Freedom may have been partially fortuitous, but its makers very consciously exploited the parallels in their marketing. Gotham promoted Conflict: DeAert Storm with the tagline "No Diplomats. No Negotiation. No Surrender," a ballsy slogan that might have been dreamed up by a Bush administration speechwriter. The title of its sequel, Conflict: Desert Storm II: Back to Baghdad, could have just as well-served as a catchy name for the Iraq War itself, and its back-of-the-box description seems like the precis of an impossibly jingoistic Hollywood action flick, complete with allusions to mythical weapons of mass destruction:

> From the emoke and fire of the Gulf War, four heroes return to fini-eh the job they etarted. Your elite operatives will be sent into the moet intense combat yet, as they take on the Iraqi regime'e chemical arms, secret weapons and hidden areenalA, which continue to threaten the gulf. Lock and load, and get ready to GO LOUD!

It's clear that other game companies took notice of the post2001 surge in national devotion when developing a new crop of vendetta-tinged let's-roll-playing games. "War is in the headlines and on everyone's mind these days," a spokesperson for Electronic Arts told GameSpot in early April 2003, "and we at EA want to be right there in the thick of it." Just as the U.S. readied to invade Iraq, EA presented its new slogan: "Real War, Real Games." After Operation Iraqi Freedom commenced with a spectacular siege on Baghdad in March 2003, fifteen companies scrambled to file trademarks on the phrase "shock and awe." Sony reserved the phrase as a possible title for a future Playstation game, but withdrew its application less than a week later due to criticisms.

The easiest sell in a neopatriotic market was the boom in World War 11 titles, steeped in the moral unambiguousness of the Greatest Generation, which appeared in a number of successful franchises, among them Activision's Call of Duty, EA's Medal of Honor, and UbiSoft's Brothere in Arme. World War II goes down easy for Americans: not only is it the last untarnished example of a Just War, but it remains key to our selfimage as both puissant superpower and righteous guardian of democracy. Exploring the audiovisual possibilities of then-nex- gen console systems, these WWII games strive for a cinematic experience of war, influenced substantially by a grim gunmetaland-gray Hollywood aesthetic. The opening of Medal of Honor: Frontline, for example, strongly recalls the look and feel of the famous Normandy Beach sequence of Steven Spielberg's Saving Private Ryan, including its unrelenting slaughter. Its sequel, Medal of Honor: Rieing Sun, models sweeping scenes of naval destruction in Hawaii on the climax Michael Bay's Pearl Harbor.

Companies took on more controversial wars as well. No less than five titles released in 2003 and 2004 brought Americans back to the once-taboo war in Vietnam, including Eidos's ShellShock: Nam '67, Vivendi's Men of Valor: Vietnam, EA's Battlefield Vietnam, Global Star's Conflict Vietnam, and Gathering of Developers' Viet-Cong: Purple Haze, which includes Coppola-esque cinematic bumpers set to period rock tunes (no Jimi Hendrix, but Iggy Pop, Deep Purple, and the likely expensive Rolling Stones' "Paint It Black," which plays in the background ad nawseam). Viet-Cong's retro-macho image ran into trouble in Britain, however. A billboard advertising the game that included a pull quote from the official PlayAtation 2 magazine reading "Napalm never smelled this good" drew complaints to the UK's Advertising Standards Authority, and Gathering's parent company, Take 2 Interactive, was promptly ordered to remove the offending signage and discontinue the campaign.

Although such legal actions never occurred Stateside, Vietnam games still seemed to unnerve some players. In 2003, popular news-and-reviews site GamePro published a debate among four gamers about the Vietnam titles, most of which were then yet to be released. Though some of the gamers said they were interested in new types of game play jungle warfare might offer, most participants expressed varying levels of suspicion, even disgust, at the prospect of gaming Vietnam. "As the child of Vietnamese refugees, I can't say that I can ever look on Vietnam games as being in good taste," wrote a gamer under the name Dom Ex Machina. "How can these games possibly do conflict the sort of justice that you hope for? Will there be 'burn the village to save it' missions in these games? Will there be search and destroy missions where the only way to separate the VC from the general populace is to shoot everyone in sight, a la My Lai? If not, how can they possibly be true to what Vietnam really was? And how can they ever hope to be done in good taste?"

While many non-game-savvy individuals with antiwar sentiments might naively imagine typical video game enthusiasts to be unthinking jingoists, suckered into propagandistic entertainment by the hi-tech cool factor of contemporary war games, the GamePro debate paints a very different picture, one of a more politically skeptical consumer. "There are 8 million Viet Nam veterans alive in the U.S. today," added one DJ Dinobot. "It is wholly disrespectful to the war's veterans and victims to trivialize the memory ... In a of their suffering for a `unique gameplay experience.' bizarre twist on the old adage, history is being rewritten by the loser. The current political climate adds an interesting flavor to this bizarre attempt at historical revisionism."

A moral ambivalence surrounding games based on real conflicts may have influenced Mark Bowden, author of Black Hawk Down: A Story of Modern War, his nonfiction account of the 1993 American military action in Somalia. This event saw the bloodiest close combat operations by American soldiers since Vietnam, and like that war, is remembered for some shocking media images: dead U.S. soldiers being dragged through the streets of Mogadishu. Although Bowden's book provided the basis for the 2001 Ridley Scott film Black Hawk Down, the author would not lend his name to the NovaLogic game Delta Force: Black Hawk Down. "I just told my agent I didn't want to be involved," he told Reuters. "To me there's a qualitative difference between making a game and telling a story." NovaLogic's Black Hawk Down, however, does not go out of its way to explain that the title "Black Hawk Down" is not copyrighted, and the game is not, strictly speaking, an adaptation of Bowden's book or its film, though it does seem to borrow from the latter's dark and grimy visual aesthetic.

Fun as Hell

Even if these real-world themes caused pockets of ethical consternation, game developers engaged in an industrywide rush to release war titles, egged on by parallel entertainment indicators like the sharp spike in war movie rentals following the 2001 attacks. The related toy business also saw a return to war themes during this time; Hasbro claimed that sales of GI Joe increased 46 percent from 2001 to 2003, and toy shelves became packed with action figures in military and Homeland Security themes.

For Christmas 2002, the Ever Sparkle Industrial Co. Ltd. produced a "Forward Command Post" military action-figure play set that one journalist called "a bombed-out dollhouse" with "a busted balustrade, crumbling bricks, bullet holes pockmarking its pretty pastel walls ... commandeered by fatigue-clad soldiers toting assault rifles." Another company produced a similar item called the "Power Team Elite: Battle Command Post." This time, the dwelling appeared to be a little less damaged, looking a bit like a smart duplex that had been quickly commandeered into military use. Because the Ever Sparkle Industrial's play-post appeared to trivialize civilian casualties, objections from consumers caused at least two retailers to stop selling the toy. Apparently many twenty-first-century descendants of 0. Henry's Edwardian pacifist parents had forwarded links to these toys' Web sites in disgust.

By 2004, the emergence of realistic war games as a mainstream genre would have been obvious to even casual players; with Iraq dominating headlines, and war on everyone's mind, the games were that much more visible. IGN, another major game reviews site, noted in a feature about the phenomenon, "with little irony, 2004 is the year of war. It's sad, true, and ongoing. It's

a year of war-and in the video game industry, of war games," adding, "military and war-based video games sales have in turn reached all-time highs." However, even if millions of dollars were made on mainstream reality-based war games, they never dominated overall unit sales during this time. From 2001 to 2004, the genre cracked into year-end top ten bestselling titles only twice: Medal of Honor: Frontline was the sixthbest-selling game of 2002, and Medal of Honor: Ruing Sun the tenth-best-selling of 2004, according to industry trackers The NDP Group. But games with war themes did see a spike in sales during in the earliest weeks of the U.S. invasion of Iraq.

Game designers didn't necessarily see their industry's embrace of real war themes as part of the kiddie mili-toy trend; the average gamer was getting older, they said, and these new war titles were part of a greater interest in creating more mature forms of video games aimed at adult sensibilities. War games, by this definition, may be classified alongside such fare as Grand Theft Autoe hoodlumcentric carnage carnival, or Acclaim's BMX XXX, a 2002 game involving topless female bikers with adjustable cup sizes. Though some games, such as Conflict: DeAert Storm and the Call of Duty and Medal of Honorseries, are rated T (or Teen, the Entertainment Software Ratings Board's equivalent of the MPAA's PG), many are rated M (Mature, the equivalent of an R rating)-but of course the extent to which retailers hew to such ratings is questionable. ShellShock Vietnam includes gory depictions of North Vietnamese psy-op tactics: scenes of American soldiers' corpses strung up on wooden posts, and soldiers' heads impaled on stakes. ShellShock's developers claimed such content was intended to depict war in a grimly serious light. "Unlike war movies, which had moved on from the John Wayne era to the likes of Platoon and Saving Private Ryan, IWorld War III video games were still treating war in a very 'Sos, glorified manner," ShellShock commercial director Martin de Ronde told a New York Timee reporter, perhaps taking aim at the red-blooded Medal of Honor franchise. "We felt we wanted to depict war, what it was really like. War is hell, and that's exactly what we wanted to get across in the game."

Nevertheless, the wartime gravitas that designers, subject matter experts, and PR reps evinced in interviews seemed to have little to do with the rest of games' marketing. Print and TV ads for the post-9/ii crop of war games stressed their entertainment value-cinematic graphics, action-packed play, and booming sound-tracks-and always, their unprecedented levels of realism. "This is as close to war as you ever want to get," raved a pull quote in an ad for 2005's Call of Duty 2, calibrated for a somewhat less gung-ho historical moment. Maybe war is hell, these ads said, but in video game form, it's also fun as hell.

Levels of Reality

What do we mean when we call a video game more or less "realistic"? The appellation is frequently bandied about by garners, journalists, and marketers, but defining what makes a game feel real is more complex than it may at first seem. It raises questions that have been examined more closely when studying older forms of media. "The commonplace notion that Realism is a'styleless' or transparent style, a mere simulacrum or mirror image of visual reality," art historian Linda Nochlin writes, "is another barrier to its understanding as an historical and stylistic phenomenon." What Nochlin observes with regard to nineteenth-century painting may also be said of contemporary war games: the effect is complex, made up of multifaceted and even contradictory components. It may be useful to risk pedantry and dissect video game

realism, for the purposes of closer examination, into three separate qualities, which may be termed experiential realism, descriptive realism, and historical realism.

Of the three, experiential realism is the most particular to games as a technology, and perhaps the most abstract. An extension of interactivity, experiential realism can be related to the concepts of "presence" or "immersion" spoken of by architects of virtual reality. It is the feeling of being "in the game," in the moment: a sense of immediacy and real time, the state of being for which folks like Chris Stapleton and Michael Macedonia pine. The game experience feels real because it feels like-and at some level is-happening right now. The roots of experiential realism go back as far as Spacewar!, which employs an information processor's visual interface to create the illusion of an environment that not only was open to manipulation by the user, but responded in ways that mimicked the real world we know (i.e., crude representations of gravity and ballistics). More advanced graphical capabilities allowed for the emergence of first-person movement through a three-dimensional environment. Realism in these 3-D worlds could mean being able to pick up and move items, open doors, jump over crevasses, or otherwise interact with objects, buildings, landscapes, and pseudo-living things. How players experienced game worlds began to include more aspects of how we experience the real world. And of course in multiplayer mode, the competition and cooperation between various gamers and teams is not illusory.

The ability to perform actions within realistic spaces is now reinforced by the increasing verisimilitude of computer-generated game images and audio. By the early twenty-first century, home console systems became powerful enough to create images that approached the sophistication of Hollywood CGI. Contemporary video games marry the interactive illusion of a responsive world, created through a games' design and Al, to a cinematic illusion, made possible by increasingly artful visuals and sound. But the technical possibilities of games can be shaped to various ends. Many of the most "realistic" games pattern themselves not as simulacra of lived experience, but of Hollywood convention, complete with swooping dramatic scores, expressive crane and zoom shots, Scorsese-influenced editing, and brooding color schemes, sometimes tinted as if seen through a gauzy lens or filter. (The recent narrative penchant for extended cinematic cut scenes in solo campaigns, however, can also work against a game's immersiveness; after the first viewing, most players would rather just skip them and get into the action.)

In many ways, the visual language of games provides an imitation not of the real world, but of the secondary world of cinema. The phrase "based on a true story," emblazoned on the packaging of Ubisoft's Brothere in Arm.e: Road to Hill 30, not only conveys that the game features reenactments of events around the Battle of Normandy, but also implies that these skirmishes will unfold with all the cinematic production values of based-on-a-true-story Hollywood movies. So in order to feel "real" in an experiential sense, games need not necessarily mimic the everyday phenomenal world in a slavish fashion. The reptilian Covenant, spore-zombie Flood, and various spacecraft of Halo's universe don't look like anything any player has seen firsthand-even less so the kawaii fairy-tale milieu of Katamari Damacy or the psychedelic Tron-esque abstractions of Rez, yet the experience of these games can feel as or more immediate than the most faithful military shooter. We accept these worlds with the same suspension of disbelief that we bring to animated films and special effects epics; it is the level of detail that feels real, not necessarily what those details visualize.

These evocations of cinematic unreality can be built into the structure of the game as well as its character design and fakephysical environmental. One of the most remarkable features of Electronic Art's Battlefield 2: Modern Combat is the novel way it handles multiple first-person perspectives during combat in its single-player campaign mode. "See modern combat the way it was mean to be seen," boasts the game's Web site, but in fact it provides a way to visualize combat that no one in the real world has ever seen. If you aim your character's point of view toward a different soldier and press a controller button, suddenly it's as if you're a disembodied consciousness zooming with unearthly speed across the landscape and into the other soldier's head. At first, this move seems like a uniquely videogamic solution to a long-standing design problem for squad-based shooters: how to toggle smoothly between the perspectives of the different men you control. But consider further how the phenomenological sense of the transmind swoosh borrows from recent movie models like Being John Malkovich or the snaky digital zoom-a cyborg child of Hitchcockian kino-eye, Fight Club testostero- vision, and Matrix disembodiedness-now seen even in mainstream action films like Mr. and Mre. Smith. Both cinematic and video game versions of the move rely on the fantasy of the physical world as informatic database, and movement through space a mere matter of point and click.

Recent war games, however, take as their overt premise the replication of certain aspects of the real world. This practice can be categorized as deAcriptive realism: the decision to model explicitly elements of the game out of the artifacts, tactics, and mathematics of actual war fighting. It is the stuff of a military reference book translated into playable form: authentically designed weapons, vehicles, uniforms, equipment, and bases, and a slightly obsessive trait borrowed from older war gamer PC titles. The virtual material contained within these games could be cribbed from the pages of Soldier of Fortune, or at least GunA & Ammo. In Delta Force: Black Hawk Down, for example, your character doesn't just carry a gun. He carries a CAR-i5 5.56mm AR M2o3 Grenade Launcher, carrying 30o rounds with 30 rounds per clip firing 11.6 rounds per second, or a M21 7.62mm Sniper Rifle carrying 20o rounds with 20 rounds per clip that fires 2 rounds a second. This artillery-nerd factor appears not only in historical war gaming, but in any contemporary or nearfuture game not based on real, specific events, such as America:e Army, the various Tom Clancy series, Battlefield 2, or Conflict: Global Terror.

Descriptive realism befits a visual technology that is increasingly photorealistic, yet essentially distinct from the indexical basis of photography: unlike its nineteenth-century predecessor, computer-generated imagery has no natural relationship to any real-world referent. Thus, this relationship must be demonstrated, constructed, or asserted by other means-usually some narrative back story about the making of the game. This is why, in fact, virtually all real-war titles have promoted the involvement of one or more subject matter experts in its development. Usually retired commanders who served during the era in which the game is set, subject matter experts (or SME's) testify to the games' attempts at verisimilitude; they're often deployed in promotional television spots and are frequently interviewed in gaming review publications. In 2002, IGN interviewed two Delta Force soldiers who advised the development of Black Hawk Down, along with Novalogic PR representativ, Marcus Beer. Identified only as "A" and "B" due to the classified nature of Special Operations, the pair discussed the compromises necessary for making a realistic yet playable game. For example, they report that the game includes far more frequent gunfire than the actual event, but attempts to models the unregimented fighting style of the Somalians on their self-taught streetlearned tactics. "Not only does it give us the expertise on

weapons handling and basic procedures that we haven't picked up on, it also gives us additional credibility," Beer said of their involvement. Whether or not such mechanical minutiae are actually accurate is ultimately beside the point; just the level of detail itself imparts a realistic feel. Most players don't know whether such details are correct or not.

Not all subject matter experts hail from the military: some are veterans of make-believe wars. Director John Milius, for example, advised on the production of EA's Medal of Honor: European A.eeault, based on his experiences directing films like Conan the Barbarian and Red Dawn, as well as his pedigree as a World War II history buff. Milius, however, does have a tangential military affiliation. "Of course, I'm a guy from the ICT: the Institute of Creative Technology, which is like the Rand Corporation, a think tank," he told an interviewer for video game cable network G4 TV in 2005. "We did very, very complex war games there for the Pentagon, and we still do that. So I did know a little about this."

As its title testifies, Sony's hit SOCOM: US Navy SEALA franchise takes a particular interest in capitalizing on its connections to the real-world military: the game was produced with the consultation of the U.S. Naval Special Warfare Command, and the connection is a major part of the game's marketing. "Realism is a huge factor," SOCOM's product manager told the Seattle PoAt-Intelligencer in 2003. "Because of our association with Naval Special Warfare, the missions in SOCOM aren't just a figment of some programmer's imagination-they are portrayals of what actually could take place in the field." The Navy may have a special interest in promoting the U.S. Navy Sea, Land, and Air Corps: they are the Navy's most elite Special Forces, trained for unconventional, counterguerrilla warfare, and therefore undoubtedly in great demand for the ongoing War on Terror. The game itself is set in the near future, and focuses on antiterrorist missions in far-flung corners of the globe. Though SOCOM is not an official Navy game in the manner of Americane Army-all its marketing carries the disclaimer "The U.S. Navy provided technical assistance, but does not officially endorse this product"-it would be naive to imagine that the Navy lent its name to a commercial product without considering the potential public-relations benefits. One game in the series even includes a minidocumentary about the real Navy SEALs. During wartime, having the SOCOM brand attached to a cool pop-culture product can't be a bad thing for the Navy.

SOCOM was one of the first games to popularize online play for console systems. In a 2003 television ad for SOCOM, a group of American teenagers engage in an online multiplayer game against an opponent who's kicking their asses. The end of the ad show's who they're playing against: it's a group of real Navy SEALs. A 2005 magazine ad for SOCOM explains that "up against the most skilled Special Ops force ever assembled, enemies can run but they can't hide. Welcome to the world of the U.S. Navy SEALs, where stealth, intelligence and teamwork are your tools for protecting freedom across the globe.... Terror may know no bounds. But neither do the elite warriors of the U.S. Navy SEALs. Ready or not, here they come. Hooyah." Across an image of men in ski masks transporting parts of a missile into the back of a van, the ad's title reads: "Wherever freedom is threatened, SEALs are there." The ad also includes the Naval SEALs' official Web site, listed below Sony's Web site for its Playstation console. The official Navy SEALs insignia, a golden eagle entwined in an anchor, is incorporated into the logo for the game.

Similar connections are stressed in the publicity for games whose involvement with the

military goes beyond mere consultation, like Full Spectrum Warrior and Americas Army, as detailed in previous chapters. The Marines have gotten in on the act as well, working with Destineer to produce CloAe Combat: First to Fight, a commercial video game based on a training aid used in the Marines, in the manner of the Army's Full Spectrum Warrior. But unlike Full Spectrum Warrior or Americas Army, First to Fight is set in a realistic near-future scenario: an insurgent uprising around Beirut in 2oo6, and its characters are based on real individual men currently serving in the Marines, rather than typically fictional characters.

In an ad for Americas Army: Special Operation-e, Special Ops soldiers in camo are seen donning night-vision goggles, getting into a helicopter, and flying off to a mission. The scene freezes as computery text appears onscreen: "How to spot a video game developer." On a shot of the goggles, they're identified as "glasses"; a soldier's armored vest is a "pocket protector" and the chopper is his "cubicle." The ad concludes with a voice-over reminding viewers that Americas Army is "the only video game developed by the world's premier land force, the U.S. Army." Imitating the look of contemporary Army recruitment ads, the spot is shot in an inky black nighttime, and cut with an MTV swagger. Ubisoft used a similar theme to promote the release of its commercial console version of the game, America:a Army: Riee of a Soldier, in 2005. Print ads for Ubisoft's game displayed a photo of a U.S. soldier in desert camo, gripping a smoking machine gun as he peers above a Middle Eastern cityscape. Underneath, in letters stitched with tan thread on olive-green fabric, the tagline declares: "Our game developers don't rely on imagination."

But both Kuma and Americae Army stress their games' close relationship to the lives of real soldiers; like America;e Army, Kuma promotes the fact that actual troops play Kuma\War, for instance. Upon launch, Kuma announced that it would provide free subscriptions to anyone with a ".mil" e-mail address. Later on, the company added a "Quotes from Players in the Trenches" section to its Web site. "This game actually makes me flash back and think about the war and the aftermath," read a specially featured quote from a "SGT from HHC 1/64 Armor, 3rd Infantry Division(M), but that's not necessarily bad. Being that I will be going back to Iraq for a 3rd tour, I'll say that it's much better fighting from my PC behind a desk then actually slinging lead at each other." Kuma also sponsored a promotional "Stories from the Front" contest, asking players to send in their personal accounts of warfare; the winner would see his or her entry turned into a playable game. The prize went to the Iraq-stationed Sergeant Major James Ross, whose story became the Kuma\War mission number 41, "Baghdad Convoy." The game includes digital versions of Ross and his real-life comrades as characters.

Another Kuma mission has even closer Army ties. According to a January 2005 press release, Kuma designed its "Ramadi Convoy Exercise" mission in collaboration with the Army's Combined Arms Support Command. "The Army provided military insights, helping to ensure the accuracy of the re-creation so it could be used to train U.S. troops," Kuma's press release reports. "The mission highlights one of the most dangerous and deadly scenarios American soldiers face in Iraq today-the IED (Improvised Explosive Device) attack." According to Kuma's description of the game, "players experience what it is like to be part of the twice-daily convoy operations trying to make their way to deliver material, food and ammunition to the troops on the frontlines in Ramadi, Iraq. Dubbed `the suicide train,' and always a favorite for insurgents to attack, the exercise shows the dangers convoys face and the devastating effects of an IED attack, as players must use the same tactics, weapons and vehicles used in actual warfare to defeat the enemy and

ensure the precious supplies make it to the troops on the frontlines."

You're History

A third level to video game realism can be termed historical realism: the re-creation not merely of real things, but real events, large or small-scale, in some approximation of how they occurred. This needs little explanation for games like Black Hawk Down, Conflict: De.ert Storm, or Vietcong: Purple Haze; the representation of specific moments in military history are their overriding concepts. The allure here is the idea of experiencing some version of these past events firsthand. Even those who remember the Gulf War, for example, probably recall fairly abstract media representations of it: pixelly bomber footage of "surgical strikes" and ML&eile Command-style explosions going off in the night sky are two of that war's iconic images. But by playing Conflict: DeAert Storm, a gamer can indulge in the fantasy of experiencing that event in greater detail, from the "inside," behind enemy lines, as it were. The Black Hawk Down soldier can shoot his way out of downtown Mogadishu; the Conflict: DeAert Storm operative can slink past Republican Guards into an air-base; the Vietcong soldier tries to just survive during the Tet Offensive.

Even if these games do base certain scenarios on historical incidents, their selection of these incidents is of course highly filtered. No Vietnam game puts the player in the shoes of an American soldier perpetrating a massacre of civilians at My Lai, and no Gulf War game displays charred corpses of bombed Iraqis lying by the sides of highways. These big-budget games remove all the vast moral complexity of war, and boil it down to a standardized narrative, far more simplistic than even the average Hollywood film. Even if a game takes on a gritty, "war is hell" feel, all good guys must be good, the bad guys bad, so that no ethical quandaries trouble the player-or its subject matter experts. Delta Force: Black Hawk Down, for instance, sought to reverse the popular perception of American involvement in Somalia. "That's the key thing across the board," Delta Force: Black Hawk Down's publicist said in an interview alongside the game's military subject matter experts. "As we've said, it wasn't a failure. To a certain degree it's about setting the record straight."

However, garners often downplay the significance of historical subject matter. For many of these games, the specific historical setting is not essential to its game play; most see it as more a way to package the experience than anything else. The settings and premises of video games are like what Hitchcock called a MacGuffin: something used as a mere excuse for the thrills of a greater narrative machinery, but not otherwise important in itself. The plot of Hitchcock's The 39 StepA, for instance, centers around an unspecified set of British military secrets: they could just have well have been purloined jewels. Such is the case, it is often argued, in video games: shooting Somalis with a machine gun bears inconsequential difference from zapping zombies with a laser blaster; both settings are mere excuses for triggerhappy game play.

Technology writer Clive Thompson tested this sentiment in an article for Slate about the reception of Medal of Honor: Ruing Sun in Japan. In the game, you play an American Marine fighting against the Japanese in the Pacific, ultimately infiltrating the island nation itself. Japanese game reviews, he found, had barely anything to say about the potentially disturbing fact that Japanese players would be slaughtering characters representing their own countrymen.

"We're accustomed to thinking that a piece of entertainment is nothing but its cultural content," Thompson writes. "A movie or TV show is just what you see on the screen. But a game is also about play, and play is invisible. That's why outsiders are often puzzled by the success of games that would appear to be nothing but screamingly offensive content. They can't see the play. Sure, you've got raw guts flying around-but for the player, part of the joy is in messing with physics (even if that happens to be bullets and shoulder-launched grenades) or with strategy (even if that's figuring out how to starve a village)."

Games are indeed modes of action-activities, not just representations. Yet adding an overarching historical narrative to a game can add a layer of meaning-and uncanniness-that a more fantasy-based game would not have. Given how insistent game companies are in promoting the historical veracity of their war games, it is difficult to play these without some moments of divided consciousness, without thinking about how you are at some level reenacting a historical occurrence. In Medal of Honor: Rieinq Sun, for instance, finishing each level rewards the player with an unlocked movie: black-and-white newsreel documentary footage of the actual event you just played. Playing the earliest chapters of the game, I could not help but think about my grandfather, who had himself fought in the Pacific during WWII, and was a veteran of the attack on Pearl Harbor, the event framing the opening segment of Rising Sun. As I maneuvered my way through a sinking warship, perishing multiple times until I found the correct means of escape, I pondered how strange it was that I was reenacting a horrific, soul-altering episode in my grandfather's life, an event that resulted in the deaths of many men he knew, and subsequently plunged the U.S. into the largest war in history. What would he have thought that the attack on Pearl Harbor, six decades later, had become something to kill a little time with on the weekends? (Or that I was in fact participating in a second-form simulation, at least as equally indebted to the imagination of Michael Bay as to the historical record?)

On another occasion, I spent a late afternoon with Rising Sun picking off Japanese soldiers in Burma, usually by shooting them in the head with a sniper rifle as they popped up from hidden foxholes, like armed whack-a-moles. After far too much time with my Xbox, I ventured beyond my apartment to attend a screening of Hara Kazuo's The Emperor:& Naked Army Marches On. A controversial Japanese verite-style documentary from 1987, Hara's film follows Okuzaki Kenzo, an obsessed and deranged antiwar activist who's on a mission to confront veterans linked to a military execution of two Imperial soldiers in New Guinea at the close of World War II. Hara and Okuzaki barge into the homes of elderly ex-soldiers, where the activist harangues them about their involvement in the affair. Few are forthcoming, though one reveals the incident involved forced cannibalism. The climax of the film involves the interrogation of one particularly frail veteran who served on the execution squad and remains resolutely tight-lipped about the event. Okuzaki suddenly wrestles the old man to the ground, punching him in the face repeatedly as Hara's camera continues to roll. The veteran's wife calls the police, as she calmly insists on "no violence" from her physically demonstrative houseguest.

The juxtaposition of Medal of Honor: Rieing Sun and The Emperor's Naked Army Marches On could not have revealed a starker contrast. Hara's film, shot decades after the event, reveals the war as an invisible, unspeakable trauma, something still churning within the men who fought it forty years earlier. In Hara's film, the events of World War 11 are never seen, yet they are nevertheless felt in a powerful way, like lingering ghosts haunting the souls of the living. Rising Sun is filled with representations of the war, but they are just bodies without ghosts, images of

hollow CGI puppets, bereft of interior experience, mere targets for my Thompson Mi SMG, Mi9ii Pistol, or Type 97 Hand Grenade. There are some elements of historical realism that war games aren't capable of-or at least have not yet been designed to achieve.

Thompson is correct in one major regard: if Rising Sun were a crappy game, I would not have stayed with it long enough to ponder its existential resonances (note, for example, that I'm not bothering to delve into my experiences with digital lemon Black Hawk Down). But this does not mean that its historical meanings are beside the point of the game experience, even if they may be ancillary effects, about which it is difficult to generalize. With gaming companies pushing historical realism, pondering the gap between their increasingly intricate simulations and the lived experience of actual people seems inevitable. Playstations, PCs, and Xboxes are plentiful on American bases in Iraq: how many young servicemen experience those perhaps unsubtle twinges of double vision, as they snipe virtual insurgents inside imaginary Middle Eastern cities? And after all, isn't this creepy, semimorbid disjunction part of the appeal of video games in the first place?

The Sick Factor

The makers of Kuma\War argue that their games have an educational, or at least informational value, allowing players a better understanding of how contemporary events have transpired. "We can let you experience the news in ways the networks cannot," Kuma CEO Keith Halper told Wired in 2004. By transforming this information into a virtual, explorable space and creating a playable narrative, Kuma claims that it wants to approximate a documentary in game form. The project gives new life to the title of the old historical-dramatization television show You Are There.

A similar argument was made by the creators of JFK Reloaded, a commercial downloadable simulation of President John F. Kennedy's assassination produced by a Scottish company that debuted on the forty-first anniversary of the event. Its makers claimed that the game was a serious attempt to explore the Warren Commission's "lone gunman" theory: the player's perspective is that of Lee Harvey Oswald's schoolbook depository aerie, looking down to the presidential limousine moving through Dealey Plaza, and the challenge is to kill Kennedy with three bullets in the exact same manner the Warren Commission's report alleges. Each shot is judged on a point scale for how closely it matches the three theoretical trajectories of report; the company offered a cash prize to anyone who scored a perfect i,ooo. Naturally, the game spurred controversy. A spokesperson for Senator Ted Kennedy-whose office was no doubt overjoyed to field press queries on the matter-simply called it "despicable."

Reviewing the game for Slate, Clive Thompson nearly countered his own argument about the Japanese reception of Medal of Honor: RL4inq Sun; he praised JFK Reloadeds complex ballistics, but found the level of detail too unnerving. "When you peer through the rifle scope, the faces of JFK and Jacqueline Kennedy (and Texas Gov. John Connally and his wife Nellie) are completely recognizable. These are real people who still have immediate living relatives-or, in the case of Nellie Connally, are still alive," he writes. "When I finally managed to kill JFK and watched his head blow open while he flopped forward like a rag doll, I was genuinely horrified. The game wants you to think about what's happening as a mere physics experiment, but you can't, nor would you want to."

Thompson's shift in focus is testament to how moral boundaries for video games currently remain in flux. Garners galore came to the defense of Rockstar's ultraviolent but brilliant Grand Theft Auto series, yet JFK Reloaded saw few public apologists. And the makers of Medal of Honor and JFK Reloaded alike play into this rapid change. For Electronic Arts, their slogan "Real War, Real Games" sells the novelty of being able to play unprecedentedly "real" simulations of famous historical events; in a few years, Medal of Honor will look clunky, but for now, it's relatively close to the cutting edge. The makers of JFK Reloaded sling some boilerplate hooey about how their game is meant to be educational, knowing full well that links to its site will be forwarded all over the Internet, half in outrage, the rest in prurient curiosity. JFK Reloaded perpetrates the old sideshow trick favored by carnies and exploitation filmmakers: serve up something immoral but seductive, then put on airs of mock seriousness as the cash register ka-chings. The huckster's crocodile tears of moral seriousness help get anyone waffling about the sideshow in the door; everyone else confident enough about their own curiosity is heading in anyway.

This "sick factor" goes as far a back as freak shows and old exploitation films like Facee of Death, but gained an interactive twist as it entered video games with early first-person shooters like Wolfenetein 3D and Doom. The sick factor is the cheap thrill of moral naughtiness-the idea that you can do something immoral without repercussion in a virtual world-and anyone who enjoys games knows well this pleasure. It is the raison d'etre of play-the-criminal games like the Grand Theft Auto series and its imitators, and cannot be discounted as part of why war games are so pleasurable. Even more than the practice of war itself, war games release us into a realm where our normal moral compunctions may be discarded: we can kill other people and destroy property. Some games, like America's Army, cloak this chance to kill in the formal code of conduct that the real Army theoretically abides by at all times. Other games allow for a more free-for-all experience, to various degrees. If these games were designed with the same level of moral complexity as films like Saving Private Ryan or The Emperor's Naked Army Marches On-fleshing out your puppet-opponents into more fully realized human adversaries-they might not be so fun.

An Education in War

JFK Reloaded may have been nothing more than a flashy exploitative prank, but others have proposed the concept of investigating history through video games more seriously. The History Channel, for example, produced a two-hour television special in zoos based on and named after the video game series Brothers in Arms: a slam-dunk marketing tie-in, perhaps, but nonetheless a novel way to use the visual historical information the game presents. In the special, historical events of World War II are replayed in the game, as a kind of low-budget CGI; these were combined with live-action reenactments and historical newsreel footage, often cutting back and forth quickly within the same scene. As a work of history, it is of course still fraught with the same issues of, say, teaching about the Holocaust using a cinematic work of historical fiction like Schindler:e Li.et.

Some of those few academics who take video games seriously have proposed that games might be capable of more than mere illustration. In his study More Than a Game: The Computer Game as Fictional Form, Barry Atkins offers that games can look at history in ways that noninteractive media like movies can't. Atkins argues that the practice of video gaming allows

the player to engage in counterfactual narratives: speculations based on those "what if" questions often pondered by sciencefiction authors and historians, particularly of the military variety. There are limits to the flexibility of counterfactuals in video games, however: most games have fairly fixed narrative pathways, with the only forking options boiling down to (a) continue or (b) die. "Sandbox" games like Grand Theft Auto or massively multiplayer online role-playing games allow for many more decisions, but counterfactual gaming in these instances seems either irrelevant or unremarkable. However, it's entirely likely that more complex historical-narrative games could appear in the future. Some history teachers have already begun to use games like Civilization, for example.

Historical counterfactuals figure more prominently as the premises of certain Kuma\War games, which allow the player to explore what might happen if alternate plans for the hunting of Osama bin Laden or the rescue of American hostages in Iran had been carried out. But this kind of counterfactual investigation leans toward the tactical, rather than questioning larger aspects of the development of civilizations beyond the outcome on the battlefield. More sociologically detailed alternative histories remain, for now, the stuff of literature.

MIT media scholar Henry Jenkins has suggested that using war games might even have a usefully cathartic effect. "We use games to work through the intense anxieties surrounding modern warfare, to bring it at least momentarily under our symbolic control," he writes. "This view was widely shared among child psychologists in the World War II era who encouraged kids to enact military conflicts and even sanctioned playing the role of the enemy as a way of feeling more control over their lives." ICT and the Office of Naval Research are pursuing this idea in a more clinical manner: a project is under way to retool Full Spectrum Warrior for use in therapy for soldiers with posttraumatic stress disorder. In theory, the game would be used to create "trigger events" like gunfire and explosions as part of a veteran's recuperative process.

The use of war games for serious matters like historical investigation or mental therapy remain specialized, largely speculative enterprises, however. As they are currently designed, historical war games seem little more educational than the toy soldier crazes of the nineteenth century. Men and boys a century ago enjoyed collecting armies of different historical eras and re-creating famous battles with them; toy soldier manufacturers rolled out lines based on the participants of contemporary wars as they were occurring, and noted swifter sales under those circumstances. Young boys and laddish men may have played Cossacks and squaddies as the Crimean War blossomed overseas. While this kind of pursuit might be seen as educational to an extent, it's instructive to recall the words of historian George L. Mosse, who argued that this education was a limited one: "History came alive, but it was history as a military struggle." With video games, it's a particularly shortsighted struggle. None of these games offer representations much beyond the immediate experience of close combat, or at best, stealth operations leading up to the same. The geopolitical ramifications of war, the impact on civilians, the lingering ancillary casualties and long-term psychological effects play no part in video games-not in the least because these aspects of war can't really be made fun.

Consider Kuma's mission number 43, "Abu Ghraib Prison." Players take on the role of Marines tasked with keeping security around the prison during an insurgent attack. Surely there are more complex and pressing historical lessons to be learned from Abu Ghraib than how best to police the actual building, but Kuma's focus on creating action-packed entertainment out of

contemporary events does not seem quite up to the task.

Final Fantasies

Videogames have not always attempted such a straightforward depiction of real war. In the 197os and i98os-an age of lower resolution-references to real warfare were more obscure. The perfectly even formation marching of the aliens in Space Invadere maybe seen as a design limitation of its age, but it also evokes fantasies of fiber-rationalized Nazi storm troopers or Soviet military parades. A 1977 arcade shooter called M-79 Ambueh may be the earliest attempt to evoke a specific historical conflict through a video game. The game took its title from a type of grenade launcher used during the Vietnam War. Its console came equipped with squat, short-nosed guns built to look like their namesake, and the cabinet was decorated with comic-book explosions and jungle foliage.

More often, references to specific weapons or military vehicles were mixed into a scenario based on science-fiction themes, creating an odd blend of history and fantasy, as if to partially disavow any connections to real war. The most famous example would be i98o's legendary Mi.uile Command. Even with its minimalist graphics, the game clearly depicts thermonuclear war, with ICBMs slowly streaking toward vulnerable cities. If a city is hit, it explodes in a little mushroom cloud. ML&sile Command evokes the ultimate Cold War fear, yet its arcade console was printed with cartoons of futuristic winged spaceships, and its marketing included images of Buck Rogers-style spacemen at control panels. The i98o arcade shooter Tomahawk Mieeile pits the player against not Soviets, but flying saucers. This aspect of eighties games could be seen as mere effect of imprecise package design; since graphics capabilities were low, the identities of a game's enemies, protagonists, and setting were augmented by exterior elements like console art, which might present merely a mishmash of stuff young boys might like: laser beams, machine guns, space soldiers. But as graphics became more sophisticated, the blend of reality and fantasy remained. Perhaps the most extreme instance is 199os arcade game NAM-1975, in which an American solider must return to Vietnam in order to stop an evil scientist who has perfected a deadly laser cannon.

Moreover, eighties pop culture frequently projected war into fantasy realms, perhaps influenced by a generation of parents who had seen their peers die in Vietnam. Games like these were to be expected from an era that produced films like Raider of the LoAt Ark, with its supernatural Nazis, or the Star Ware franchise, which translated WWII naval battles into impossibly swift and noisy outer-space dogfights. While the U.S. was led by a movie-star president, the "real American hero" GI Joe transmuted from camo dress-up doll to action figure, leaving behind the real-world enemies he fought before 1970 in order to search out and destroy fictional terrorist organization COBRA. After all, for the first generation of American video game kids, real wars were something that had happened almost before they were born, even if the prospect of nuclear conflict between the superpowers loomed as an horrific possibility.

This blending of real and unreal began to change with the Gulf War, which brought with it a small but significant output of video games based on U.S. and British involvement in that conflict. Most were straight-up tank and flight simulators, designed to show off the graphics capabilities of a new generation of PCs. In 1991, Spectrum Holobyte released one such PC game, Tank, which put players in control of an MiAi Abrams tank on desert patrol. Its box cover

proudly advertised that Tank was "based on the US Army's SIMNET." Software publisher Absolute Entertainment followed with their own series of Abrams first-person sims for Nintendo, Super Battletank: War in the Gulf, and Super Bat- tletank 2, which included skirmishes introduced by a pixelly General Norman Schwarzkopf, while Electronic Arts entered the post-Desert Storm vogue with the popular Mi Abram Battletank. Sega even released a 1994 arcade game developed with assistance from military contractor Lockheed Martin: Desert Tank, a higher-res update of Atari's Battlezone. The air war likewise provided game-developer fodder: in 1991, Microprose released F-15 II Operation Desert Storm, a new scenario for its 1989 title F-15 Strike Eagle II, which had presciently included an original Persian Gulf scenario.

Given the speedy conclusion of Operation Desert Storm, Gulf War games had to alter the odds in order to provide a better game challenge-which also jibed with America's favored selfimage as go-it-alone rebels. "In a curious reversal of America's Gulf War odds, you got to play the US Armed Forces as underdog," J. C. Herz observes of Super Battletank, "It's just you and your 115 millimeter cannon against all of Saddam Hussein's SCUD launchers, mines, helicopters, tanks, and the entire Iraqi army." In other words, it's the Gulf War rewritten with the logic of Battlezone or Space Invadere.

Other Gulf War games were more low-tech. Spit on Saddam, early shareware game for Mac in the black-and-white line graphics of the time, worked like simple interactive propaganda, made to help American computer users get in the Saddam-hating spirit; an informational title screen requests donations to a college fund for dependents of war casualties, to be sent to the game's producers, the Arkansas-based Plaid Software Group. Players earn "expectorant points" (a takeoff on roleplaying games' experience points) by shooting down Scud missiles launched from an onion-domed building, and then spend the points on various forms of spit to be splattered on a crude cartoon of Saddam Hussien's face, which appears as the voice of a G. H. W. Bush imitator drawls, "Come on out, Sadd'm." Ten points get a "raspberry," while thirty buy a "lung biscuit," which is unloaded with a hocking sound effect upon point-andclick. Crudely made and jingo-populist, Spit on Saddam is its era's digital equivalent to a "This Scud's for You" T-shirt.

A stranger attempt at Gulf War exploitation was Operation Secret Storm, produced in iggi by Color Dreams, an infamously sketchy firm that produced low-budget indie games for the Nintendo Entertainment System. Opening with cartoon images of Saddam Hussein surrounded by robed guards, and then a childlike map of Iraq (titled in cute bubble lettering), Operation Secret Storm is little more than a clumsy Mario rip-off. The mustachioed plumber has been replaced by a karate-kicking American operative, who must fight storybook Arabs, bald eagles, armed female soldiers, and eventually Hussein himself, amid a multitiered landscape of oil barrels and palm trees. According to Color Dreams programmer John Valesh, the game was originally titled Who'e Sane Now and was supposed to have been released during the war, but was delayed. The "official reason," Valesh claims, was that Color Dreams staffers were afraid that "Saddam Hussein may try to kill us." The firm had better luck with its more lucrative Christian titles for Nintendo like Spiritual Warfare and Bible Adventure, released through its Wisdom Tree subsidiary.

Foreign Bodies

A notable limitation of these games, from Operation Secret Storm to SOCOM Navy Seale, is that

their depictions of war present almost exclusively an American-or occasionally British-perspective. In this regard, they mirror the conventions of Hollywood cinema and television, who typically find some way to frame global events from an American point of view, thinking that domestic audiences won't identify with a foreign protagonist.

There have been commercial games that have allowed for non-Anglo-American participation in historical conflicts. In hobby war gaming, playing "enemy" sides of historical battles is common, and this aspect appears in some of the more computer war games catering to this crowd. Some World War II PC strategy titles like Atomic Game's 1997 Cloae Combat II: A Bridge Too Far allowed players to fight on the German side; Sega's 1994 Panzer General caused some controversy due to the fact that you could only play a Nazi general (later versions allowed a choice between Allied or Axis perspectives).

Or consider the case Battlefield 1942, which enjoyed a following far beyond the traditional war gaming hobbyist scene. The original game, released in 2002, is set in World War II, and is popular as a multiplayer online game, in which players can take on roles within the numerous Axis or Allied forces and fight battles based loosely on real events. Desert Combat, a free mod created by the U.S.-based Trauma Studios, changes the setting to Iraq during Operation Desert Storm. By far the most successful Battlefield 1942 mod, Desert Combat became particularly popular after the U.S. invasion of Iraq in 2003. While American garners played as American forces, German garners often choose to play Iraqi forces. During a time when many Germans strongly opposed the U.S. invasion, an international debate on foreign policy was being symbolically slogged out inside a virtual Iraq.

Other games appeared from designers outside the U.S. offering an explicitly Arab perspective: the Lebanese Special Force and a pair of games from Syria, UnderAeh and its sequel, UnderSiege. Like the post-9/ii spate of American war-themed video games, these Middle Eastern games portray specific historical conflicts, but do so from radically different points of view. Their very existence is predicated as a riposte to an American-based game culture that disavows the biases of its own game content.

In Under AAh, produced by Damascus-based game publisher Dar El Fikr, the protagonist is Ahmad, a Palestinian teenager growing up under Israeli occupation during the first Intifada. In the game's opening chapter, Ahmad runs through his village, throwing stones at Israeli soldiers. Later in the game, Ahmad moves from stones to guns, and shoots at Israeli settlers attempting to push out the Palestinian villagers. In a dramatic trailer for Under Aeh, a bulldozer destroys a Palestinian home, and Israeli police stomp and kick a Palestinian villager. Ahmad throws a stone into a black void; it transforms into a grenade in midair.

The designers of UnderAeh state their goals explicitly on the game's Web site, citing the lack of video games that allow for a non-American perspective. "The main purpose of the game was originally filling the time of leisure which this section feels and previously filled with foreign games distorting the facts and history and planting the motto of `Sovereignty is for power and violence according to the American style.'" Dar El Fikr designer Radwan Qasmiyya says that the game allows Arabs to support the Palestianian cause, albeit in a virtual manner. "The Arab street is very charged. They believe they can't do anything to help their brothers in Palestine," he told BBC News in 2002. "So I think they are playing because they feel that they can feel the

experience of young Palestinian people living in Jerusalem." ("Like the game," the BBC reporter concludes ruefully, "the nature of Arab support is largely virtual.")

The game's more elaborate sequel, UnderSiege, is set during the second Intifada, between 1999 and 2002. Its narrative draws from true events experienced by Palestinian families during this time; its publisher, Afkarmedia, hopes to release it worldwide. "I just can't wait for UnderSiege to be published internationally," Qasmiyya told an interviewer for Selectparks' blog, "so players can tell the difference between a history game based on lives of real people trying to survive ethnic cleansing and a political propaganda that is trying to inject morals in future marines to justify their assaults on nations far away from their homeland." Short teaser videos for UnderSiege have the air of a brutal documentary. In one, after a child is gunned down in the street, an Israeli soldier jumps from his tank, apparently to rescue him. When he arrives by his side, he appears to finish him off by pounding him with a cement block. In another teaser, a Palestinian religious service is interrupted by an Orthodox Jewish gunman, who mows down the congregation with a machine gun. The latter scenario appears to depict the 1994 attack on a Hebron mosque by Baruch Goldstein, which killed twenty-nine and has historical distinction as the bloodiest attack on Palestinians by a lone Jewish extremist.

Special Force, published by the Hizbollah Central Internet Bureau in 2003, is based on the guerrilla battles waged against Israel during its occupation of South Lebanon, which ended in 2000. Created from the Genesis 3D open-source game engine, its name perhaps unwittingly parallels Americae Army: Special Forcee, released the same year. Its makers say they intend the game to be "educational for our future generations and for all freedom lovers." In the game, players train at a Lebanese war college, firing guns and lobbing grenades at images of Prime Minster Ariel Sharon and other Israeli leaders, and are awarded medals from real-life Hizbollah secretary general Hassan Nas- rallah upon completion. When battling Israeli forces in South Lebanon, players can honor photos of actual "martyrs" at spots of their real-life death. Israeli bad guys shout, "You killed me" in Hebrew when felled. Moments in the game are decorated by Hizbollah's insignia, or a blue Star of David with a hissing snake at its center.

"The military posts that are attacked in the game by the player are the exact replicas of the posts used by the `Israelis' during their brutal occupation," the Special Force Web site reads. "In the game the player has to attack the military post and liberate it as the Lebanese actually did. The player attacks military personal and not civilians; the attack also takes place on Lebanese soil. In the game you will also find pictures of all the martyrs that died during their struggle to liberate their land so that our children may live in freedom.. . Special Force game will render you a partner of the resistance."

A March 2003 Reuters item reported that Special Force was advertised on Lebanese television and promoted by one Internet cafe operator by decorating his business with plastic rifles and sandbags because "guys like that stuff" (a tactic not too far removed from the guns-n-camo militaristic displays decorating American game boutiques around the same time). "The goal is to create an alternative to similar Western games where Arabs and Muslims are portrayed as terrorists," Hizbollah spokesman Bilal at-Zein told the reporter, while an eight-year-old interviewee said he liked Special Force "because it kills Israelis ... I can be a resistance fighter, even though in real life I don't want to do that."

China has also produced its own nationalist game. Set in World War II, Anti-Japan War Online is a massively multiplayer online game designed by Chinese firm PowerNet Technology in collaboration with the China Communist Youth League (CCYL) in 2005. The game allows players to participate in battles waged during the Japanese invasion of China from 1937 to 1945, but only from the Chinese side; the war fighting itself is presented in miniature, its sponsors say, to minimize violence. CCYL official Chen Xiao told news agency Interfax that Anti-Japan War Online is "a patriotic online game that is both interesting and instructive, and can attract and guide young players," created in response to the dearth of games that conveyed a "national spirit." Chen states that the Youth League "will pay close attention to the authenticity of historical facts in the game." Interfax adds that CCYL has already begun projects with other firms: with Guangdong Data Communication Network, the youth group is developing Guohun Online (National Spirit Online), budgeted at more than six million dollars, while with Beijing Magical Digit Company, CCYL plans three other games: Sim Battle: Blue Helmet China, Sim Battle: Sky Dragon, and Sim Battle: Long March, the last title presumably based on brutal military campaigns led by Mao Zedong against the Kuomintang in the 1930s, celebrated for over half a century by the Chinese Communist Party.

Anti-Japan War Online isn't the only Asian analog to American war video games, though it promises to be the most accomplished. Right after September iith, the Taiwanese company INSREA hastily updated a Korean title called X-Tank by adding a desert environment to the game and retitling it Final Battle Afghanistan X-Tank, complete with a photo of Osama Bin Laden serving as its box-cover art. "We're the first company to make software for a game specifically themed on the conflict in Afghanistan," INSREA's marketing director, Hu Long-yun, proudly told the Taipei Times in early 2002, adding "We wish Bin Laden would contact us so we could give him a copy of the game." (The Taipei Times, however, reports that Final Battle Afghanistan XTank's "graphics are dull, the action sleep-inducing and the Afghan map unconvincing.")

Around the same time, a toy company in Guangzhou, China, called Panyu Gaoming Electronic churned out a cheaply made LCD handheld game called Laden ve USA. Its overwrought packaging is decorated with photos of airplanes slamming into the World Trade Center, the subsequent wreckage, and the faces of Bin Laden and a scowling Bush, all mashed up into an overwrought digital collage in imitation of a Hollywood blockbuster advertisement. The game is recommended for "Ages 5 and Up" and seems to have nothing to do with the 9/11 attacks or the war in Afghanistan. The initial levels of the game involve shooting down airplanes and boats with a submarine, depicted with barely discernible graphics using a technology almost two decades old. Upon completion of a level, Laden ve USA plays a pinging version of the Christmas carol "Deck the Halls."

As a slapdash product, quickly shipped out from China's seemingly endless trinket and geegaw factories, Laden ve USA is a video game example of the strangely off-key 9/11 memorabilia that could be found in any American Chinatown emporia within the first few weeks of the event: items like cigarette lighters that seemed to spark flames off the top of the burning towers or added blinking lights to the points of impact, World Trade Center snow globes emblazoned with the slightly inappropriate slogan "Don't Forget," or DVD compilations of 9/11 news footage designed to look like action-packed Hollywood epics. These souvenirs offer a strange blend of crass commercial opportunism and misguided cultural translation; they're the kind of poorly

thought-out commodities that the U.S. once shilled to other nations. J. Hoberman's observation about Chinese 9/11 DVDs with titles like The Centurya Great Cata.etrophe, Surprise Attack on America and American DiaaAter: The Pearl Harbor of the 2lAt Century rings true as well for Laden va USA and its sense of cross-cultural disjunction: "Suddenly, the Chinese were us-enjoying the spectacle of cataclysmic mass destruction from a safe vantage point. Cool!"

POV Shots

While Laden vs USA and Final Battle Afghanistan X-Tank provide interesting examples of non-American attempts to cash in on contemporary conflicts, the overtly political agendas espoused by the makers of Special Force and Under A.eh merit closer attention. Artist and academic Alexander R. Gallowayone of a younger generation of scholars who have recently taken to reading video games as forms of culture-offers a provocative reading of these pro-Arab games, contrasting them with mainstream U.S. games like Americans Army. He suggests that Under A.Ah and Special Force explore the potential for a more complex form of realism in gaming, one closer to a concept of "social realism" that Galloway draws from older art forms like Italian neorealist postwar cinema, the literature of Flaubert, and the painting of Courbet. Social realist artworks, in Galloway's definition, "reflect critically on the minutia of everyday life, replete as it is with struggle, personal drama and injustice"; they provide models of realism based on socially-aware narratives, not mere visual fidelity.

By this standard, he argues, Under AAh and Special Force achieve greater realism than America:a Army, even though the latter game is of a higher technical caliber. The average player of American Army does not live the globetrotting military existence depictued in that game, but "players of Under AA," Galloway writes, "have a personal investment in the struggle depicted in the game, just as they have a personal investment in the struggle happening each day around them." And since Galloway's notion of social realism requires that a game provide resonance with the player's own everyday life, the effects depend on the specific interaction between gamer and game: the actions he or she performs in the game must speak to the greater reality around them. "To put it bluntly, a typical American youth playing Special Force is most likely not experiencing realism," Galloway says, "where as realism is indeed possible for a young Palestinian gamer playing Special Force in the occupied territories. This fidelity of context is key for realism in gaming."

The kind of cultural solipsism that Galloway describes rings true for gaming, in ways that it does not with these other art forms. Many video games are based around conflict, and firstperson shooters especially are structured around an "us" and "them" far more rigidly divided than most novels or films. Games don't do much in the way of conveying the interior experiences of one's comrades or opponents: these forces appear as merely puppet bodies that give aid or deal ill. The single interior experience that takes place is in the mind of the person playing: therefore, military games with real-world themes tend to "play to" the ideological predilections of the gamer. Thus an American playing a game like the Chinese Anti-Japan War Game or antiIsraeli Special Force-or even pondering their premises-could experience a kind of cognitive dissonance, a confrontation with a very different worldview. By interacting with the blinkered viewpoint of another national ideology, the gamer could begin to see the cultural limits inherent in games made to cater to one's own cultural experience. As Galloway notes, the very existence of games like UnderAAh and Special Force have the potential to reveal how peculiarly American are the

viewpoints presented in games like Americas Army, Full Spectrum Warrior, or Conflict: Deeert Storm.

Still, one would hope for games that explore solutions less deadly than the us-versus-them mentality of the real-life conflicts they seek to emulate. One such attempt is a game developed in 2005 at Carnegie Mellon University, devoted to exploring possibilities for peace in Israeli-Palestinian relations. Called PeaceMaker, it is a single-player turn-based strategy game, like SimCity or Civilization, meant for educational use by "Israelis, Palestinians and young adults worldwide." The user takes on the role of either the Israeli prime minister or Palestinian president, and then manages scenarios based on real occurrences. According to the game's Web site, "the player must react to in-game events, from diplomatic negotiations to military attacks, and interact with eight other political leaders and social groups in order to establish a stable resolution to the conflict before his or her term in office ends." A high score merits a "Nobel Prize Winner" distinction; the lowest possible scorer is ranked as "War Criminal." Perhaps PeaceMakerwill become the Oregon Trail of the Age of Terror.

Sideshow of Force

One need not explore as far afield as Chinese or Islamist gaming to experience ideological discord: an underground world of nobudget underground American games that cropped up during the tumultuous aftershocks of 9/11 and the War on Terror can provide just as potent a dose of culture shock. A decade ago, the advent of Macromedia Flash allowed for a whole new type of doit-yourself, low-tech game that melded the simple play of oldschool video games with South Park-style cartoon graphics. In the late 199os, one popular kind of Flash games was the celebrity assassin genre: little shoot-'em-up created so the player can terminate the Spice Girls, Hanson, Eminem, or jar jar Binks. In these brief, gory gunfests, animated photos purloined from gossip magazines are defaced with rifle blasts, blood splotches, and chainsaw wounds.

Assassin games were the descendants of the old pop-sicko Doom mods, gone mainstream in a broadband era. Often structured like ultrashort first-person shooters, the assassin games don't have much game play to speak of, and are often openended free-for-ails or gaming equivalents of one-liners. Simply excuses for ridiculous acts of abuse, they satisfy an urge to deal symbolic harm by defacing someone's image, which is why so many employ photographs. Assassin games give the same basic satisfaction obtained by scribbling over the face of your nemesis in a high school yearbook.

When Newgrounds, a site that aggregates homemade Flash content, started compiling these celebrity shoot-outs, the makers of assassin games began to one-up each other with increased levels of gore, absurdity, juvenility, or even design sophistication. Though many contributors are effectively anonymous, most seem to be teenagers or college-aged. The archives on these sites now seem like kid-culture minimuseums, with games devoted to murdering Pokemon, the Spice Girls, Gap models, and, in one instance, "Steve, the faggot in denial" from Blues Cluee.

After 9/11, that magical date when everything changed, celebrity assassin games underwent a notable transformation as well, and the invisible army of Internet Flash artists quickly rolled out a new assassin subgenre. Within days of the attacks, when many Americans were still confused, anxiety-ridden, and pissed off, games appeared on the Internet that allowed you to shoot, kick,

punch, electrocute, or nuke Osama Bin Laden, helping players point and click toward some modicum of catharsis. In one game, you can shave off his beard with an electric razor; in another, force the Al Qaeda leader to snort an enormous amount of cocaine. Free Osama "skins" began circulating for multiplayer games Unreal Tournament and Quake3: Arena, allowing players of these shootfests to transform a character into Bin Laden for the sole purpose of blasting him to hell over and over again. These anti-Osama games are the latter-day equivalents of the Gulf War's Spit on Saddam-interactive political cartoons, war totems, and digital voodoo dolls-but play to a more organic desire for retribution.

Newgrounds creator Tom Fulp wrote such classic celebrity assassin titles as Beat up Backstreet BoyV and Britney Spears Truck jump. Just three days after 9/11, Fulp uploaded a game he had quickly designed called Bad Dudes ve Bin Laden, inspired by the 1988 street-fighting game Bad Dudea vv Dragon Ninja. In the sick-cute little death match, players control an old-school tough guy in long hair, muscle-tee, and high-tops, who throws some badass martial arts moves at Bin Laden until the Saudi terrorist leader's head flies off, as eight-bit pseudo-Arabic music loops in the background. Fulp acknowledged that there were real-life bad dudes who used 9/11 as an excuse for racist violence. As the game opens, the Bad Dudes announce that "We've got no problem with our Arab buddies ... Except for one," and the game repeats this warning at its end, this time delivered by the Bad Dudes on the White House lawn with Ronald Reagan.

Fulp added a further explanation on Newgrounds. "I've been very conflicted ever since the attack on NYC," he wrote. "I was considering making a tribute movie that portrayed the positive acts that occurred during the aftermath, but eventually decided to stick with my roots and make a violent video game. I have a hard time trying new things. I wasn't sure if a game would be appropriate, but I realized that it really is. You see, America is very sad right now, but it is also very ANGRY. People need a way to vent their frustrations, and I feel this can help. I also tried to pack the game with a positive message. There are a lot of nice people in my city who wear turbans, and I don't want people giving them dirty looks just because of some wacko terrorists. So with that said, go kick Bin Laden's ass!" These Osama- whacking splatterfests may be goofy, but they take as their premise the need to react to an actual traumatic event, and thus tap into a kind of righteous hatred considerably less trivial than mere annoyance with boy bands or Britney. The games can be seen as cathartic for both makers and users: a taste of sweet revenge came both in the act of their creation and in play.

Another early game, Matt Chase's Whack O.eama, refashions the arcade and fairground favorite Whac-A-Mole: photos of Bin Laden pop up out of holes so you can smash them with a mallet. Blow Osama to Hell, by Newgrounds user stuntmonkey666, sends a photo-montaged George W. Bush himself to kill Osama with a pistol. After firing rounds at his body (which collapses limb by limb, like a George Romero zombie), Bush holds Bin Laden's bloody, severed head in victory. Drugfilms' O,eamagotchi provides more elaborate means of destroying Bin Laden. Its name is a play on the Japanese Tamagotchi, a "virtual pet" keychain toy whose owner assumed responsibility for the simulated animal's care and feeding. In O.eamagotchi, the user assumes responsibility for Bin Laden's torture. Under a cartoon of a shirtless Bin Laden in a desert, players choose a variety of violent options from a panel of buttons. Some are straightforward, like a gun that blasts dripping-red holes in his body, or a baseball bat that bitch-slaps his head from side to side. Others are parodic-patriotic. You can make a bald eagle attacks

his head, stick American flags into his body, or order Ronald McDonald and Grimace to assault him. One button makes two anime-style nudie babes appear behind him, bare breasts bobbing - insulting his fundamentalist mores, perhaps, but otherwise causing no harm. OAamagotchi is bizarre enough that it's difficult to tell whether its violent jingoism is in earnest or ironic, though it's probably both.

Given these dark underpinnings, it's no surprise that some games verge into unsavory territory. In the crude first-person shooter Bin Laden Liquore, produced by Fieler Media in 2001 and found on various Web sites, Bin Laden is the proprietor of an American-style liquor store-"secret headquarters of the Al Qaeda," a title declares-in a reference to the Arab-American convenience-store owner cliche. "No attempt to stereotype, condemn or discriminate against any given race, religion, nationality or occupation (except terrorism) is either expressed or implied," a lame disavowal reads before the action begins. Fieler created the equally cynical Mind the Bombs right after the 2005 terrorist attacks in London; in it, players must laser-zap cartoon bombs as they pop up on a map of the London Underground. Neither one of these games appears on Newgrounds, and Fieler's original site for their Osama shooter has disappeared; Bin Laden Liquors lives on, however, traded and hosted on numerous home pages.

Fulp also created an Osama game with creepy overtones of prisoner torture, although it was uploaded prior to the Abu Ghraib revelations. A departure from the retro whimsy of Bad Dudes vs. Bin Laden, Fulp's 2002 Al Qaidamon joins in Bin Laden Liquors' vicious spirit. In another takeoff on the virtual pet fad (specifically Pokemon's Gameboy incarnation), the player has to "take care of" an orange-suited, bearded prisoner in a dungeonlike cell. If you give him doughnuts or brush his beard, a barometer rises from "Geneva Convention" to "Human Rights Activists Approved." Stop feeding him, or batter his face with a boxing glove, and his rating drops all the way down to "Hitler's Approval." At that point, the player can shoot the imprisoned terrorist to death with a gun. "This of course was inspired by the activists who feel we are too hard on our prisoners," Fulp explain in his description. "Now it is up to you to decide!"

A user with the screen name "ViolaVillainess" left this response to Al Qaidamon in 2005: "well ... maybe it's my sick and twisted little mind ... but i wanted more options ... maybe u could have more places where u could shoot him ... a knife would be nice ... and what's the point of putting him in his underwear if u can't low blow him? I'd like for him to bleed more. I'd like for him to respond ... maybe some yells and screams ... to be suffering he doesn't express a lot of agony ... why can't we stone him or drown him? since it's jus a game ... go all out ... but i still like it ... but I'm an angry ANGRY person ... with issues ... and i need more VIOLENCE..."

Blood Lust

The ultimate anti-Bin Laden game went beyond the realm of Macromedia Flash, crafting an elaborate revenge fantasy in the form of a full-fledged first-person shooter adventure. Jason Huddy created Blood of Bin Laden from the engine for Marathon, a game from the mid-nineties for Mac by Bungie. Blood of Bin Laden has the logic of the other Bin Laden assassin games, but pushes the real-life revenge theme to even greater levels of bombastic excess and absurdity. The front page of the game's short-lived Web site (taken down in late 2003) looks like a John Heartfield agit-surrealist photomontage revisited for the Fox News age, cramming together a composition of Bin Laden's face, gas-masked desert soldiers, a map of Afghanistan, and a laptop

displaying photos of the September iith hijackers. Its navigation menu is built on a belt of machine-gun bullets. "Blood of Bin Laden is more than just a means of satisfying America's post 9/11 bloodlust," the site's "About B.O.B.L." section reads. "It's a game that accurately re-creates the exciting events of Operation Enduring Freedom, allowing players to fight the War on Terrorism without leaving their desktop!"

The game begins in Afghanistan, right after the Al Qaedaengineered suicide bombing of the USS Cole in 2000. The player assumes the role of an American covert operative on a mission to destroy those responsible for the bombing; in a terrorist training camp, he finds literal blueprints for the September ii attacks. The action then shifts to Operation Enduring Freedom, during which the player fights Taliban in Kabul (and rescues American missionary Heather Mercer), and ends with a raid on Bin Laden's palatial underground hideaway beneath the caves of Tora Bora. The finale is the chance to kill Bin Laden himself, who is armed with a shoulder-mounted rocket launcher. The game also has an "Instant Gratification Level," which allows players to jump right to the final scene, and kill an army of Bin Laden clones over and over again.

In a parody of big-budget military games' stated obsession with realism, Blood of Bin Laden carries over its photomontage aesthetic into the game itself. Almost everything in the low-res game environment has been converted from newswire photos: Afghan huts, destroyed architecture, U.S. convoys, bright yellow food packets, and nearly identical bright yellow cluster bombs. Enemies are designed from photos of Huddy and his friends dressed up in cheap costumes as suicide bombers, Taliban warriors, and Al Qaeda gunmen, bumped down to chunky-pixeled characters. Some of the most spectacular visuals in the game are the screens that open each chapter, also collaged from photos into a superglossed, heightened reality, satirizing news channel graphic bombastics. The USS Cole blossoms an impossibly beautiful plume of smoke, Taliban crouch in snowy mountain crags, and jetliners zoom ahistorically toward the Twin Towers in unison, which appears backlit by a golden rising sun, while throngs of New Yorkers flood the Brooklyn Bridge below, as in a biblical epic. The final screen is one of Saddam Hussein, looking out over a golden desert emblazoned with the question "Next time ... IRAQ?"

Before Blood of Bin Laden, Huddy created another Marathon variant called LoA Dieneye in 1998. Set in a future world in which Florida had been taken over by the Disney corporation, the game had players shooting their way through the Magic Kingdom, slaughtering trademarked characters and Michael Eisner clones amid the screams of tourist children. "Americans are angry," Huddy told a Wired reporter in a story about the game. "They come home, and they want to kill the boss. Instead of climbing a bell tower with a sniper rifle, they can play Lo.e Dieneye "

Americans may have still been angry in zooz, but their focus had shifted or expanded from corporations to terrorists. Our world had been handed a new map on which to chart our hatreds and anxieties. "We hope our game serves not only as a means of satisfying American gamers' post 9-11 thirst for vengeance," Huddy concludes on the Blood of Bin Laden site, "but also, and more importantly, as a first-hand history lesson to the few who didn't have their eyes glued to the television set every waking moment of that truly historic period. And remember ... If you don't play our game, the terrorists have already won."

Go USA

By pushing their violent, absurd humor to the extreme, games like O.eamagotchi and Blood of Bin Laden convey an ambiguous political valence. They can be taken as examples of American patriotism gone wild, or overblown parodies of the same. Al Qaidamon probably falls just inside the border of in the former camp, while Blood of Bin Laden is definitely closer to the latter. Like games in general, the meaning of the actions performed involves the subjective experience of the player. In this regard, ViolaVillaness's creepy LivejournaI-style response to Al Qaidamon feels particularly disturbing, since she seems to impart no greater meaning to a game based on prisoner torture at all: her desire to see more detailed elements of torture because she is "ANGRY" reads less like an opinion and more like an underexamined cultural symptom. (Then again, as is often the case with Internet postings, maybe she's just some kid talking shit.)

Indeed, at a certain level, many would consider it a quixotic gesture to read too much moral meaning into a genre that is expressly designed to explore the limits of bad taste: after all, some the earliest games on Newgrounds were devoted to clubbing baby seals. If these games were just about sending Bad Dudes to kick Osama's butt, they could be seen as a harmless, populist responses to a traumatic event. But months after g/ii, Newgrounds' archive of assassin games contained substantial subsections devoted not just to games about mutilating Bin Laden, but Saddam Hussein and Kim 11 Jong 11 as well. These bluntly political games parallel the Bush administration's own transference of enemy status from Bin Laden to the Axis of Evil-even if specifically anti-Iran games have yet to surface, no doubt due to the lack of an Baruch Goldstein-style figurehead to punch, kick, or spit on. Like ViolaVillainess, many of us may indeed enjoy dealing out virtual violence in games: one of the great joys of the Internet is exploring forbidden desires without real-life repercussions. Yet here lies a trove of evidence pointing to how effectively we can be influenced by a leader with an agenda as to where we should direct our anger. For all the rebellious in-your-faceness of the Newgrounds aesthetic, so much of the user-submitted content appears to be uncritically compliant with the desires of the Bush administration.

This is demonstrated to the fullest extent in Newgrounds 2002 entry TerrorWar-Da PAYBACK by EvilDave, in which the player points-and-clicks nuclear strikes on a map of the Middle East, guided by red stars indicating sites like Palestine, Afghanistan, Iran, Mecca, Baghdad, "Qatar, Home of Al-Jazeera the Raghead Network," and, for bonus amusement, France. Responses to TerrorWar remain archived on the site. "Next to banging some supermodel, im sure this is everyone's fantasy, nuking the shit out of the middle east. GREAT FUCKING GAME!" wrote Purebastard a few days after the game's release. "FUCK MECCA!!! THOSE RAGHEAD CAMEL FUCKING TERRORISTS FLEW A COUPLE OF PLANES INTO THE WORLD TRADE CENTER, KILLING THOUSANDS OF PEOPLE, SO WHY SHOULDN'T WE BOMB THE FUCK OUT OF MECCA???" screamed another user in a post entitled "GAME DOESN'T GO FAR ENOUGH!!!!" while others added, "A good game to vent out your anger regarding Septic! GO USA, KICK SOME ASS!" and "Woohoo! I got israel! Die Jew Die!!!!!" (A small minority of responses criticized the game; "someone ought to blow you up, you racist fuck," wrote one user.)

Repugnant responses like those quoted above are reminders of the possibility for games to be used to reinforce hatred. Like cinema, literature, or other forms of media, games are certainly not immune from this potential, and they add the ability for players to perform symbolic actions of violence against representations of their particular enemies. This is why game publishers often

create politically correct good-guy characters in war-themed games, as if to defuse this aspect: Viet-Cong has South Vietnamese nonplayer characters as part of your squad, Medal of Honor: Rieing Sun includes a Japanese-American spy who helps the Marines infiltrate Tokyo, the commercial version of Full Spectrum Warrior includes an Arab-American soldier in one squad, and Americas Army offers the option of playing disconcertingly ambiguous "indigenous forces," who are identified as a "unique class [that] mimics the real life indigenous allied forces that work with U.S. Special Forces around the globe," according to the game's site. The over-the-top ultraviolent arcade game Target: Terror includes scenarios that mimic contemporary events and fears (in one sequence, players must kill hijackers of an airliner who intend to crash it into the White House), but the terrorists are depicted as not specifically Middle Eastern but rather, in the words of its developer, "ethnically ambiguous."

With games created outside mainstream commercial channels, however, open hatred can be unleashed freely, without fear of reprisal from government censorship panels or poor sales. There is something of a minor tradition in virulently racist white power games, for instance. Resistance Records, the official music label of the American neo-Nazi organization National Alliance, distributes a game called Ethnic Cleansing, in which the player moves through a virtual New York City in order to slaughter blacks, Latinos, and Jews. The player can outfit his protagonist as a contemporary skinhead, or in more retro Ku Klux Klan hood and robe. Earlier versions of the same idea include the German game Concentration Camp Manager, a crude simulation that awards points for killing Jews and Turks, Nazi mods for Doom (such as Nazi Doom and WP Doom), a PacMan takeoff called SA Mann, Concentration Camp Rat Hunt, which involves shooting Jews inside the Auschwitz death camp, and something simply called Shoot the Blacks.

There are a handful of Newgrounds games that allow play from outside the American perspective. Kaboom! The Suicide Bomber Game is drawn like a children's book: you play a suicide bomber and win points by killing people on a street. Needless to say, it is a one-round game. But even here the game is framed with its author's supposedly apolitical stance (according to his profile, he was seventeen when he wrote it): "By the way, I'm not jewish, I'm not an arab, and I'm not a terrorist. I have little interest in what goes on in the middle east so I don't share any extreme views. I just think people who blow themselves up are stupid. That's all this game is. If anything this is going to be an anti-Yasser Arafat game ... If you found this offensive, tell your friends! If you are DEEPLY offended by this game then you're way too fucking sensitive for my taste and I hope that you've been scarred for life." (Despite the author's stated intention, Kaboom! also appears on neo-Nazi Web sites, who contextualize it as an opportunity to kill Jews.) More bizarre is Fly into the World Trade Center, a primitive flight simulator that zooms over a cityscape filled with endless replicas of the Twin Towers, which the player is meant to smash into over and over again. The humor here is not specifically anti-American, but plays with the shock of the forbidden.

Thinking back to Galloway's analysis of Arab games versus America'e Army, it's instructive to compare the jingo-nihilistic batch of Newgrounds games with those of French Web site Uzinagaz, which likewise traffic in clever flash pastimes with naughty content, but do so from a slightly different worldview. For example, Uzinagaz's celebrity assassin game is the medievalish Axe Throw (or Lance La Hache), in which famous figures are spread-eagled on a wooden plank as targets for a series of hatchets. Players can choose from a wide variety of political

personalities, including George W. Bush, Condoleezza Rice, Tony Blair, Jacques Chirac, Jean Chretien, "Oussama Ben Laden," Saddam Hussein, Slobodan Milosovic, "Muqtada AlSadr," and Fidel Castro. As of late 2005, Bush hit number one on Axe Throw's "Kill Parade" of "most killed top listing," while Chirac is listed at number three.

Possibly the most well-known Uzinagaz game, however is a 9/u-themed number called New York Defender, created by a duo by the name of Stef and Phil. According to Uzinagaz, the game has been played more than a million and a half times (the most popular Newgrounds games also claim to have been viewed over one million times). New York Defender has a similar logic to eighties arcade game Mi.neile Command: you control a powerful laser cannon to destroy a nonstop series of hijacked airliners tearing through a clear blue sky toward the World Trade Center. If a plane crashes successfully, it leaves a smoking scar. If more than one plane hits, the towers crumble in on themselves in a plume of gray smoke. Though at first the planes are easy to zap, soon there are so many that saving the Towers is ultimately impossible. The games' directions simply state (in English): "Use your mouse to fight the feeling of impotence," but this is ironic: it is a game that cannot be won. Thus New York Defender could be seen as a statement on the futility of fighting terrorism, or the irreversibility of historical events. September ii happened; it cannot be undone, even through the fantasy of a game.

Uzinagaz's Baghdad Defender is almost identical in game play to New York Defender, but looks onto the nighttime skies over the Iraqi city, where the player must zap incoming missiles. When hit, Baghdad glows a deep orange. The game does not state whose perspective is portrayed: Saddam Hussein's army? Insurgents? Heavily armed peace activists? Or perhaps, like New York Defender, you play a purely philosophical construct: the desire for events to have been otherwise. In any case, the mirrorimage parallels between New York Defender and Baghdad Defender are themselves meaningful. From the point of view of the city dweller, the attacks are equated; like New York Defender, the Baghdad Defender player is told to use his or her mouse "to fight the feeling of impotence." This, it seems, is the real battle being depicted in the games, and their meaning is deepened in relation to one another.

The French site also includes a game based on the war in Afghanistan, called Enduring Freedom. In it, you fly a bomber over a vertically scrolling desert landscape, dotted with villages, oases, tanks, and terrorist training camps. It's not too dissimilar to eighties games like Activision's River Run, except instead of blocky eight-bit graphics, the icons representing civilian and military areas are round and cartoon-bubbly. The object is to bomb the bad guys without bombing civilian villages. It's not a hard game, but with every wrong move, you cannot help but feel a slight tinge of remorse; after all, you've just killed some innocent people-maybe a wedding party. "Game Over: you have murdered too many peaceful civilians," the game sternly announces at the end of one round, yet might add simultaneously, "Congratulations! You enter top ten scores!"

Antiwar Games

While the Newgrounds' teens were busy crafting novel ways to torture virtual terrorists, other flash designers promulgated games that took a more direct antiwar stance than those of Uzinagaz. One of the earliest to emerge was New Zealander Josh On's Antiwargame, a cunningly designed mini-war simulation with an overtly leftist tack. On is best known for a later 2002 Web

work, They Rule, which allows users to map the personal connections among members of presidential cabinets, boards of directors of major corporations, and other elite institutions-almost like a Friendster for the ruling class. Antiwargame likewise deploys a Chomskyesque politics, but more in the allegorical manner of a political cartoon than a visualized database.

The player takes the role of an American president (Uncle Sam or Aunt Samantha), who must made decisions in the wake of a major terrorist attack. The game consists of two landscapes, each populated by small mushroomlike people-a map of the United States, and a desert dotted with a few oil wells-as well as a manipulatable pie chart indicating budget levels for Military/ Business, Social Spending, and Foreign Aid. The little Americans appear as either blue civilians or green military. Using pull-down menus on each citizen, the player can send soldiers to the desert to annex oil wells or draft them into the National Guard to quell war protesters. Once the oil-guarding soldiers start killing desert dwellers, "media" with cameras appear, who can be chased away using military officers. Throughout the course of the war, the player must balance the budget in response to events as they occur. When a terrorist threat is announced, for example, the game suggests increasing Foreign Aid. If the Military/Business wedge becomes too narrow, a business leader has the president "assassinated" and the game ends.

Achieving an optimal budget in the course of Antiwargame is difficult and may be impossible. The only way to avoid disastrous events appears to be to choose to do nothing: do not alter the budget significantly and do not send troops to the desert. The political message of Antiwargame is determined primarily by the structure of its game play-yoking Military and Business spending into one category, for example, or dictating that increased Foreign Aid will quell terrorists in ways that military actions will not. Thus the message of Antiwargame is as reductive, in its own way, as America:e Army. Antiwargame creates its own miniature fantasy world that does not, for example, allow for the idea that terrorism could ever merit a legitimate military response. In Antiwargame, war happens merely to secure oil wells, and results in increased domestic terrorism-a notion that the invasion of Afghanistan and ongoing military efforts to disrupt the Al Qaeda network would seem to counter, even if the invasion of Iraq does not. An important distinction, however, is that Antiwargame openly announces itself as a political allegory-a parody, even-while Army-subsidized games like America:e Army or Full Spectrum Warrior do not. Like a political cartoon, Antiwargame presents an openly partisan argument or point of view, rather than pretending to aspire to mimetic realism.

A similar comparison could be made between Kuma\War and Newsgaming.com, an Uruguay-based project spearheaded by Gonzalo Frasca, a designer who has also written extensively on theoretical aspects of video gaming, and a "team of independent game developers who believe video games are not simply an amusement." Like Kuma\War, Newsgaming states that its goal is to produce games that respond to current events as they occur. But instead of games steeped in tactical simulations of real-life melees, Newsgaming offers, in its own words, "simulation meets political cartoons" that "can also make us think about what is going on in this world."

Newsgaming uploaded September 12th, a toy world to its site in 2003. In this piece, the player must attempt to kill blackrobed, gun-toting terrorists as they skulk through the narrow pathways of a cutely cartooned Middle Eastern town, making sure not to kill the blue-robed civilian adults and children they move among. But the player's missiles prove to be unreliably messy: it is impossible to strike the terrorists without destroying nearby buildings and civilians. When each

civilian dies, the body remains on the ground near the cartoon rubble, and other tiny civilian figures appear next to it, weeping audibly; before long, the mourners transform into terrorists themselves. The game has no end and, again, cannot be won: after a few rounds of missiles, the town is overrun by terrorists. September 12th achieves a similar effect to New York Defender or Baghdad Defender, but is more explicit in proposing an intended antiwar message of violence begetting violence.

Kabul Kaboom! is another game created by Frasca, prior to the Newsgaming project, with a blunter urgency. On his Web site, Frasca explains that the game was created very quickly, during a single airplane trip in 2001. "I was on a United flight with my wife on [September 11[, and the next time that I had to fly I decided to create a game as a way to deal with my fear," Frasca writes, paralleling many of the statements of Newgrounds game designers, many of whom likewise claim that their games were designed as a means to confront their own post-9/i i emotions. "By that time, there were many anti-Osama online games but, as much as I dislike Osama, I decided to focus on another event ... I was disgusted at seeing how the most powerful country on earth was bombing the crap out of one of the poorest." Frasca designed Kabul Kaboom! as a takeoff on the eighties bomb-catching game Kaboom!. In Frasca's "humanitarian game for a 'humanitarian' war," players try to catch hamburgers falling from the sky without getting struck by missiles that rain down with them. The player's character is an image lifted from Picasso's Guernica of a woman wailing to the heavens as she cradles a dead baby. One quickly discovers the game is almost impossible to play, and it ends abruptly; the final screen is a photo of a bombed-out building strewn with more Guernica body parts and a restart button marked "GAME NOT OVER-PLAY AGAIN."

The most humorous of the antiwar game crop is not really a game at all, but rather a click-through flash sideshow imitating turn-based strategy games like Civilization. Dermot O'Connor posted his Gulf War 2 (aka World War 2.5) in late 2002. The "player" takes the role of a dumbfounded President Bush, who is guided by his advisers to enter a war in Iraq that escalates into an all-out Middle East nuclear conflict, which transpires on a map of the region dotted with icons for armies, missiles, stealth bombers, and other forces. Cheney, Powell, Rumsfeld, Rice, and Ashcroft all appear as taking-head icons, in the manner of the advisers in Civilization, and wartime events pop up with messages spoofing those in Sid Meyer's game. "Baghdad crater is liberated!" announces one such update after U.S. forces finish bombing the capital. Despite its lighthearted tone, O'Connor's game received a great deal of hate mail, ten pages of which he has posted to his site. "You must be French. I think your web site sucks. Why don't you move to Iraq? Communist hippy," reads one (O'Connor is in fact Irish). "Quite possibly the stupidest thing I've ever seen! I guess we need to have another September iith before people like you wake up and realize who we are dealing with here. Maybe you should go live over in Iraq for a while and then you can come home and thank your lucky stars that you are an AMERICAN! (you are an American, aren't you?)" another suggests.

Not all antiwar games took the structure of shooter games as their basis, however. Urtica, an artists' group based in Belgrade, Serbia, created an online game called Lapeu.e Memoriae in 2oo2. Players click on gray squares arranged in a grid of four by five, briefly revealing pairs of black and white icons that resemble corporate logos. The goal, as in the card game Concentration, is to match pairs of symbols. When the player makes a match, the screen shifts to an animated display of the icon, which is revealed to literalize the official names of military

actions from the War on Terror or the post-Communist wars in the Balkans, ranging from Operation Infinite justice (the temporary name for the 2001 war on Afghanistan) to Operation Amber Fox (a contemporary NATO action in Macedonia, symbolized by a stylized fox's tail). According to its designers, Lapaue Memoriae is about the way such brandlike names evoke "an unconscious erasure of all negative connotations connected to the concept they refer to." Its makers may or may not also realize that it recalls card games used in the nineteenth century to train French officers in military terms, World War II card decks that taught American soldiers to identify the shapes of Japanese and German aircraft, or even the famous "Most Wanted Iraqis" playing cards developed by the U.S. Military in Iraq. Lapeu,a Memoriae ends when all the pairs have been matched, but in their statement about the game, Urtica says that "in this game nobody wins."

Most of the antiwar games mentioned-New York Defender, Baghdad Defender, Antiwargame, Kabul Kaboom!, and September 12th-all share a similar trait: they are games that cannot be won. (Even Newgrounds features one anti-war game from 2002 along these lines, Enduring Pipeline, which is similar in structure to September 12th, but enacted with mere stick figures.) A hackneyed sentiment about war-as-a-game, perhaps, but in the context of video games, it is one that can be made on an experiential level rather than simply that of content. Gonzalo Frasca argues that video games have traditionally limited their outcomes to a mere "binary" win/lose structure. The outcomes of real war, of course, are far more complicated than this, but most commercial war video games avoid this fact by focusing on the acts of single individuals or small groups of characters. Thus the Vietnam War cannot be won by American troops in Viet-Cong: Purple Haze, nor does the Intifada overthrow the Israeli government in Under AAh, but in both cases the survival of the protagonist becomes the game's goal. By throwing out the option of winning, antiwar games refuse to allow for even this limited feeling of triumphalism.

Anne Frank as Princess Toadstool

At the same time, a more nuanced exploration of war is possible in games, beyond a simple-and simplistic-structure predicated on either the experience of victory or its denial.

In his essay "Ephemeral Games: Is it barbaric to design video games after Auschwitz?," Frasca describes a hypothetical version a game that could take on a topic as serious as the Holocaust. (Frasca's essay takes its title from a famous phrase by philosopher Theodor Adorno, who stated that it would be barbaric to write lyric poetry after Auschwitz: an event of worldhistorical ghastliness should never be aestheticized.) Regardless of content, using a normal video game to portray the Holocaust would be offensive, Frasca argues, for reasons inherent in the very structure of video games as we know them. Because the game can be restarted, the player would not feel the weight of moral responsibility. "For example," Frasca writes, a player "would be able to betray other prisoners and make the guards shoot them. In case the rest of the prisoners would react by criticizing or even attacking him, all he would need to do is to restore a previously saved version and he would be able to get away with his crimes. In other words, the environment could become a simulator for sadists"-not unlike actual racist games that appear on neo-Nazi sites.

This observation can be easily extended to military video games. In Conflict: Deeert Storm, for example, the player can pick off civilian Iraqi farmers and shepherds if he or she wishes, or even play target practice on goats. Whether this constitutes true sadism is debatable, but it

undoubtedly happens without the "weight of moral responsibility" that such real-world actions would merit. But often designers seem to take this sadism-simulator potential into account. In many games, it is impossible to shoot your compatriots, or even anybody aside from designated enemies: unloading ammo into them has no effect at all. In America'e Army, soldiers are removed from the game for a period of time if they let off friendly fire. In neither case are these actions given the dramatic or tragic import they would in, say, a film or graphic novel.

More perniciously, Frasca postulates, the very nature of a typical video game's win-lose logic would make the Holocaust "a secondary issue, an object to overcome." This is not dissimilar to Clive Thompson's claim that Japanese garners saw little import in the content of the Pearl Harbor-themed Medal of Honor: Rising Sun; after all, most war games play out in more or less similar fashions, with only superficial differences in styles of weaponry, type of terrain, and ethnicity of opponents. "If we followed that logic," Frasca says, "the player could follow a `correct' path in order to save Anne Frank from death," and with the ability to restart a failed mission, life and death "would lose their ethical, historical and social value." By extension, one could say that any ethical qualms or historical resonances felt by the player-such as my deja vu in playing Rieing Sun-would be determined outside the game itself, and thus beyond the control of the designer. A neo-Nazi, for example, might use Frasca's Holocaust game as a means to delight in Anne Frank's slaughter.

A contemporary equivalent of Frasca's Holocaust game could be a game in which you play someone trapped in the Twin Towers during the September iith attacks. In fact, a notorious proposal for such a game did surface in 2003. Called 9-11 Survivor, it never got beyond a few examples of concept art posted to its Web site, which were enough to cause outrage on their own. Frasca criticized 9-11 Survivor's premise on his blog, Ludology.org, calling it "nothing but the Disneylandation of terror," spurring a great deal of blogger discussion.

In order to avoid these dangers, Frasca suggests a hypothetical video game with a highly experimental structure. Such a game would be single-player, so as to allow the designer more control over its play. Its narrative should be irreversible, so the player would have to deal with the consequences of his or her actions without being able to simply restart; by extension, when game characters died, their demise would be realistically irrevocable. Most radically, any given player should only be allowed to play a given game a single time, in order to ensure its irreversibility and finality. For this final requirement, Frasca suggests that his hypothetical games could be "scheduled," as unique events. "Our only solution would be to transform the game into a happening"-borrowing terminology from the oneoff countercultural art events of the i96os. "The game could be scheduled for, let's say, next Monday at 8 P.M. Every player would have to log in at that moment to start playing. After that, nobody else would be able to start playing that game, ever. It would be the exact equivalent of missing a happening: you simply can not show up three days later."

Frasca's hypothetical Holocaust game remains a philosophical toy rather than a real one, but is nonetheless interesting to ponder as a kind of mythical object. It should be considered not so much an actual blueprint, but a commentary on how far outside the norm designers might have to go to make video games about real war that approach the gravity and nuance of older art forms like literature or painting-games that work not just as entertainment, but as art. In this example, Frasca suggests that games might have to become a little less like games as we have come to

know them, and a bit more like theater.

The Art of War

The concept of video games as art is nonetheless a fait accompli: during the same first five years of the new millennium in which real war became an important new theme for commercial games, a new generation of visual artists began to use game technologies in their work. By 2005, the practice had gone from underground to trendy. And many of the best of these game artists have at one time or another taken on the topic of war-an unsurprising confluence, given the frequency of that same theme in commercial games. Noncommercial games like LoA Dieneya, September 12th, Lapeue Memoriae, and They Rule have all been classified as art upon occasion, as museums, curators, biennials, and galleries have extended their reach onto the Internet. One might even consider the anti-Osama games as a form of digital folk art. Like more traditional artworks, these games have either a single author or a relatively small group of authors as opposed to a corporate imprimatur; they are intended to convey a message, meaning, or experience not otherwise available through commercial entertainment; sometimes they are virtuoso expressions of programming cleverness or design wit-a legacy of the hacker culture of the 196os. Like commercial games, game artworks can succeed or not, but their goals and standards of value are very different. Most importantly, the line between high art and homemade fun is not always clear, however-Huddy's Blood of Bin Laden could be taken as a work of ironic art that purloins mass-media culture in the pop traditions of Warhol or Rauschenberg, or it could thought of as just some fucked-up thing someone made because it was sick-cool. In a field so new, the distinctions among commercial designer, amateur hacker, and studio artist are frequently irrelevant.

The fact that many of these games do not seem to allow for a salable object in the manner of paintings or sculpture does not hinder this classification, of course: the dematerialization of the art object is an old story by now, and contemporary art is well acquainted with such unmarketable art-stuff as performance art, Web-based art, conceptual art, and activist art. (And all have found a way to be bought and sold, in due time.)

Not all works of art made from games remain participatory; some artists have used game engines and footage from games to create works that are installed in a space as nonplayable video art pieces. A spectacular example is Diplomatic Arena, created in 2003 by Belgian-Canadian-American art-and-architecture collective Workspace Unlimited, using the engine for Quake III Arena. The artists populated vast gravity-free spaces with scores of armed, automated characters outfitted with the faces of terrorists and world leaders, programmed to frag one another endlessly in an orgy of carnage, forever blossoming with clouds of red blood and body parts. The sound track is an audio cut-up of CBS News-a copyright-infringing mash-up called "Rocked by Rape," by Evolution Control Committee-consisting of ominous headlines uttered by Dan Rather and driven by sampled AC/DC guitar riffs: "mysterious murder-chemical terrorism-military targets" and so on, in a looping litany of disaster. The upper left-hand corner of the screen keeps an ongoing tally of who's killed whom before they respawn and start all over again: "John Ashcroft ate Subcomman- dante Marcos's grenade," "Condoleezza Rice was shredded by Dick Cheney's shrapnel," "Al Gore Jr. was gunned down by Osama Bin Laden." The viewer can alter the point of view or perspective of the game as it plays itself, but that's all.

Workhouse borrows the slaughterhouse aesthetic of Diplomatic Arena from video games like Quake or the celebrity assassin genre to create an object of contemplation. Adding real-world figures into the gunfest brings any number of potential allegorical meanings to mind: one could interpret the work as a commentary on how we must watch helplessly while these figures wage eternal war with one another, and moreover do so as a sort of entertainment. The work could be seen as a wish fulfillment: like twenty-first-century versions of the Shahnama's Kaid, world leaders have decided to stop deploying armies and minions, and simply kill each other directly, leaving soldiers and innocent civilians out of it. Certainly if, as in Diplomatic Arena, Osama Bin Laden and George W. Bush had just shot at one another and left it at that, our world would be a safer place. Or perhaps Diplomatic Arena is simply a vision of Hell, where power-hungry world leaders have been condemned to destroy each other forever.

While not lifted directly from a video game, John Klima's 1999 Serbian Skylight might be the oldest artwork to deploy the visuals of war-themed games. Installed horizontally, so the viewer looks up into a video projection as if it is a window onto the sky, Serbian Skylight displays CGI missiles falling downward. The number of bombs is based on figures the Brooklyn-based Klima nicked from Department of Defense briefings at the time regarding the American bombing of Kosovo that year, so Serbian Skylight serves as a dramatic example of data visualization.

Klima pursued the same concept more elaborately in The Great Game, a work from 2001, named after the term used during the British Empire to describe that superpower's military and espionage operations in Afghanistan. Klima produced The Great Game at a time when images of the U.S. military action in Afghanistan were hard to come by; each day, like a news junkie, he sifted through the Department of Defense's written public reports online about the operation, and then rendered this information onto a digital, geologically contoured map of Afghanistan, using custom-made 3-D icons to represent aircraft, cities, military bases, humanitarian relief drop points, and other items. With several weeks of this data, he combined the maps into a Web-based Java applet that allows the user to zoom through the changing landscape via click-and-drag. It's as if Klima reconstituted a homemade analog of the same military simulations that one assumes American commanders used in the action event itself. Like Diplomatic Arena, The Great Game creates the sensation of a game we are allowed to watch, but not control; in this case, the model is a strategy game rather than a first-person shooter. Klima accentuated this aspect further when he moved The Great Game from the Internet to the gallery. As an installation, The Great Game runs on a video screen mounted to the front of a kiddie-sized blue helicopter ride (resembling, perhaps accidentally, the early Link "Blue Box" trainers). After the viewer sits inside the cockpit, the ride moves about on its own while the screen's image flies over an approximation of real wartime landscape.

A different kind of visualization is provided by British artists Ben Langland and Nikki Bell, who created an interactive digital replica of a house in Afghanistan briefly occupied by Osama Bin Laden. Commissioned by Manchester's Imperial War Museum, The Houee of 0.eama Bin Laden allows viewers to navigate through a three-dimensional digital model of a modest-looking abode that sits in an almost idyllic, unpeopled setting. The house resembles a video game environment awaiting action: an empty artifact, like ICT's digital Parthenon, Bin Laden's house reminds us of the continued elusiveness of its former inhabitant.

Log in, Sit in

Velvet Strike is an antiwar project that goes beyond the boundaries of the gallery, infiltrating Counter-Strike, the terroristthemed mod for Half-Life that has in recent years been the most popular networked first-person shooter in the world, with over 150,000 people playing some version of the game online at any given moment. In Counter-Strike, players choose to be members of either a terrorist or antiterrorist squad; game play includes killing each another with AK-47s and sniper rifles, destroying opponent bases, and taking and rescuing hostages. In addition to the usual text-based taunts and boasts found in online gaming, Counter-Strike players can shoot logos and other images-"sprays"-onto the walls of the game environment. Typical sprays partake of online gaming's playful macho-nerdism: porn models, band and musician logos, anime or manga girls, and graffiti-style tags for their clans.

Created by Anne-Marie Schleiner, Brody Condon, and Joan Leandre, Velvet Strike is not a modified game in the usual sense: it's a modified game practice, a way of simulating protest inside an imaginary world that parallels the real-life War on Terror. Its name calls to mind Czechoslovakia's bloodless Velvet Revolution of 1989. On the Velvet Strike Web site, launched in 2002, players can download antiwar sprays for their Counter-Strike characters, then unload them inside the game world. Schleiner created sprays with enigmatic slogans ("Shoot love bubbles" scribbled over a teddy bear with a gun, "War is Funny," "Refugee Camp Here," or "Hostages in Military Fantasy"), while Condon posted images of Counter-Strike terrorists embracing counterterrorists in various homoerotic poses, subliminally conveying a "make love not war" vibe. Others are wordless feminine images meant as a nose thumbing to the game's mostly male users: a cartoon of a mother cat licking its kitten, or girlish chalk-drawn hopscotch patterns sprayed on the ground. Users have also uploaded their own Velvet Strike sprays to the site: many are blunter, with messages like "We Are All Iraqis Now" and "Stop the War in Iraq and Go Home."

Velvet Strike also includes "recipes" for counter-CounterStrike activities to perform inside the game-virtual versions of sit-ins or love-ins. One suggests grouping your team in the shape of a heart, refusing to fire at anyone, and typing "Love and Peace" repeatedly into chat. Another recommends piloting a transport ship filled with unsuspecting fighters off into the landscape, far from any enemies, so they can't fight. Or players could perform a more drastic sacrifice: "During the battle, tell everyone you are martyrs for peace, then jump off the tallest structure in the level, killing yourselves."

The idea of performing antiwar actions inside Counter-Strike originated with Schleiner. She remembers attending a workshop in Spain about modifying computer games, in fall 2ooi. While at the workshop, she first heard that the U.S. had begun war in Afghanistan, just as some workshop participants were playing Return to Cantle WolfenAtein nearby. "The sounds of the weapon-fire echoed off the concrete walls of the workshop warehouse space," Schleiner writes. "What I once approached with playful macho geek irony was transformed into uncanny echoes of real life violence. At that moment, that room was the last place I wanted to be." Invading Counter-Strike appealed to her not simply because of its popularity, but also its pretense to military realism within a terrorist-themed setting. "Maybe there is something ultimately subversive in the knowledge that it is only a game, that at any moment you may switch sides with the 'other,' Ithatl you may play the terrorist side in Counter-Strike," she says. "But reality games pretend to erase this awareness. And if you are going to converge network shooter games and contemporary middle eastern politics into a game ... then you leave out a number of

complexities such as economics, religions, families, food, children, women, refugee camps, flesh bodies and blood, smell etc."

Expectedly, the Velvet Strike team received a great deal of mostly negative e-mail in response to their Counter-Strike in-game theatrics, with counter-protests ranging from "it's just a game" to "GO PLAY WITH YOUR BARBIE!" and "What's with all the feminist bullshit?" Many complain about having the intensity of their play ruined by nonviolent Velvet StrikerA. "You, and those like you are the reason why the US is spiraling out of control," wrote one player. "People are too wrapped up in their feelings, worrying about the inequality in video games, and if its too soon after (said in a hushed, awed voice) 9/11 to be playing games."

Another furious Counter-Strike player pulled the New York City card and claimed to have lived near the World Trade Center. "I saw people jumping out of those towers live, not on some TV. I smelt the smoke, heard the rumble, felt the earth shake. Those are images and feelings that are indescribable ... And when you say that we should not be at war with Afgnastan [sic], it makes me stomach turn and my heart sink. I cannot begin to describe the anguish I felt after 9/ii " As in so many other online confessions centering on politicized video games, this player sees military games as a cathartic experience, akin to virtual Osama-bashing. "Although I can understand why you feel this way, I do not understand why you have to ruin the game for those who enjoy it. CS was my way out after 9/i i. I played alot of CS after that, in order to take out my anger against those 19 bastards who caused the destruction of the WTC. Please, do not ruin my game.

Even politically sympathetic commentators have questioned whether Velvet Strike does any good: is anybody really recruited to the antiwar cause by ruining a game? This concern seems to miss a more important point. In a medium known for so many other kinds of unauthorized hacks, cheats, and mods, "ruining" the game could otherwise be seen as just another way to play it. If the Counter-Strike world was created as a place in which garners could play war, what's to stop anyone from using it to play antiwar? After all, civilian protests are as much a part of the experience of modern conflict as anything else, and fantasizing about the power of AK-47s is not too different from fantasizing about the power of protest. "Reality is up for grabs," Schleiner writes. "The real needs to be remade by us."

Head Games

"I think American garners play with a sense of irony, distance and humor," Eddo Stern remarked to critic Holly Willis. "This comes from the distance that Americans have from the people they fight." More so than any other contemporary artist, Eddo Stern has explored the convoluted relationships between the reality and fantasy of war in video games, and does so equally as avid game enthusiast, knowledgeable designer, and sharp critical thinker. Take for instance his 2003 sculpture Fort Paladin: America's Army. At first glance, it looks like a small castle, about half a foot high, made from off-white plastic. Its base, in a nod to the maps of tabletop hobbyist war gaming, is a set of green hexagons. On one side, where the drawbridge might be, is a video screen running images of America:e Army; in front of that is a keyboard outfitted with a series of robotic fingers, clicking away at the keys. Turns out the sculpture is an elaborate case-molded PC which has been programmed to play America:6 Army on its own. The whole package evokes the roots of computer games like America:e Army in pen-and-paper strategy games, marrying a

nostalgic Dungeon & Dragon nerdism to the bitter ironies of a recruiting game played out during a real war.

A former soldier in the Israeli Army, the Tel Aviv-born Stern frequently cites in interviews a particular videogaming experience that occurred when he was a student in the U.S., during one of his frequent bouts of playing Command and Conquer online in 1997. "Someone sent me a message saying, `I heard you lost six commandos yesterday,' " he recalls. "I realized they were talking about the news, not the game. They were talking about six Israeli commandos who got killed in Lebanon that day. I kind of freaked out for a second. I saw myself playing with these little commandos, it seemed a ridiculous investment in fantasy."

Subsequently, Stern enfolded the real-world Israeli-Palestinian conflict with the often historically anonymous violence of video games in a seventeen-minute video from 2000, Sheik Attack. Stern's video retells the history of Israel using footage from various video games to illustrate different eras. Clips from Age of EmpireA, set to hippyish Israeli folk songs, depict early utopian Zionist farmers; the growth of Tel Aviv is experienced as towering buildings from SimCity and a rave-techno sound track. So far, the video is almost cute. But as the images give way to sequences lifted from a first-person shooter, with tiny figures falling from bullets aimed through a night-vision scope, a new unease emerges: these little dying men now represent Palestinians, picked off by an Israeli sniper. They have lost their anonymity; Stern has given back to these images a connection to the realities of history. Then comes a tense sequence taken from some Tom Clancy-style squad-based espionage game: a commando skulks through the upper floors of a dimly lit house, his gun's floating red crosshairs searching for its goal. The commando finds a woman inside one of the rooms, kneeling on the floor with her arms behind her head. He shoots her, and she crumples.

At some screenings of Sheik Attack, viewers have gasped at this moment in the video; not because they have not seen violence like this before in movies or games, but because they are shocked at feeling remorse at the death of a video game character. Even without a specific referent (is the woman a Palestinian assassinated by an Israeli, or could it possibly be the other way around?) we understand that, at some level, the image we just saw represented the death of a real human being. Sheik Attack recalls the hypothetical Holocaust game described by Frasca: removed from a standard game structure, these images regain a moral weight.

Using a similar process, Stern depicts the Vietnam War with game footage in his 2003 video Vietnam Romance. Here, however, the effect is a calculated opposite to Sheik Attack. Mashing up images from Vietnam-themed games (as well as others like Grand Theft Auto and Deer Hunter) with drony MIDI files of stereotypical era music ("California Dreaming," "Knocking on Heaven's Door," etc.), Vietnam Romance evokes a pitch-perfect re-creation of films like Full Metal Jacket, Platoon, M*A*S*H*, and Apocalypse Now. The effect is one of moral weightlessness inside of a pop construction. Stern says the video evokes a "sickening nostalgia"; it is a peculiarly American memory trip, one in which the legacy of a gruesome war has become indistinguishable from pleasurable, if mythic-tragic, entertainments. Stern's 2004 video Death.etar culls its images from a slew of Osama- killing games. Shots of cartoon Bin Ladens being shocked, chopped, skewered, and punched are set to music from The Last Temptation of Christ and The Passion of the Christ. Digital Osama dies a thousand deaths for the real Bin Laden's sins.

Some of Stern's work is interactive. As part of C-Level, a Los Angeles-based game design group whose members include Brody Condon, Stern helped create the game Waco Resurrection, built on top of Garage Games' torque engine. Like many contemporary war games, Waco: Resurrection reenacts a real conflict, in this case the 1993 showdown between federal agents and David Koresh's Branch Davidian compound. In the game, you play from Koresh's point of view, as well as his worldview; your abilities include divine powers from God. In order to operate the game, players don giant papier-mache helmets fitted with voice recognition microphones. Each helmet is based on Koresh's face: you play the game by literally getting inside his head.

Perhaps the ultimate example of Stern's desire to return the fantasy world of games to its roots in reality is Tekken Torture, made with Mark Allen, which has been staged at various venues since 2001. It's a modified version of the fighting game Tekken 3 that comes with a special electrified armband for each player, hooked into hacked Playstation 2. As the characters battle on screen, each hit translates into a jolt of pain for its controller's arm. In public events, volunteers play until they can't take the pain any longer.

Violent Pop

Many of these artworks and underground games were created between 2001 and 2004, during three years in which war and terrorism seemed to infiltrate every part of life. The U.S. lurched from the September 11th attacks to anthrax scares, the invasion of Afghanistan, and eventually the war in Iraq. By 2005, long after protests, red versus blue consternation, the re-election of George Bush, torture at Abu Ghraib, and the debacle of Hurricane Katrina, those tumultuous three years began to feel distant. Neither Osama Bin Laden nor weapons of mass destruction had ever been found, the White House administration became embroiled in multiple ethics scandals, and President Bush's popularity fell to a record low. Utopian dreams of blossoming democracy in Iraq and Afghanistan became tempered by the day-to-day toil of reality. After the mania and anxiety of the post-9/ii years, the culture was beginning to come back down to earth.

At the end of 2005, tony Pace-Wildenstein gallery in New York held an exhibit devoted to art made from video games. PaceWildenstein was not like the grungy underground spaces, avantgarde biennials, or specialist digital-art salons to which this genre of artist was heretofore accustomed. It was a cavernous, megabox space in the swank Chelsea art district, more used to painting and sculpture rather than consoles and keyboards. But for an exhibit called "Breaking and Entering," Pace-Wildenstein had gathered some of the best-known names in the field. Brody Condon and Alexander Galloway were included, as well as Eddo Stern, whose Deathetar looped its spurts of cartoon Bin Laden blood near the gallery's entrance.

In the far back corner were two installations by Cory Arcangel, a younger artist who was quickly becoming known as the punkish Andy Warhol of video game art; he did with Nintendo and Mac what Warhol did with Brillo and Campbell's Soup, taking pop culture objects and resituating them in ways humorous, clever, and enigmatic. Arcangel was already notorious for his 2002 installation called Super Mario Cloude: hacking into the source code for Super Mario Brothere, he had removed everything from the game except its blue sky and clouds, then reburned the altered program back onto a Nintendo cartridge and-bingo-video art played off a flea-market game console.

At Pace-Wildenstein, Arcangel premiered two new works. One was his first example of purely "found" art: a game he called Bomb Iraq i99o. After buying an ancient early-nineties Mac at a thrift store in Buffalo, New York, he had discovered on its hard drive a little game built from the old Hypercard software. The game was merely a click-through slide show of a black bomb flying toward a map of Iraq. When it reaches it destination, the map explodes in a squiggle of black lines. Now almost literally a museum piece, Bomb Iraq 1990 felt like a missing link antecedent to the explosion of real-war commercial titles and terror-era homemade online games.

But it was easy to miss the tiny desk holding Bomb Iraq 199o as Arcangel's second piece loomed above it. Called MiG-29 fighter and cloude, this was a hack of a 199o game MiG-29 Soviet Fighter by indie developers Camerica for the NES. It involved three massive video projections onto Pace-Wildenstein's gigantic, warehouse-sized walls. Two of the images were clouds, taken from the game in manner of Super Mario Cloude, but whizzing to the left on one screen, and to the right on the other. In between them was the biggest screen, which held nothing but a single MiG jet fighter taken from the game, in all its pixelly sixteen-bit glory.

The image of the Soviet-made jet fighter was perfectly still, save for a minimalist four-frame animation of the plane's exhaust flames. Together with the two screens of moving clouds, the whole piece had an eerie effect of simultaneous movement and stasis. Presenting an artifact from the tail end of the Cold War combined with one from the first Iraq war, Arcangel's enigmatic artworks seemed to quiver in historical time. They reminded us that technology had advanced in the last decade and a half, and video games become more realistic, but somehow we had shifted from one kind of global conflict to another. The rules may have changed, but the old game remains.

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"In treating of the general problems of culture one is constantly obliged to undertake predatory incursions into provinces not sufficiently explored by the raider himself," Johan Huizinga wrote in his 1938 introduction to Homo Ludene. "To fill in all the gaps in my knowledge beforehand was out of the question for me. I had to write now, or not at all. And I wanted to write."

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