AN ATLAS OF ARMAGEDDON:

INTERPRETING CULTURAL HISTORY IN A NUCLEAR MISSILE SILO

by

ERIC BAUGHER

(Under the Direction of Ian Firth)

ABSTRACT

Conventional historic preservation of military artifacts and sites is typically limited to presenting technological context and/or official military history. Cultural context is usually ignored in developing preservation strategies for these sites. This thesis explores ways in which the Atlas F Intercontinental Ballistic Missile (ICBM) came to embody cultural fears and concerns about nuclear technology, including ways in which these fears were expressed in cultural media. It then goes on to argue for a more culturally inclusive, dynamic, interpretive approach to preservation of historic military landscapes and architecture. Using a specific Atlas F ICBM silo, three possible design alternatives are generated as examples of how to present relevant cultural history on such a site.

INDEX WORDS: historic preservation, landscape architecture, military landscapes, public history, cultural history, Cold War, ICBM, Atlas F, nuclear missile silos, nuclear weapons, cultural museums

AN ATLAS OF ARMAGEDDON:

INTERPRETING CULTURAL HISTORY IN A NUCLEAR MISSILE SILO

by

ERIC BAUGHER

BA, St. Mary's College of MD, 1998

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF LANDSCAPE ARCHITECTURE

ATHENS, GEORGIA

2003

AN ATLAS OF ARMAGEDDON:

INTERPRETING CULTURAL HISTORY IN A NUCLEAR MISSILE SILO

by

ERIC BAUGHER

Major Professor:	Ian Firth
Committee:	Marianne Cramer
	James Dowd
	Henry Parker

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
May 2003

ACKNOWLEDGEMENTS

I would like to thank a few folks who helped keep me sane through the process of writing this thesis. First and foremost, I want to thank Professor Ian Firth, my major professor. His guidance and advice was invaluable in conceiving and putting together this project. Moreover, he is and has been a marvelous resource to the students in the landscape architecture program here at UGA. The program will have difficulty replacing him as he embarks on his career as a "flaneur."

Second, I would like to thank the other members of my committee, Marianne Cramer, James Dowd, and Henry Parker, who have taken the time to review this thesis and offer their comments and ridicule.

Third, I want to thank my classmates. Everybody in the MLA program made the entire experience here in Athens a hoot. I'll miss y'all. In particular I want to thank Andrew Walter for helping juggle thesis ideas along the way and for being an upstanding citizen and roommate all around. I also want to thank Lauren Brandes for leading by example these last three years, and more importantly, for being there when I needed her.

And of course, I want to thank my family for their support. I could not have made it through the last three years without them, especially Mom, who always was there to help with some problem or another. Thanks.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

"History! Read it and weep."
(Vonnegut 1963, p. 168)

Fig. 1-1: An 11 megaton thermonuclear test blast conducted near Bikini Atoll on March 24, 1954. (Department of Energy 2003)

Revelations:

An hour south of Tucson, Arizona, just below the surface of the Sonora desert, lurks a relic of the Cold War that was capable of destroying civilization. Today, that same historic relic has been given new life as a unique tourist destination-- the only place in the country where you can currently view a fully preserved Intercontinental Ballistic Missile (ICBM) in a formerly operational silo. This is the Titan Missile Museum, and it once housed the largest nuclear missile the U.S. ever built, the Titan II, which had a range of 9,000 miles and the ability to carry a 9-megaton warhead (Vanderbilt 2002, p. 36). After being retired from "active duty" in the mid 1980's, this site was turned over to the Arizona Aerospace Foundation. The silo was then converted into a museum in 1986 (Walton 1998).

Touring the restored silo today is a sobering experience. Virtually everything within the silo's launch site is just as it was when the site was "on alert." "The second hand continues to sweep around the dial of a clock set to Zulu time (Greenwich mean time). Banks of now-antiquated computer equipment still hum, lights blinking. The data tape remains on its reel, ready to feed new targeting information to the missile" (Masters 1995). Above ground, vehicles, refueling equipment, and other physical artifacts are on display. Below ground, the control room remains seemingly frozen in time. "Painted in stereotypical institutional green, its equipment racks are loaded with computers that were state of the art in their day, but have already become [obsolete historic] artifacts" (Walton 1998). One of the main attractions of the one-hour tour offered by the museum is the experience of turning one of the two master keys that would have been used to launch the missile. When this is initiated, status lights blink wildly along the control panel and a

loud klaxon announces the last chance to abort a launch (Walton 1998). In the missile chamber itself, two picture windows have been cut in the launch duct wall to facilitate viewing of the missile in its silo environment. Also visible in the sealed chamber are two "lifelike" mannequins in standard issue rocket fuel handling suits, seemingly performing a routine maintenance task on the missile (Titan Missile 2003).

In general, the nature of the tour is informative and educational. Though reminiscent of a Hollywood wax museum or a "Washington-slept-here" roadside attraction, the experience provides a sense of what it must have been like to work in such a silo, patiently awaiting the signal to unleash the unthinkable fury of a nuclear device several hundred times more destructive than the bomb dropped on Hiroshima in WWII. Nevertheless, something is lacking. This site represents a milestone in history, a turning point that irrevocably changed American culture. Despite never having laid eyes on the silo interior during its operational period, millions of Americans had grown up in mortal fear of this sort of place. Once the ICBM was introduced to the American landscape, it became a cultural icon synonymous with global apocalypse. The resulting psychological impact was pervasive. How many millions of Americans had nightmares or bouts of paranoia and anxiety fueled by the conscious or subconscious knowledge of the existence of these ICBMs?

The Titan Missile Museum only relates part of the story. While it provides an adequate introduction to the logistical workings and physical appearance of the site, the museum's interpretive treatment conspicuously fails to address the matter of cultural context. The museum does little to illuminate the impact the Titan had on society. This is ironic in that the presentation of the restored silo is meant to convey to the public a

sense of the missile's importance in American history, and yet minimal attention is given to how the missile influenced the lives of everyday Americans. Only the effects on the lives of those few soldiers that worked directly with the missile are addressed.

This lack of reference to any meaningful cultural analysis is indicative of a problem common in preservation projects tackling military landscapes and structures. Typically, such projects emphasize military history or technological context rather than broader cultural implications. Questions of how the sites and structures were developed and adapted, how they affected the course of a war (or wars), and how they altered general military strategy are often explored. Questions of how the developments influenced society over time, however, are not. In particular, the breadth and variety of cultural reactions to the existence of these artifacts are ignored in favor of a more sanitized presentation of the "official" story. Presentation of historic military artifacts could be made far more compelling to the general public if a stronger connection were made between the artifacts and their effects on everyday life.

Much of the military technology developed during the Cold War had far-reaching impacts. Now that the Cold War is over, many of the structures and landscapes associated with this period are rapidly deteriorating from neglect. In fact, some sites have been left abandoned and unattended for more than half a century. Over the past few years, the field of historic preservation has begun to directly address the weighty and difficult issues involved in preserving these Cold War sites. One of the more promising candidates for preservation treatment in the upcoming decade is the Atlas F-Intercontinental Ballistic Missile silo.

The Atlas Series of missiles were the first fully functional American ICBMs. Like Titan II, Atlas F was a liquid-fuel nuclear missile, launched from within a hardened silo complex, and capable of traveling several thousand miles to strike a target on the other side of the globe (Gibson 1996, p. 10-11). The development of the Atlas ICBM system was approved by the National Security Council in January 1955 (Day 1988 p. 14). Over the following ten years, a total of 72 Atlas F silo complexes were constructed, at an approximate cost of $29.2 million each (Vanderbilt 2002, p. 168). Most of the silos became operational in the early 1960s, and by June 1965, they were officially deemed obsolete and taken off duty (SiloMan 1997-2003). Though their tenure in America's nuclear arsenal was very short, less than six operational years, they nevertheless ushered in a new era in American history. During this pivotal period America and the world learned to live with the invisible threat posed by a cadre of underground nuclear weapons capable of being launched in less than fifteen minutes and wreaking untold destruction on distant cities.

Today, the remnants of the 72 Atlas F silos inconspicuously dot the American landscape near Air Force Bases mostly in the Midwest and Southwest. These silos are distributed in dispersed squadrons of twelve missiles each at six different locations. The subsurface structures of the Atlas F are enormous. The silo itself is as tall as a twelve-story building, and several hundred tons of concrete and steel encase the interior spaces. From the surface, however, these structures are well hidden and easy to miss from nearby county roads and state highways. Site features consist primarily of a security fence surrounding an area of a few acres. Within the perimeter, only a small number of metal pipes and a large concrete slab indicate the presence of something more significant. In

fact, these sites "could easily be mistaken for small electrical power substations." (Day 1988, p. 8). Their innocuous appearance, however, belies their true cultural importance.

In his book, *Discovering the Vernacular Landscape*, J.B. Jackson notes that the traditional definition of "landscape" found in most dictionaries is flawed and antiquated, being over three hundred years old and intended for artists. Landscape is generically defined as a "portion of land which the eye can comprehend at a glance" (Jackson 1975, p. 3). This view of landscape came to inform the perceptions of gardeners of the eighteenth century, who tended to create "painterly" designs, landscapes that were in essence uncomplicated pictures (Jackson 1975, p. 3). The irrelevance of this definition for analysis of Cold War military landscapes is obvious when considering the Atlas ICBM. The emotionally charged political and military decisions that led to the promotion of this technology, and the wide diversity of cultural reactions that were produced during its development and construction, suggest the true significance of the Atlas landscape is impossible to "comprehend at a glance.' Rather, to understand the relevance of such sites, we need to look beyond the pictorial representation of the artifacts themselves in favor of a much more complex, inclusive view of the enveloping context.

In terms of revealing this cultural context, the Titan Missile Museum presents an oversimplified, "picturesque" treatment to the public. It fails to go deeper than the surface issues of operational appearance and technological context. How can the treatment of an Atlas F ICBM silo be done differently so as to ensure the presentation of a more pluralistic view of the effect this ICBM had on the culture at large?

This thesis explores this question in an attempt to shed light on how preservation treatment can be adapted to convey a meaningful history accessible to multiple levels of society. As such, it is a theoretical design exercise that culminates in the presentation of three treatment alternatives for a specific Atlas F ICBM site. The design alternatives are meant to illustrate novel ways of presenting the cultural context of the Atlas during the period in which the Atlas was being developed, introduced, and maintained as operational. Central to addressing this problem will be the resolution of the site's physical issues with the potential methods of presenting interpretive narrative.

The next three chapters deal with the latter of these two issues. Presenting history to the public is an exercise in storytelling. To make it accessible and give it meaning, the history has to be interpreted in a narrative framework. Chapters 2 and 3 begin to establish a framework by detailing some of the diverse and contradictory themes that are associated with nuclear weapons and the Atlas ICBM. These themes can eventually be applied to the presentation of cultural history in the design alternatives. What ideas did these weapons come to symbolize in the post-World War II political environment? How did the culture respond to their existence? Chapter 2 introduces the policies formulated during this period that led to the eventual development of the Atlas ICBM. It also suggests how nuclear weapons and the Atlas F came to symbolize the new role of America in world politics. Chapter 3 surveys the many ways in which the culture reacted to these powerful new symbols. In particular, it suggests some of the means by which nuclear weapons were represented in various cultural media, ranging from high art to the rhetoric of social movements.

Chapter 4 tackles the issue of how to present an interpretive narrative to the public. It outlines some of the recent scholarship in the field of history and preservation that can contribute to a richer presentation of cultural context. It then goes on to apply these ideas to an analysis of three military preservation case studies that serve as useful points of comparison when approaching the design for the Atlas F.

The physical integrity of the site is critical in determining possible spatial arrangements and circulation patterns within design alternatives. It also affects the methods of preservation treatment that can be utilized. The physical limitations and opportunities that exist on an Atlas F site are presented in Chapter 5. Features characteristic of all Atlas F ICBM silos are detailed, as are specific nuances of the site chosen for the design exercise—silo site SMS 579-4.

The interaction of the issues of physical integrity and interpretive narrative are resolved in Chapter 6. This chapter details how these issues are combined in different ways to produce the alternative designs. The different combinations suggest some of the ways that cultural history can be presented through unconventional treatment approaches. They also suggest what a more inclusive, complex interpretation might look and feel like.

Though the argument and the final design alternatives presented here are site specific, the analytical process and theoretical underpinnings are applicable to many other preservation dilemmas. The field of preservation in general has been slow to embrace an interpretive, inclusive, and dynamic approach to treatment that looks beyond the issues of architectural theory and "historical accuracy" to embrace the more important issues of how humans connect to historic architecture and landscapes. As such, the author hopes this thesis contributes to the field of preservation by advocating a more intuitive,

complex, and unorthodox approach to the treatment of historic structures. With luck, the lessons drawn from this thesis will eventually find practical application in the field as historians begin to tackle the difficult issues involved in preservation of Cold War artifacts.

CHAPTER 2

THE POLITICAL CONTEXT

"Now I am become Death, the destroyer of worlds."
– J. Robert Oppenheimer after the test of the first atomic bomb
(Henriksen 1997, 6)

Into the Atom

With the dropping of the atomic bomb on Japan in 1945 and the subsequent end of World War II, the course of world history and international politics shifted. The legacy of WWII, and the political ideologies borne out in the decades following, pushed America into a new era of political turmoil, paranoia, and technocracy. The cultural context from which the Atlas-F ICBM was wrought evolved from the chaos created in these influential years. The advent of nuclear weapons not only ushered in a new era of destructive capability in American history, they also introduced many Americans to the serious ramifications of unchecked military power.

The following chapter briefly explores some of the post-WWII political trends and cultural attitudes that came to be symbolically and literally embodied in nuclear weapons and the Atlas ICBM. These ideas not only suggest the rationales for the development of ICBM technology, they also offer insight into why the Atlas ICBM became such a powerful cultural icon. In combination with the ideas introduced in Chapter 3, these themes present a general overview of the breadth and contradictory nature of the subject matter that are presented in the final design alternatives of this thesis. The inclusion of such a wide variety of viewpoints and ideas help make the

presentation of cultural history complex and rich, adding multiple layers of meaning discernable to various segments of the public.

War without Battlefields

World War II witnessed a change in the way war was conducted. No longer were military installations and personnel the primary targets for attack from slowly advancing surface troops. Now entire cities became targets from high-speed, high-elevation aerial forces without the capability to discriminate between soldiers and citizens. The dense population centers of cities—composed primarily of women, children, and the elderly now that most of the able-bodied men were involved in fighting—became targeted along with military and industrial installations. At first, only the Germans, Italians, and Japanese targeted enemy cities on a large scale in this way. The Allies, however, stymied by the paradoxical concept of "precision bombing" from several miles above the Earth, eventually adopted the same tactics (Hewitt 1983, p. 260-270). As the war went on, the "distinction between combatant and noncombatant began to blur" (Vanderbilt 2002, p. 49-54). Ultimately, Allied efforts in bombing far outpaced those of the enemy. The apex of this ongoing urban holocaust was the Allied incendiary bombing of Tokyo in 1945, in which 80,000 civilians, mostly women, children, and the elderly, were killed in an engineered firestorm of tremendous proportions. In terms of the sheer number of casualties, it was the "single greatest man-made calamity ever," worse than the atomic bombings of Hiroshima and Nagasaki combined. (Vanderbilt 2002, p. 59)

This military strategy had its roots in the First World War. The Italian military theorist Giulio Duohet had originally pushed for the use of aviation in the bombing of

population centers during the early 1920s, but was dismissed by his superiors. With the burgeoning application of aerial bombardment, however, his ideas carried more clout. The concept of city annihilation suddenly presented itself as a practicable art. Duohet summarized the implications of this paradigm shift.

> No longer can areas exist in which life can be lived in safety and tranquility, nor can the battlefield be limited to actual combatants. On the contrary, the battlefield will be limited only by the boundaries of the nations at war, and all of their citizens will become combatants, since all of them will be exposed to the aerial offences of the enemy. (Duohet 1942, p. 9-10)

In essence, aviation had made the nations of the world vulnerable to attack in ways they had never been before.

With the later introduction of the ICBM in the late 1950s, this fact was driven home in a more compelling way. The ICBM became the quintessential urban-annihilation machine. The political isolation America had long relished as a result of its geography was eventually "rendered moot by the advances in aviation, first by the long-range bomber, then decisively by the intercontinental ballistic missile" (Rose 2001). An ICBM attack could be launched without warning and take minutes to reach its destination. By the late 1950s, the nations of the world became precariously interconnected by a shared vulnerability to nuclear devastation. In many ways, borders no longer mattered.

Political Internationalism

The frightening urban holocausts wrought through advanced technology during World War II forced President Truman and his government to realize there could be no

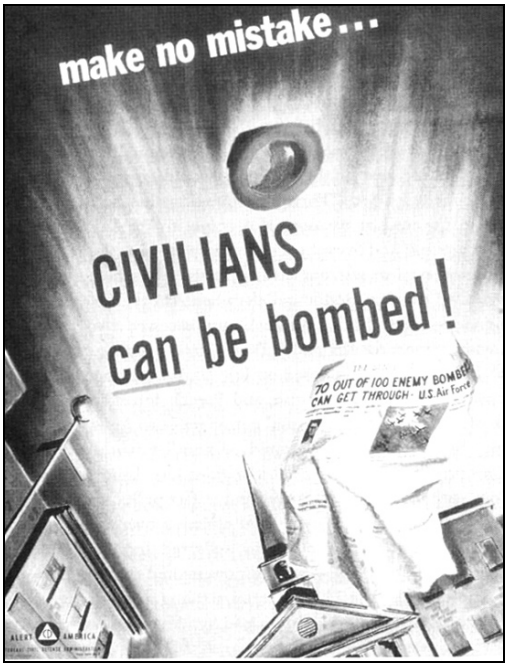


Fig. 2-1: Civil Defense Admin. Poster from the 1950s (reprinted in Rose 2001, p. 7)

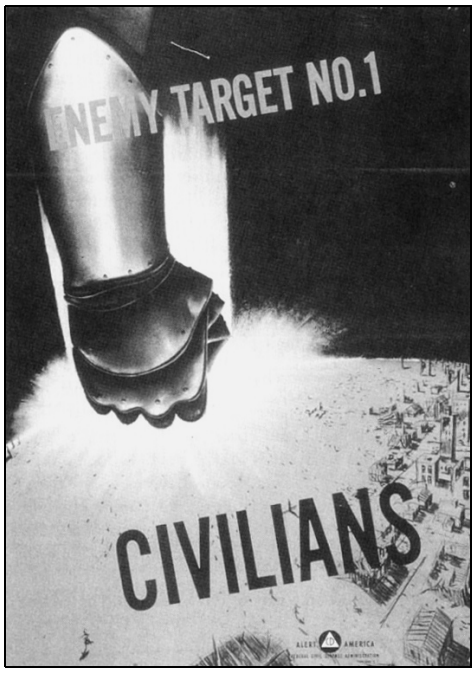


Fig. 2-2: Civil Defense Admin. Poster from the 1950s (reprinted in Rose 2001, p. 6)

return to America's age of isolationism. Truman was well aware that if another attack should come to America, unlike the situation in Pearl Harbor, the Americans could not count on having time to arm themselves and strike back (Henriksen 1997, p. 16). Equally compelling, however, was the recent crumbling of the western European empires that had dominated international politics and warfare over the last several centuries. These world powers had proven themselves incapable of containing the Nazi threat, and America felt the need to fill the vacant niche they left behind in the interests of maintaining a balanced world order that was soon to be threatened by the rise of international Communism.

Because of these changes, in March of 1947, President Truman publicly set forth a new vision of America's role in international politics. The Truman Doctrine laid out the philosophic justification for expanding and exercising American influence worldwide. In essence, "Truman crafted an American conception of the Cold War world which

precluded any other response than the one he offered: a limitless American defense of freedom whenever and wherever it was threatened." (Henriksen 1997, p. 17) The inevitable result of this commitment was the incursion of American military and political strength into every corner of the globe in the name of the interests of the "Free World".

The ICBM would eventually add leverage to the American ability to enforce its policies in the international arena. Touting its nuclear supremacy, the US was able to make strong demands on foreign powers that undoubtedly would have been ignored in the absence of the nuclear advantage. For example, the professed willingness of Kennedy to go to the brink of nuclear war with the Soviets during the Berlin Crisis and the Cuban Missile Crisis of the 1960's, a threat that was given teeth by the recent installation of rapid-response ICBM technology around the country, proved successful at initiating a reciprocal drawback from Soviet and American forces involved in those escalations (Henriksen 1997, p. 109). ICBM technology eventually came to be a psychologically convincing means of enforcing the Truman doctrine, and as such it came to symbolize our new role in international politics.

Containment Abroad

Despite the temporary alliance enjoyed by the Soviets and the U.S. during WWII, the U.S. quickly became suspicious of the growing communist threat abroad in the post-war environment. From the American perspective, the 1948 communist coup in Czechoslovakia, the Soviet blockade of Berlin, the division of Germany and Korea, the 1949 explosion of the first Soviet atomic bomb, and the fall of China to communism exemplified an extreme military threat and expansionist tendency on the part of the

"international communist conspiracy" (Henriksen 1997, p. 18). The sanctity of the American way of life and its underpinnings in the free market economy were perceived to be at stake as the rest of the world was being enveloped in an impenetrable communist fog. George Kennan, a diplomat in Moscow during the Truman years, expressed his belief that the U.S. needed "patient but firm and vigilant *containment* of Russian expansive tendencies" (NPS 1995, p.22). This strategy of "containment" became the operative method by which America chose to exercise its newly professed international role. And this international effort would soon extend well beyond dealing with direct threats from the Soviet empire, to encompass the containment of the communist threat wherever it sprang up.

When Eisenhower assumed the Presidency in 1953, he inherited a conflict born from these containment policies. The Korean War began in 1950 after the newly installed communist North Korean regime invaded South Korea. Truman and the U.N. responded by sending troops to South Korea, and the Chinese government responded in kind by sending troops to aid the North. After years of violent struggle, a truce was eventually brokered in 1953 (Stich 1987, p. 236-238). However, the damage had been done. The American commitment to containment abroad was irrevocably fixed for the next several decades. Eisenhower's State of the Union Address in January 1954 summed up the heightened sense of fear: "American Freedom is threatened so long as the Communist Conspiracy exists in its present scope, power, and hostility... We will not be aggressors, but we...have and will maintain a massive capability to strike back" (NPS 1995, p.22).

In an effort to help secure this massive capability to strike back, Eisenhower eventually approved the development of ICBM technologies. These technologies were considered an inexpensive, effective means of enforcing the foreign containment agenda. The ICBM network that was produced in the late 1950s, beginning with the Atlas Series of missiles, became directly associated with the protection of American interests in a hostile world.

Containment at Home

Concurrent with the rise of America's international containment policies was a drastic shift in the domestic political establishment as well. As Michael Davidson asserts, "what is most important in terms of cultural hegemony is [the] recognition that military containment abroad depended on the maintenance of domestic order at home" (Davidson 1998, p. 270-271). The realities of a potential communist revolt taking seed within the American populace, as it had in China, engendered an increasingly paranoid anti-communism in every level of government and civilian life. This resulted in a new concern about the stability of the American way of life in the new world. How could the U.S. fight communism around the globe, while potentially allowing this enemy to proliferate within?

In response to these new concerns, in the early 1950s the House Committee on Un-American Activities (HUAC) was created, Truman ordered a loyalty investigation of federal employees, a list of subversive organizations was compiled by the government, Congress passed legislation aimed at outlawing the Communist party, and the FBI began to scrutinize the lives of everyday Americans suspected of subversive activities

(Henriksen 1997, p. 19). The atmosphere of suspicion culminated in Senator Joseph McCarthy spearheading highly publicized investigations of Americans by congressional committee, and the execution of Ethel and Julius Rosenberg in 1953 for divulging atomic secrets to the Soviets (Stich 1987, p. 236-238).

Despite America being represented as a land of diversity, the end result of the domestic containment agenda was to squelch dissension and marginalize views contrary to the increasingly conservative establishment and culture at large. This had serious repercussions on the debate about nuclear weapons. To question the morality of the bomb in the early 1950s was not just considered unpatriotic, for many it was tantamount to treason. J. Robert Oppenheimer, one of the original scientists involved in the development of the atomic bomb, had his security clearance revoked in 1953 after he questioned the potential ethical inconsistencies underpinning development of a hydrogen bomb (Henriksen 1997, p. 48-50). As Henriksen points out:

> The humanist and innovative liberalism of New Deal Democrats became suspect in this harsher cold war America, and many New Dealers in government found themselves accused and ostracized for an idealism out of place in the atomic age. (Henriksen 1997, p. 75).

The new America was quickly becoming a "consensus culture," where little public debate about American Cold War policies would be entertained or tolerated. Ironically, the ICBM technology that came to represent the means by which America imposed its will on outsiders, also came to represent domestic oppression as well. While the creation of the ICBM offered America an indomitable voice of authority throughout the world, this voice did not represent the views of all Americans. It was merely the voice of containment politics overpowering the voice of the marginalized culture of dissent.

The Military-Industrial Complex

The lack of serious criticism of American Cold War policies permitted the growth and expansion of an immense military establishment built on the promise of nuclear weapons. The containment of international threats necessarily involved an expensive revamping of the military to take advantage of the latest and greatest technologies available. In fact, by 1953, 70% of the national budget was devoted entirely to military spending (NPS 1995, p. 23). Concurrent with this increase in spending, Eisenhower introduced and pursued the strategy of "massive retaliation," in essence, expressing a willingness to respond to a wide range of international problems by threatening the use of a large number of nuclear weapons. In other words, he "pursued a bargain-basement defense policy, using nuclear weapons as stand-ins for foot soldiers" (NPS 1995, p. 23). The result was a massive buildup of the American arsenal. Starting with about a thousand nuclear weapons in 1953, by 1960 there were nearly 18,000 (Rose 2001, p. 19).

Other factors also drove the expansion of the America's nuclear forces. For instance, inter-service rivalries between different branches of the armed forces put competitive pressure on the development of missile technologies. In particular, in an effort to obtain a monopoly on the nuclear weapons defense program, the U.S. Navy was developing solid-fuel nuclear missiles at the same time that the Air Force was developing liquid-fuel missiles (Beckman 1992, p. 22). Also, pressure from the Soviets further spurred production—in particular, the explosion of the Soviets' first bomb using thermonuclear principles in 1953, the explosion of their first true "superbomb" in 1955, and their successful launch of Sputnik in 1957 (Day 1988, p. 14). The first atomic bombs exploited fission technology, splitting uranium nuclei to produce a tremendous release of

energy and initiating a powerful chain reaction that resulted in an atomic blast. Thermonuclear bombs exploited a more powerful chain reaction that relied on the fusion of hydrogen nuclei in a high temperature environment (similar to reactions taking place in the sun) to release several orders of magnitude more energy. A true "superbomb," several hundred or thousand times more powerful than the bombs dropped on Japan in WWII, produces a thermonuclear, fusion chain reaction that is generated by the initial triggering of a small fission reaction (Dennis ed. 1984, p. 63). The Soviet development of these highly destructive weapons and the means for transporting them via missile technology like that used to launch sputnik, prompted an immediate American response. Eisenhower's administration reacted by stockpiling even more nuclear weapons and pushing for faster development of the Atlas ICBM system.

Eventually, however, Eisenhower himself grew wary of the military monster he had helped generate. In his January 17, 1961 farewell address, Eisenhower warned the nation of the growing threat.

> The conjunction of an immense military establishment and a large arms industry is new in the American experience. The total influence- economic, political, even spiritual- is felt in every city, every state-house, every office of the federal government. (Eisenhower quoted in Henriksen 1997, p. 79)

The incoming Democratic leadership, however, having based part of its Presidential platform on the idea that America suffered from a fictionalized "missile gap" in competition with the Soviets (Nelson 1991, p. 5), paid little heed to Eisenhower's ominous warning.

After his inauguration in 1961, John F. Kennedy quickly contributed to the further expansion of the military-industrial complex by stimulating the development of a host of

new military technologies at a cost of an additional $17 billion over three years (Nelson 1991, p. 5). It was at this point that the Kennedy administration unveiled the military strategy of "assured destruction." This concept hinges on the idea that even after absorbing a devastating nuclear attack, the US would still have sufficient nuclear resources to respond and inflict an "unacceptable degree" of damage on the enemy (Rose 2001, p. 22). This strategy was made possible by the introduction of a large number of widely distributed, heavily protected missile silos throughout the American landscape, missiles that were operated from self-contained launch complexes. Even after a comprehensive nuclear strike, enough of these fortified ICBMs would remain intact to retaliate against an aggressor. At this point in history, the American military-industrial complex had grown to such tremendous proportions that it could conduct a devastating war campaign, even if the entirety of the civilian population of the U.S. were dead.

The ICBM eventual became a symbol of America's military might. A very large portion of the increase in military spending and development projects that occurred during the 1950s and 1960s were targeted specifically to production of ICBM systems. As a result, ICBMs soon became the most destructive weapon in the immense American arsenal, a weapon that was part of a virtually indestructible network of defensive/ offensive fortifications. The ICBM made the American military more powerful, and potentially more resistant to pre-emptive attack, than it had ever been during any period of "peace" in history. Consequently, the ICBM came to represent the America's burgeoning military-industrial complex, the most expansive military force in the world.

Global Apocalypse

One of the earliest records of the complete devastation of a city by humans was Rome's siege of Carthage in 146 B.C., in which the "Romans plundered and burned the city, ploughed its ruins, and sowed them with salt" (Hewitt 1983, p. 259). The dawning age of ICBMs created the potential for a much quicker and more efficient urban holocaust, one that would not involve any direct threat to the soldiers who brought it about.

Truman recognized the shift in man's power implicated by the atomic bomb in his State of the Union address of 1953. He foresaw that:

> The war of the future would be one in which man could extinguish millions of lives at one blow, demolish the great cities of the world, wipe out the cultural achievements of the past- and destroy the very structure of a civilization that has been slowly and painfully built up through hundreds of generations. (Truman quoted in Boyer 1998, p. 39)

As devastating as the bomb dropped on Hiroshima was, however, this early atomic technology was not truly capable of wreaking a definitive global apocalypse. It lacked sufficient radioactive fallout capabilities, and too much of the world's population was decentralized in rural areas to make the fission bombs used against Japan very efficient at killing *all* life.

With the advent of the "superbomb" and the ICBM, however, that all changed. Following America's Bravo test of a thermonuclear device on the Bikini Atoll in 1954, a public debate, initiated by scientists, raged about the realities of fallout. The test explosion produced far more radiation than was initially predicted by the scientists involved. The result was the contamination of an innocent Japanese fishing vessel (ironically named the *Lucky Dragon*) with radioactive ash (Winkler 1993, p. 108). The

ensuing public argument brought home to many Americans the true implications of nuclear warfare. As one historian put it, "fallout focused atomic fears more than any other issue in the early postwar period. A silent and insidious killer that affected all people, and unborn children too, it dramatized the consequences of an arms race out of control." (Winkler 1993, p. 108)

Americans were introduced to a new way of life, one in which they lived under the constant menace of atomic attack. In this world, human life seemed devalued and threatened at all times. The "possibility of death, even a complete apocalypse was omnipresent" (Henriksen 1997, p. 93). The belligerent confrontation between Kennedy and Khrushchev during the Berlin Crisis of 1961 and the Cuban Missile Crisis of 1962 greatly ratcheted up fears of a total apocalypse. These were probably the most serious instances of nuclear brinksmanship seen during the Cold War. Speeches from the two leaders were laden with references to nuclear war and the need not to give ground to the enemy (Henriksen 1997, p. 109). A 1960's student anti-war activist, Todd Gitlin, explains what it was like coming of age in this era of doom:

> Whatever the national pride in the blasts that pulverized Bikini and Eniwetok atolls, whatever the Atomic Energy Commission's bland assurances, the Bomb actually disrupted our daily lives. We grew up taking cover in school drills- the first American generation compelled from infancy to fear not only war but the end of days. (Gitlin 1987, p. 22)

By the end of the 1950s, the ICBM came to represent in many ways the constant threat of global annihilation. Thus, though it represented to many the embodiment of American military strength, it also embodied the means by which the world could end. The ICBM truly became the architecture of doom, the means by which man could quite

conceivably destroy civilization. Yet despite this fact, it continued to be introduced across the face of the continent.

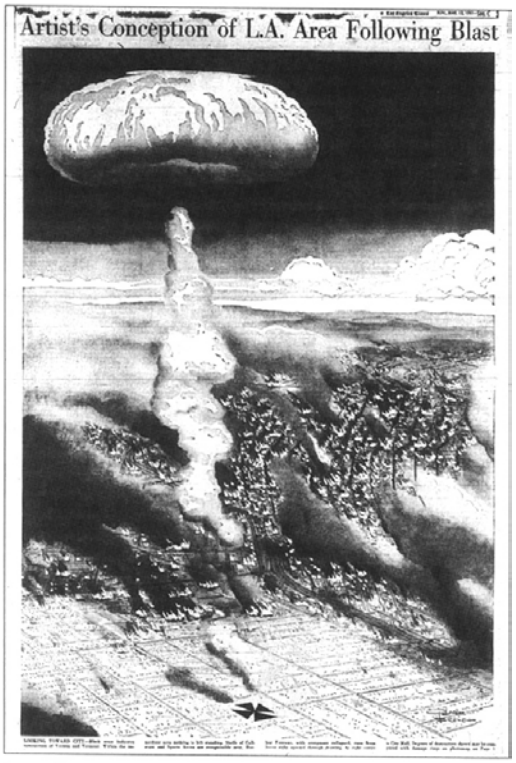


Fig. 2-3: Illustration from *Los Angeles Times*, Mar. 12, 1961 by Oliver French (Rose 2001, p. 60)


AS PAGE ONE OF THE HERALD MIGHT LOOK AFTER H-BOMB ATTACK

The Grand Rapids Herald

16,200 DIE AS H-BOMB LEVELS GRAND RAPIDS

25,500 Injured; Fast Evacuation Saves 136,000

City's Business District Is Wiped Out; Heavy Damage Extends Outward a Mile

DEADLY PATH OF H-BOMB FALLOUT

Radioactive Dust Imperils West State

Avoid Panic — Listen Only to Official CD Bulletins

Fig. 2-2: Front Page of *Grand Rapids Herald*, Jul. 21, 1956. (Rose 2001, p. 60)

Conclusion

Though the consensus culture of the early 1950s was generally mute on the subject of the morality of the bomb, a seed was sown that would begin to sprout in the mid 1950s, and later flourish in the 1960s—a seed of dissent. As the ICBM was developed in response to the political ideas of post-WWII America, and as the ICBM began to symbolize such a wide variety of contradictions and emotionally charged political issues, American culture began to respond. Evidence of the presence of nuclear anxiety began to work its way into every nook and cranny of American high and popular culture, undoubtedly fueled in part by the advent of ICBM technology. The next chapter

looks at the wide variety of ways that nuclear weapons and ICBMs influenced broad cultural trends during its brief tenure in the American defensive arsenal.

CHAPTER 3

THE CULTURAL REACTION

> *"Zap; that's all it takes. The little red button and zap. Right? And this little button makes a definite difference in our world; in our generation, ever since we've been old enough to read, our tomorrows have been at the mercy of this button."* (Kesey 1983, p. 435)

Out of the Pit

While the ICBM came to embody the nuclear age governmental policies and dilemmas that led to their creation and deployment—unrestricted civilian war, global interconnectedness, containment, the growing military-industrial complex, and global apocalypse—a generalized anxiety and obsession with nuclear weapons began to work its way into the culture at large. During the early '50s, at the height of containment propaganda and anti-communist rhetoric, cultural consensus about the "bomb" in America was secure and unchallenged. Overt anti-nuclear and anti-war messages were relatively unheard. This is not to suggest that dissent did not exist. Rather, those who did have reservations about the development of nuclear weapons expressed their fears well below the radar of direct criticism, in ways that were "by necessity allusive, ephemeral, and only metaphorically suggestive of the disruption caused by the bomb" (Henriksen 1997, p. xxii). Over the 10 year period during which the Atlas ICBM was funded, designed, tested, deployed, activated and eventually retired, dissent became conspicuous and widespread.

The following chapter offers a brief sampling, from 1955-1965, of how the influence of nuclear weapons began to be expressed in different aspects of the culture at large—sometimes overtly and sometimes more subtly. The wide variety of reactions presented reinforces the idea that nuclear weapons were a significant force in shaping American culture. It also offers further elaboration on the diversity of contrasting themes that can be presented in the final design alternatives of this thesis.

It is important to keep in mind, however, that broad cultural trends can not be distilled down to simple causes and effects. For example, it is impossible to determine whether a certain author's fear of nuclear holocaust was a direct result of the buildup of ICBM technologies, the bombing of Hiroshima, or the increased rhetoric of American and Soviet politicians. In all probability, all these factors and many more would contribute to this fear. Nevertheless, the immediacy of the nuclear threat and the general extent of nuclear anxieties were certainly augmented by the introduction of ICBM sites to America. ICBMs greatly increased the speed and ease by which nuclear annihilation could be brought about. As a result, ICBMs came to play a major role in influencing the American cultural consciousness of the nuclear dilemma.

Literature/ Poetry

Literature, poetry, and fine art, particularly the avant-garde, are at the forefront of expressing new cultural ideas yet to be accepted by more general audiences. So it is no surprise that these high art forms expressed some of the earliest and most vocal concerns about the nuclear threat. Probably the most famous new poetic/ literary movement to emerge in this time period was that of the Beats. The voice of rebellion in a consensus

culture, the Beats offered a manic-depressive, chaotic image of America inspired by their need to fight back against an oppressive world that tried to "beat" them down (Henriksen 1997, p. 171-174).

The two men most readily associated with this burgeoning literary movement were undoubtedly Allen Ginsberg and Jack Kerouac. Their writing clearly reflects anxiety about the burgeoning threat of nuclear holocaust and the military-industrial complex. In *Howl*, Ginsberg metaphorically describes a terrible monster, Moloch, that is a thinly-veiled reference to America:

> Moloch whose mind is pure machinery! Moloch whose blood is running money! Moloch whose fingers are ten armies! Moloch whose breast is a cannibal dynamo! Moloch whose ear is a smoking tomb!...
> Wake up in Moloch! Light streaming out of sky! Moloch! Moloch! Robot apartments! invisible suburbs! skeleton treasuries! blind capitals! demonic industries! spectral nations! invincible madhouses! granite cocks! monstrous bombs! (Ginsberg 1956, p. 21-23)

The allusion to American militarism is obvious, but in particular, Ginsberg mentions a "light streaming out of the sky," "granite cocks," and "monstrous bombs," which are clear references to nuclear missiles.

In other poems in the book, like "America," Ginsberg is more explicit about his feelings concerning the nuclear issue: "America when will we end the human war?/ Go fuck yourself with your atom bomb" (Ginsberg 1956, p. 39) Kerouac offers a similarly disparaging remark in *On the Road* as his lead character, Sal, is surrounded by a horde of impoverished Indians outside Mexico City:

> They didn't know that a bomb had come that could crack all our bridges and roads and reduce them to jumbles, and we would be as poor as they someday, and stretching out our hands in the same, same way. (Kerouac 1957, p. 241)

Ginsberg's and Kerouac's anxieties about nuclear weapons are clear and compelling, revealed in direct and confrontational language. Unlike most members of the consensus culture, they openly expressed fear and distaste for the weapons rather than veiling their anxieties under the cloak of anti-communism or fears of subversion.

Of course, not only the Beats, but other poets and authors of the day referenced the omnipresent threat of nuclear or scientifically-wrought annihilation. For example, William Carlos Williams' poem "Asphodel, That Greeny Flower" from 1955 makes poetic use of the image of the bomb detonating:

> The mere picture
> of the exploding bomb
> fascinates us
> so that we cannot wait
> to prostrate ourselves
> before it. We do not believe
> that love
> can so wreck our lives.
> The end
> will come
> in its time.
>
> (quoted in Davidson 1998, p.286-287)

The conclusion of the poem suggests an apocalyptic end to our obsession with nuclearism. In *A Canticle for Leibowitz* (1959), Walter B. Miller, Jr. opens the storyline with a "Flame Deluge," a metaphor for nuclear holocaust that leaves only isolated pockets of humanity behind in its wake (Henriksen 1997, p. 60). Kurt Vonnegut's sardonic black-comedy, *Cat's Cradle* (1963), chronicles the end of times as one of the world's premier nuclear scientists devises a chemical substance, "ice-nine", that destroys human life, much like a nuclear war (Henriksen 1997, p. 309).

Many other stories of the era tackle the issues of nuclear war to a lesser or greater extent as well. In fact, in a survey of fiction produced during the Cold War, Paul Brians

counted 217 major works of fiction written between 1955 and 1965 in English that either "depict nuclear war or its aftermath" (Brians 1987, p. vii, 355-359). This high incidence of nuclear-tragedy stories indicates more than just the introduction of a convenient plot device. Nuclear apocalypse, the military-industrial complex, a technocracy tampering with the fate of the world, and the possibility of insufferable civilian tragedy had become a pervasive undercurrent of everyday thought, influencing many of the writers of the day, and often compelling them to explore the ethical and moral questions that arise from the presence and possibility of nuclear annihilation.

High Art

Likewise, studio art of the day began to show the influence of nuclear technologies and fears. Roughly concurrent with the rise of the Beat poets, the art world experienced the birth of a new genre of painting and sculpture, one with a uniquely American identity-- "Pop Art." Modern art had made a shift in the mid fifties away from the precepts of Abstract Expressionists such as de Kooning, Rothko, and Pollock, who shunned the limitations of realistic imagery and mass culture, toward a new aesthetic incorporating the mundane and common (Stich 1987, p. 2-5). Whereas the Beats utilized the emergent language and lifestyles of Youth in mass culture to resonate with the public at large, Pop Artists exploited images and icons familiar to ordinary American people to the same effect-- as a means of expressing ideas outside the scope of the culture of consensus. The reflections of nuclear pride and nuclear paranoia in Pop Art are exemplified specifically in two types of work. On the one hand is art that incorporates debased images of patriotic American icons, such as the flag or George Washington. On

the other hand is art that incorporates a hectic collage of images culled from the omnipresent mass media, peppered with unmistakable military themes (Stich 1987, p. 17).

One of the earliest Pop Art explorations into a playful subversion of American icons was Jasper Johns's series of flag paintings. Starting with the flat, unadulterated image of the American flag, Johns would alter it in a variety of ways, sometimes inverting colors, sometimes obscuring the lines underneath with a top wash, sometimes reducing the flag to a monochromatic metallic surface. In all these cases, Johns was essentially treating the flag as "the site of subterfuge, concealment, and obfuscation," and as such he was "raising doubts about its integrity as a sanctified symbol" (Stich 1987, p. 19).

Fig. 3-1: Jasper Johns, *Sculpmetal Flag*, 1960. (Stich 1987, p. 21)

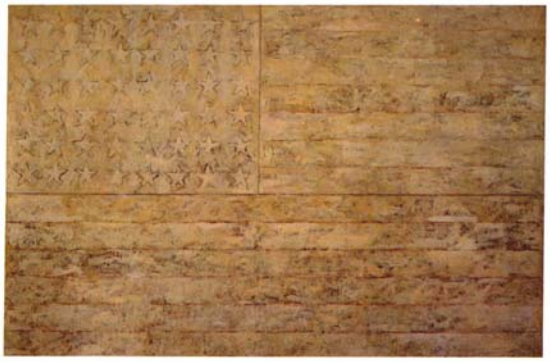


Fig. 3-2: J. Johns, *White Flag*, 1955 (Hughes 1980, p. 338)

To these ends, several other artists contributed their own versions of the subverted flag to the art world, including artists such as Claes Oldenburg, Jake Berthot, George Herms, and others (Stich 1987, p. 23-27).

Figure 3-3: George Herms, *Flag*, 1962 (Stich 1987, p. 27)

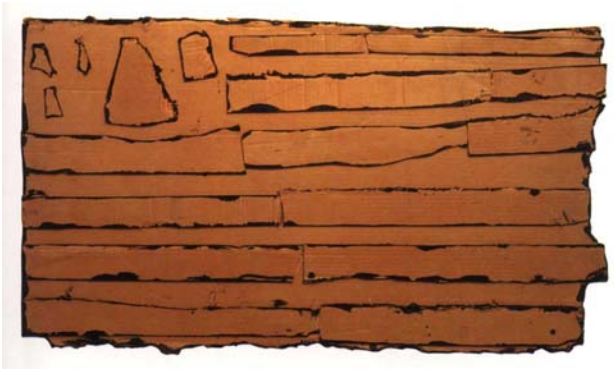


Figure 3-4: Claes Oldenburg, *Flag*, 1960 (Stich 1987, p. 23)

.

In addition, other American icons that received irreverent treatment in the Pop Art movement included George Washington, maps of the United States, images of the Oval Office, and military heroes (see figures 3-5 through 3-8). In these collective works, the artists incorporate traditionally patriotic images, and they then distort, change, or juxtapose these images, robbing them of their integrity, righteousness, and infallibility. Whether this interest in subverting icons is driven directly by America's expanding nuclear arsenal is difficult to ascertain, but the existence of ICBM technology probably contributed on some level to the artists' desires to re-examine the ideas that inform American cultural identity and morality.

Other artists of the period made more direct references to the military-industrial complex and the threat of nuclear holocaust embodied by weapons such as the ICBM. Often they did this through collage techniques that juxtaposed mass-media imagery with various emblems symbolic of military might. For example, James Rosenquist's *F-111*

(1965) (see Fig. 3-9) did this by contrasting commercial images of a cherubic girl in a hairdryer, canned spaghetti, a radial tire, an umbrella, and light bulbs, with darker, more portentous images of an F-111 fighter jet and an atomic blast.

Fig. 3-5: Ed Keinholz, *George Washington in Drag*, 1957. (Stich 1987, p. 33)

Fig. 3-6: Jasper Johns, *Map*, 1962. (Stich 1987, p. 33)

Fig. 3-7: Tom Wesselman, *Great American Nude #8*, 1961. (Stich 1987, p. 30)

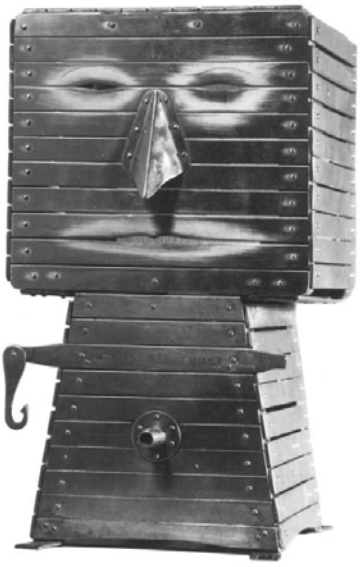


Fig. 3-8: H.C. Westermann, *Evil New War God*, 1958. (Stich 1987, p. 193)

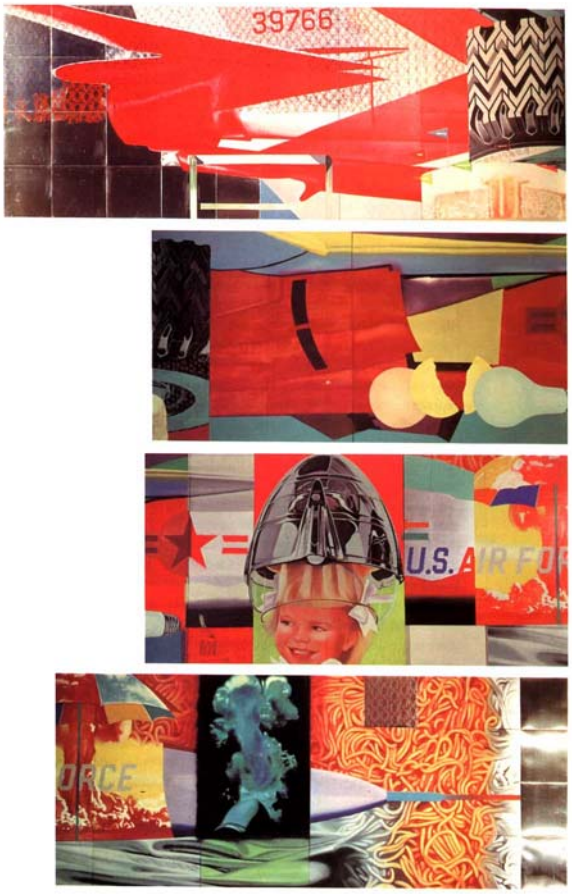


Fig. 3-9: James Rosenquist, *F-111*, 1965.
(Hughes 1980, p. 355)

In an interview with Gene Swenson in 1965, Rosenquist gives his interpretation of this work:

> While I was working in Times Square and painting signboards, the workmen joked around and said the super-center of the atomic target was around Canal Street and Broadway. That's where the rockets were aimed from Russia...the Beat people like Kerouac and Robert Frank, Dick Bellamy, Ginsberg and Corso, their first sensibility was of [nuclear missiles] being used immediately and they were hit by the idea of it, they were shocked and sort of threatened. So this is restatement of the Beat idea, but in full color. (Hughes 1980, p.354)

Rosenquist's painting pays homage to the spirit of the Beats, by challenging the cultural consensus view of the superbomb. The juxtaposition of disparate images brings into full-light the triviality of modern existence in contrast to the horrendous possibilities for

destruction embodied in nuclear weapons. The layering of complex contradictory meanings adds significance to the images themselves, significance that would not be obvious in the absence of the contradictions.

Many other artists used similar artistic techniques to the same ends, juxtaposing emblems of humanity or nature with images reminiscent of American military strength.

Fig. 3-10: Jasper Johns, *Target with Plaster Casts*, 1955. (Hughes 1980, p. 339)

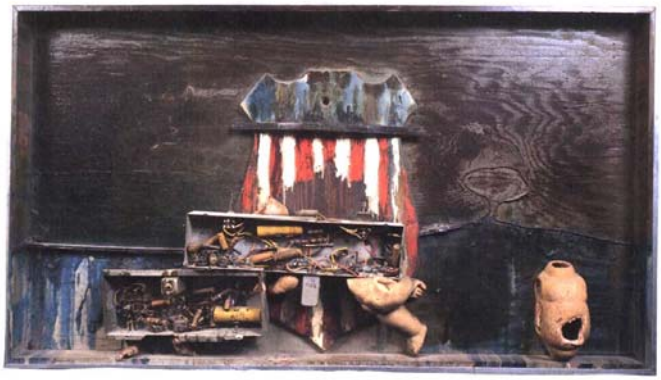


Fig. 3-11: Ed Keinholz, *O'er the Ramparts We Watched Fascinated*, 1959. (Stich 1987, p. 194)

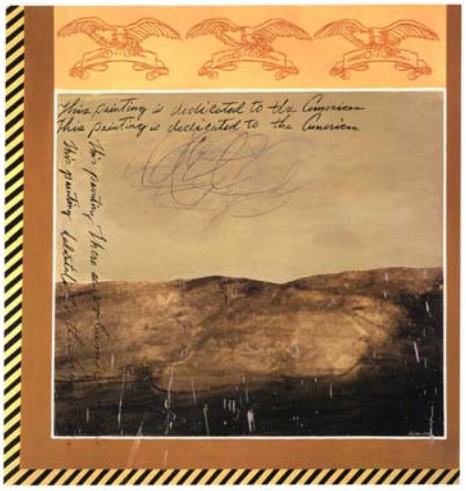


Fig. 3-12: Llyn Foulkes, *Death Valley U.S.A.*, 1963. (Stich 1987, p. 171)

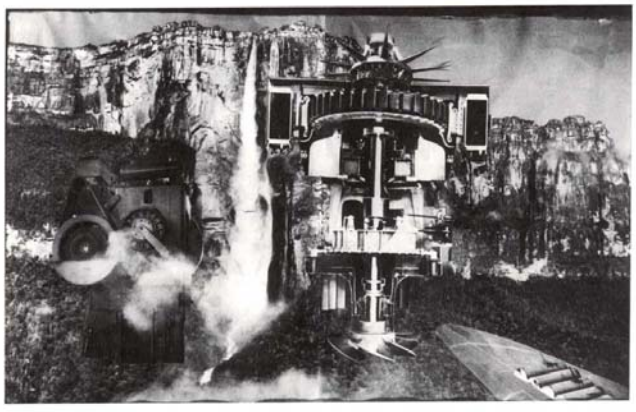


Fig. 3-13: Jess, *The Face in the Abyss*, 1955. (Stich 1987, p. 170)

Like Rosenquist's F-111, these works highlight the new national consciousness that formed in the wake of the approval of ICBM technology. These artists suggest that the introduction of nuclear technology and military might to America had a huge impact on the cultural and natural environment-- on the one hand resulting in a destroyed humanity (here represented as body fragments or broken dolls in Fig. 3-10 and 3-11), and on the other hand resulting in a destroyed nature (here represented as a desolate desert wasteland or a war machine in the garden in Fig. 3-12 and 3-13). This art "stands not as propaganda but as a telling reflection of America's post-war obsession with expressing, defining, analyzing, promoting, and criticizing its Americanness," (Stich 1987, p. 12).

Buildings and Architecture

The effects of nuclear technology on the world of buildings and architecture were manifold during the period from 1955-1965. Probably the most obvious impact was seen in the proliferation of structures that could serve as bomb shelters in the case of nuclear attack. Much of the bomb-shelter craze was brought about by the volatile years following Kennedy's inauguration into the Presidency. On July 25, 1961, during the heat of the Berlin Crisis, Kennedy made a speech outlining his plan to fight Khrushchev and the Soviets to maintain control of West Berlin, including a serious request for $207 million to fund a civil defense initiative to identify space and existing structures for use as shelters (Rose 2001, p. 2). Congress then went on to approve an unprecedented $306.2 million for civil defense, $100 million more than requested (Henriksen 1997, p. 233). The implication of this successful request was that a nuclear strike was considered to be likely, and civil defense funding was necessary to save American lives. This perceived

need for a more nuclear-prepared citizenry was made even more urgent when President Kennedy publicly endorsed the idea of fallout shelters in the September 15, 1961 edition of *Life* (Kennedy 1961, p. 95), and following the panic induced by the Cuban Missile Crisis in 1962 (Henriksen 1997, p. 237).

In the years of the early '60s, thousands of residential shelters, possibly more than a million (Henriksen 1997, p. 203), were successfully built by independent home-owners across America, many using pre-fabricated structures and the expertise of entrepreneurs that turned the construction of shelters into temporary livelihoods (Henriksen 1997, p. 206). Other shelters were more make-shift, spartan, and inexpensive in overall cost.

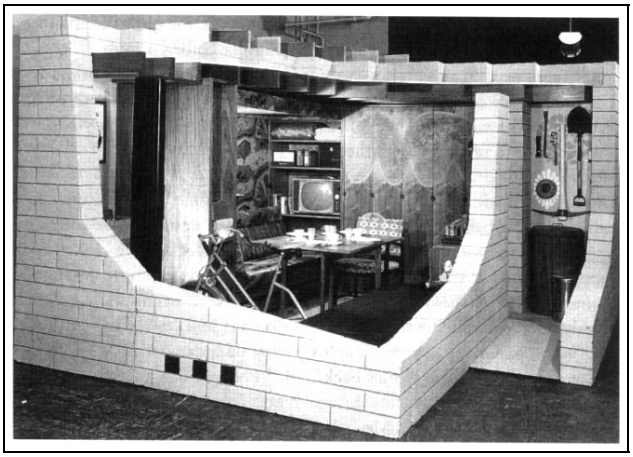


Fig. 3-14: Sample Home Fallout Shelter with Stylish Interior
(Rose 2001, p. 192)

Fig. 3-15: Business Card for a Shelter Salesman
(Authentic History Center 2003)

However, though home fallout shelters were numerous, American families never built as many as the Civil Defense Department wanted. In general, an adequate civilian defense predicated on self-protection never materialized. A survey of 1,474 home-owners in November of 1961 found that only 0.4 percent (six families) had taken noticeable measures to construct fallout shelters for themselves (Berrien et. al. 1963, p. 207).

Despite this lack of action on the part of the average American, many architectural theorists of the day began to call for the incorporation of shelter principles in new designs. In April 1958, *Architectural Forum* declared that "atomic radiation is a new building design element to be taken into account with wind, weather, and sanitation" (*Arch. Forum* 1958, p. 131). Similarly, *Architectural Record* in 1964 predicted that "eventually, the inclusion of shelter in buildings will be a primary requirement as are fire stairs, exits, sprinkler systems, [and] safety treads" (Berne 1964, p. 56). Throughout the architectural world, a paradigm shift was taking place in response to the new threats posed to citizens fighting a war without boundaries. Tom Vanderbilt sums up the shift:

> The 'atomic facts of life' were presented as a *fait accompli*, part of the natural order of things, an environmental condition as ubiquitous as sun or wind. Only a fatalist would not choose to counter the new forces with a new kind of design. (Vanderbilt 2002, p. 102)

As architecture responded to the perceived need for public space that could serve as a bomb shelter in times of emergency, a new type of architectural form, largely derived from engineering principles, was adopted by many designers. The effects of the Bomb tended to highlight the virtues of tightly sealed steel and concrete structures versus the dangers of transparency and openness.

Many new structures in the late 1950s and early 1960s came to exhibit unmistakable bomb-shelter attributes. Tests by the government and industry on atomic resistant architecture inevitably ended up "emphasizing shelter at its most fundamental, cave-like level; anything humanizing about architecture, it seemed- any considerations of light or ventilation or ornamentation- was potentially lethal" (Vanderbilt 2002). Many public institutions, such as libraries, hospitals, highways, and housing complexes began

to adopt these radiation-resistant materials and forms, to powerful effect (see figures below).

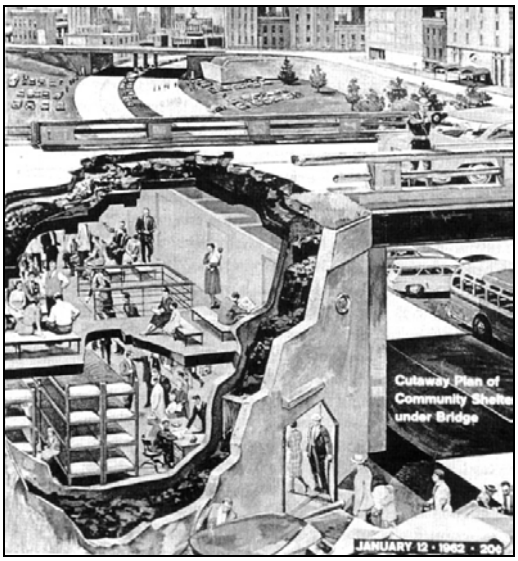


Fig. 3-16: Cover of *Life* showing a community shelter beneath a bridge (Jan. 12, 1962). (image from Rose 2001, p. 85).

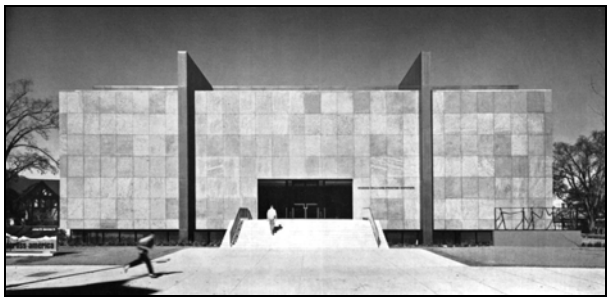


Fig. 3-17: Museum of Art, Munson-Williams-Proctor Institute, Utica, NY (1960) (Brawne 1965, p. 139).

By the late '60s, the continued effect on architecture was noted by *Architectural Design*: "The form and finishes of military installations are being used for the most hallowed of new buildings- cultural and civic centers" (July 1967, p. 374). As such, the concept of the ICBM, a quickly launched nuclear weapon that constantly threatened civilian populations, had a visible effect on contemporary architecture. Many designers adopted a style that was fundamentally the same as that used in the construction of the ICBM silo itself. "Building against the atom" was becoming a way of life.

Movies

It took time for the filmmakers in Hollywood to explore the cultural and philosophical ramifications of the introduction of nuclear weapons. During the early post-WWII period, most films that related to Cold War issues did not deal directly with nuclear weapons or global nuclear apocalypse. Rather, prior to 1953, there appeared a preponderance of films that reinforced the consensus culture's fears of communism. As the decade progressed, however, movies came closer to addressing the issue of nuclear war, most noticeably in the science fiction genre. Many movies of the early and mid '50s involved rampaging radioactive monsters terrorizing the world, introducing indirect fears of radioactive fallout effects from nuclear testing to the general public. The rise in popularity of science fiction movies in this era was significant. In fact, many commentators in the field of film studies agree that "as a viable American movie genre science fiction was virtually born in the 1950s...[and] concomitant with the historical period of its ascendance, the genre was suffused with anxiety about The Bomb" (Worland 1996, p. 103). Movies such as *The War of the Worlds* (1953), *The Beast from 20,000 Fathoms* (1953), *Them!* (1954), *20,000 Leagues Under the Sea* (1954), and *Godzilla* (1956) alluded to apocalyptic scenarios and panic-stricken civilian populations. (Henriksen 1997, p. 57). However, these movies still failed to focus frankly on the issue of disaster brought about directly through the use of nuclear weapons.

Like literature and art, though, many movies of the late '50s and early '60s came to address these themes and concerns. One of the earliest treatments along this line was the film adaptation of Neil Shute's novel, *On the Beach*, by Stanley Kramer (1959), exploring the idea of the residents of the southern hemisphere awaiting a slow death from

radiation clouds formed during a nuclear war between nations of the northern hemisphere. *The Day They H-Bombed Los Angeles* (1961) took a slightly different tack by opening the story after having the U.S. government nuke L.A. over fears of the spread of radioactive protein molecules from the sea (Henriksen 1997, p. 219-220). *The Day the Earth Caught Fire* (1962) portrayed the disastrous events following prolonged nuclear tests by the Soviets and Americans, as the Earth spins closer and closer to the sun after being jolted off its axis (Henriksen 1997, p. 235). In all these cases, the aftermath of nuclear devastation is presented as the survivors struggle to live in a drastically altered world.

It was not until 1964, however, that any major films explored the nuclear issue from the other side, examining the events leading up to the disaster rather than those after the disaster. This year saw the release of three films exploring the themes of nuclear holocaust: *Fail-Safe*, *Seven Days in May*, and *Dr. Strangelove,* all of which starkly criticized the military establishment and the feasibility and infallibility of a nuclear deterrence strategy. *Fail Safe* follows the disastrous results of a computer glitch that sends a group of American bombers on a course to drop H-bombs on Moscow. The film ends with the President agreeing to nuke New York City in compensation for accidentally bombing Moscow (Henriksen 1997, p. 331-336). *Seven Days in May* explores the idea of a top military leader planning a bloody coup of the American government in order to halt the President from pushing forward a plan to broker a nuclear weapons peace deal with the Soviets (Henriksen 1997, p. 336-338). And *Dr. Strangelove or: How I learned to Stop Worrying and Love the Bomb* savagely critiqued the idea of a plausible nuclear deterrence system. A black comedy, with sardonic overtones, *Dr. Strangelove* predicts

the inevitable annihilation of the human race as a rogue military general sends a bomber squad to attack the Soviets, in the process triggering a Soviet "Dooms-Day device" that instigates a total global nuclear war. Meanwhile, the ineffectual, moronic, and self-interested military and political brass argue about what to do. Henriksen feels this is the pivotal turning point in terms of the cultural discussion about the sanity of nuclear weapons build up. She points out that the results of these movies "tarnished both military and political authorities, challenged the sway of power exercised by the nuclear establishment, and exposed the quality of human life in the atomic age" (Henriksen 1997, p. 331). As such, by the conclusion of the era of the ICBM, the culture was seriously and openly criticizing the existing powers in respect to the desirability and acceptability of nuclear weapons in their backyard.

Television

The 1950's witnessed the rapid integration of a new form of entertainment into the American home. This was the dawn of the television age, the introduction of a medium that influenced and reflected mass culture in ways that no other medium could. As with film, however, it took time before the television began to reflect a true diversity of viewpoints in the Cold War. In the early '50s, since dissent against nuclear weapons seemed to come so uncomfortably close to communist-sympathizing, official views were rarely challenged on television. In fact, "when disagreements were presented, the framework of analysis was so narrowly circumscribed that television became a custodian of the cultural Cold War. Its viewers were boxed in to a tight consensus" (Whitfield, 1996, p. 154-155). This can be most readily seen in the limited ways family-life was

presented on TV. America was bombarded with images of homogenized, undiverse, conventional family role-models that completely fit the conformist '50s ideal of the perfect family-- a well groomed, snow white, patriotic group of citizens concerned with appearances and their role in upholding high community standards. This image is revealed best in shows such as *The Adventures of Ozzie and Harriet* (1952-1966), *Father Knows Best* (1954-1962), and *Leave it to Beaver* (1957-1963) (Henriksen 1997, p. 295)

During the 1960s, however, this image of the traditional family was replaced by a number of less conventional families. For example, *Mr. Ed* (1961-1965) involved a talking horse and a jealous wife who resented the horse only talking to her husband. *My Favorite Martian* (1963-1966) presented the lives of a young reporter and his uncle from Mars. *I Dream of Genie* (1965-1970) featured an alluring, semi-slave genie serving an astronaut master. *My Mother the Car* (1965-1966) presented the novel idea of a young man's mother being rein(car)nated (literally) as a 1928 Porter. *Bewitched* (1964-1972) tackled the idea of a mortal man married to a mischievous witch. *The Munsters* (1964-1966) and *The Addams Family* (1964-1966) both showcased families of impossibly related monsters of various descriptions, including Frankenstein wannabes, vampires, werewolves, disembodied hands, walking hairballs and others (Henriksen 1997, p. 295). The highly unconventional families of these situation comedies indicated that there was a fragmentation of the consensus that characterized the America of the early '50s. "The nonconformists who populated television in these years represented distinct alternatives to the homogenized and indistinguishable television families of the 1950s" (Henriksen 1997, 296). The splintering of these homogenous families allowed for the eventual

introduction of a few series that openly and regularly questioned the military establishment and nuclear weapons proliferation.

The two series that best embodied this shift in viewpoint by making regular and direct references to the threats posed by ICBMs and nuclear technology were *The Twilight Zone* (CBS, 1959-1964) and *The Outer Limits* (ABC, 1963-1965) (Worland 1996, p. 103). Unsurprisingly both of these series used the open forum of science fiction fantasies to address real concerns about a potential future dominated by nuclear weapons and fears of nuclear holocaust. In fact, the threat of nuclear war or its terrible consequences took center stage in at least six of the Twilight Zone's episodes- "Time Enough at Last" (11/20/59), "Third from the Sun" (1/8/60), "The Shelter" (9/29/61), "One More Pallbearer" (1/12/62), "The Old Man in the Cave" (11/8/63), and "Probe Seven, Over and Out" (11/29/63) (Worland 1996, p. 108). Similarly, *The Outer Limits* also made some direct allusions to nuclear holocaust, for example in "The Architects of Fear" (9/30/63) and "Nightmare" (12/2/63). And more generally, about half of all the *Outer Limits* episodes related to "The Military-Industrial Complex and its Discontents" as a system (Worland 1996, p. 110-118). As such, even the relatively conservative medium of television came to offer some critique of the insanities and paradoxes of the nuclear age near the completion of the Atlas ICBM period of tenure. These two series added to the growing mainstream discontent with life lived under the shadow of ICBMs and nuclear weapons.

Pop Culture

Many other aspects of popular culture from 1955-1965 reflect the influence of nuclear weapons, from music to cartoons to comic books and toys. A good example of the influence on music is found in Barry McGuire's rock 'n roll song "Eve of Destruction" (1965). "'If the button is pushed, there's no running away/ There'll be no one to save with the world in its grave.'" (Henriksen 1997, p. 90). Songwriter Tom Lehrer also satirized anxiety about the bomb and radiation in his music, as evidenced in his 1959 song "We Will All Go Together When We Go":

> And we will all go together when we go,
> Ev'ry Hottentot and ev'ry Eskimo.
> When the air becomes uranious,
> We will all go simultaneous,
> Yes, we all will go together
> When we all go together
> Yes, we all will go together when we go.
> (Winkler 1993, p. 99-100)

Both of these songs express an almost fatalistic acceptance that nuclear annihilation is unavoidable after the advent of the ICBM. This apocalyptic theme recurred in various songs of the period by unknowns and celebrities alike. For example, songs like Sonny Russell's "50 Megatons" (1956), the Commodore's "Uranium" (1957), the Five Stars "Atom Bomb Baby" (1957), and Ray Anderson's "Sputniks and Mutniks" (1958) are difficult to miss and are clearly inspired by nuclear weapons proliferation (Authentic History Center 2003). Their humorous views of the bomb and their use of it as a metaphor for a powerful force adds some levity to a typically dark subject.

Political cartoons of the Cold War era also found some humor in the dilemma posed by nuclear weapons. Most political cartoons of the period advocated one of two positions with reference to nuclear weapons: the idea that the expansionist Soviet Union

was a menace to the free-world and had to be contained through gruff posturing and a strong defense of nuclear weapons; or the idea that national security could not be gained through the threat of nuclear war, and that there really is no way to combat nuclear threats with arms (Gamson and Stuart 1992, p. 59-61). Figures 3-17 and 3-18 demonstrate the former point of view, while Figures 3-19 and 3-20 demonstrate the latter. The highly political climate of the Cold War period resulted in a rich tapestry of cartoons with nuclear themes, particularly during periods of high international, political stress, for example after the Soviet launch of Sputnik in October 1957, following the end of the U.S./ Soviet moratorium on atomic testing in August 1961, and after the first Soviet 50 megaton nuclear test in October 1961 (Gamson and Stuart 1992, p. 64-65).

Fig. 3-18: Cartoon by Herblock originally in *The Washington Post*, Oct. 31, 1961. (Gamson and Stuart 1992, p. 75)

Fig. 3-19: Cartoon by Arthur B. Poinier originally in *The Detroit News*, Sep. 5, 1961. (Gamson and Stuart 1992, p. 76)

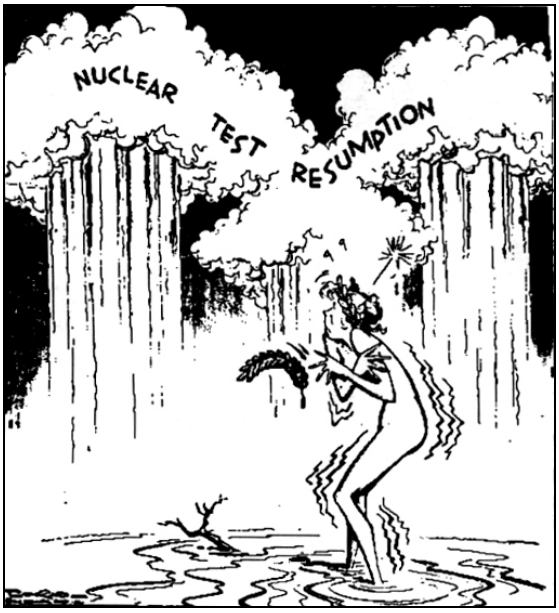


Fig. 3-20: Cartoon by Paul Conrad originally in *The Denver Post*, Sep. 6, 1961 (Gamson and Stuart 1992, p. 71)

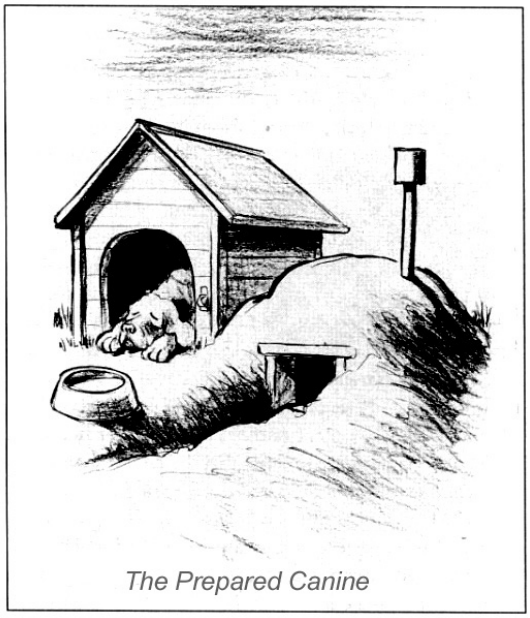


Fig. 3-21: Cartoon by Bill Mauldin from October 18, 1961 (Rose 2001, p. 106)

Many of the comic books of the early '60s exhibited nuclear imagery as well. Most obviously, Spiderman and the Incredible Hulk, both introduced for Marvel comics in 1962, came to embody cultural concerns about radiation and its mutagenic effects on organisms. These two superheroes gained their powers when exposed to some form of radioactivity, either by being bit by a radioactive spider, as in the case of Spiderman, or being exposed to a new type of atomic blast, as in the case of the Hulk (Rose 2001, p. 39). While the effects are anything but deleterious, they do utterly change the lives of the men involved, rendering them freaks and outcasts in society. In addition to these action heroes, U.S. manufacturers produced a plethora of nuclear "playthings" in this same era, including a Khrushchev vs. Kennedy card game, nuclear submarines, and even a model atomic-bomb shelter (Rector 1995, p. 285). All sorts of these toys can still be found in antique stores and at yard sales across the nation. Below are just a few examples.

Fig. 3-22: Some Atomic Toys of the 1950s: Clockwise from upper left: 1) an atomic energy chemistry set, 2) a model Cape Canaveral nuclear missile base, 3) an atomic robot, and 4) an atomic bomb ring. (Authentic History Center 2003).

Social Movements

Also generated in this volatile period of contradictions were a slew of social movements embraced by disillusioned minorities and youth. Some of these movements were directly related to the nuclear fear generated by the existence of ICBM networks across the country, and others have more indirect connections.

As an example of the latter, Henriksen suggests that at least part of the impetus behind the Civil Rights Movement was the burgeoning nuclear menace and the lessons of WWII, in particular the ideas that white people were indeed capable of racist genocide (as evidenced by Germany in the Holocaust and by the American use of the atomic bomb on Japanese civilians), and the idea that whites now had even greater technological capability for genocide in the form of the H-bomb. As Henriksen explains:

> World War II served as a long-term catalyst of black activism for a variety of reasons, but most poignant among these was the proof the war offered about the depth of Western racism and the breadth of the Western world's technological and destructive power. (Henriksen 1997, p. 281-282)

A few incidents and writings from the period support Henriksen's theory. For example, in 1957 in Mobile, a routine evacuation exercise in the city turned into panicked flight as many blacks were convinced through rumors that the whites were going to drop a nuclear device on them in order to avoid going through desegregation (Henriksen 1997, p. 283). Moreover, James Baldwin's *The Fire Next Time* notes that:

> We human beings now have the power to exterminate ourselves; this seems to be the entire sum of our achievement. We have taken this journey and arrived at this place in God's name. This, then, is the best that God (the white God) can do. If that is so, then it is time to replace Him- (Baldwin 1962, 1963, p. 71)

Undoubtedly, the roots of the Civil Rights movement are both wider and deeper than the existence of a generalized nuclear fear. However, the introduction of ICBM technologies undoubtedly contributed to heightened anxiety throughout American culture, including black culture. Nuclear fears indelibly influenced the attitudes of all Americans of that era, and so it seems probable that the introduction of ICBMs to the American landscape indirectly contributed to black activism. Similarly, one could hypothesize that the existence of nuclear weapons had an effect on the environmental and feminist movements of the day. To support this idea, one could point to evidence suggesting corporate and patriarchal hegemony enforced its will through threat of apocalypse and genocide. Considering the fact that the government was composed largely of white men with corporate ties, and the fact that the government made decisions about international nuclear policy, this is not a difficult argument to make. This brings up an interesting

possibility, that many of the social movements of the 1960s were partially inspired, or at least catalyzed to action, by the fears and hopes embodied in the bomb.

One social movement of the day that was clearly and professedly influenced by the advent of the ICBM and the potential for nuclear apocalypse was the "countercultural" movement. Alternatively known as the hippy movement, and having roots in the Beat generation, the counterculture represented the "assumption of defiantly non-conformist attitudes, uninhibited behavior, and generalized dissent by large numbers of young people joined together by their shared enthusiasm" (Brick 1998, p. 113-114). Much of the lifestyle of the counterculture reflected a rejection of conventional Western ideals and mores. Many individuals embraced the new music of rock 'n roll and the hedonistic, mind-expanding delights of narcotics and promiscuous sex. Others simplistically embraced the religious and cultural practices of Native American and Asian cosmologies, or the political leanings of libertarians and anarchists. In any case, some of the motivation behind individuals involved in the countercultural rebellion were spawned by fears of the bomb and disillusionment with the military-industrial complex.

In the summer of 1962, a group of student activists representative of this new movement and operating under the acronym SDS, Students for a Democratic Society, put together the "Port Huron Statement" pronouncing it the "agenda for a generation:"

> Many of us began maturing in complacency. As we grew, however, our comfort was penetrated by events too troubling to dismiss...the enclosing fact of the Cold War, symbolized by the presence of the Bomb, brought awareness that we ourselves, and our friends, and millions of abstract "others" we knew more directly because of our common peril, might die at any time. (SDS 1962).

The group goes on to explain the causes for despair and hopelessness in Modern Man:

> The horrors of the twentieth century, symbolized in gas ovens and concentration camps and atom bombs, [which] have blasted hopefulness...to be idealistic is considered apocalyptic, deluded. (SDS 1962)

Here, we see that the Movement was a response to the anxieties of the nuclear age. Participants in the movement refused to tacitly accept the crushing fatalism that had come to characterize what they perceived as the system of authority. As such, a radical new view on the bomb was being accepted by large segments of the youth culture. As Brick puts it "the youth opposition defined itself by what it stood against, that is, as a culture of life against a culture of death" (Brick 1998, p. 116). As such, the ICBM and nuclear technologies had become the enemy for many youth of the early '60s. The political ideologies and harsh realities embodied in the ICBM and nuclear weapons became a symbol of all that was wrong with the previous generation and its culture.

Conclusion

The influence of the ICBM, and nuclear weapons more generally, is evidenced in myriad ways in the culture of the late 1950s and early 1960s. Beginning with a culture of consensus that rarely questioned the propriety and necessity of these weapons, a small minority of artists and writers began to dissent. As the years rolled by, more and more of the population adopted this attitude, culminating in the birth of social movements in a time of extreme political contradictions. Over just about every aspect of society, from literature to pop culture, the ICBM projected a shadow, as fear of the ICBM penetrated into the deepest recesses of our culture.

The themes and issues suggested by these explorations, when presented in the final design treatments for this thesis, add depth and complexity to the interpretation of

history. This complexity helps to illuminate hidden connections that intimately tie the effects of the Atlas ICBM to the lives of the American public. As such, though the Atlas F is functionally obsolete, it can still convey a rich sense of historical importance to different segments of the population. The ideas outlined in the last two chapters will be used to layer multiple political and cultural viewpoints into the interpretive narratives delivered in the final design alternatives. The best means for crafting this interpretive narrative will be outlined in the next chapter.

CHAPTER 4

PRESERVING ARMAGEDDON

> *"We cannot hope to recapture history [just as we] cannot hope to read the hearts of half-forgotten kings. The Memory of the world is not a bright, shining crystal, but a heap of broken fragments, a few fine flashes of light that break through the darkness."* (Butterfield 1924, p. 14-15)

The New Preservation

To present a rich historical narrative that adds fertile meaning to a relic such as an Atlas F ICBM silo, the treatment needs to stimulate individual memory and draw connections that reinforce the visitor's feeling of personal association with the Atlas. The best way of doing this for a wide variety of audiences is to ensure that the presentation of history is pluralistic and layered, presenting a complex narrative that resonates with all members of society in one way or another. In addition, the presentation should be dynamic and flexible, allowing for change, refinement, and open dialogue over time as is appropriate for a scholarly presentation of ideas. However, this flexibility does not imply the history should be overly objective. Conveying a history through storytelling is essential for its successful appreciation by the public. As such, the presentation of history should also be bold and interpretive, unafraid to embrace the subjective interpretation of ideas. Lastly, the experience should be transformative, synthesizing divergent ideas to reinforce the cultural importance of the Atlas ICBM in American history.

The following chapter explores different contemporary ideas on the true nature of history and preservation, suggesting why these various factors are essential to creating a

meaningful history for presentation to the public. It then goes on to review three conventional military preservation case studies to assess how well these ideas are addressed in traditional approaches to treating historic military sites. By taking a closer look at these sites and ideas, a multifaceted approach to the treatment of the Atlas ICBM silo can be crafted.

Memory as Filter, History as Collage

The foundation of our sense of the past is memory. From memory, we craft images of who we were and who we are today. Much recent scholarship in the field of history has focused on the workings of memory and how it influences the perception and creation of history. Kevin Lynch made some early forays into analysis of this subject from the preservation perspective in his book, *What Time is this Place?* In it, he suggests:

> memory can not retain everything; if it could we would be overwhelmed with data. Memory is the result of a process of selection and of organizing what is selected so that it is within reach in expectable situations...serendipity is possible only when recollection is essentially a holding fast to what is meaningful and a release of what is not (Lynch 1972, p. 36).

Lynch perceives that memory is in essence a filter, a device that selectively edits out extraneous information and retains important ideas. He feels this concept of human memory has implications for the field of preservation. Not only is it impossible to preserve every historic artifact in existence, it is also detrimental not to allow some decay and replacement to occur naturally. If everything is preserved, then the entire exercise becomes "life-denying" by not allowing man to live in an acknowledged present (Lynch 1972, p. 36-38). However, Lynch suggests "there must also be some random

accumulations to enable us to discover unexpected relationships" (Lynch 1972, p. 36). While we need to recognize the inherent impossibility of preserving a truly complete picture of the past, we should also strive to leave some fragments of the past intact to help create material connections between people and history.

Lynch suggests that most preservation of the environment has been preoccupied with isolated, intact physical artifacts, such as buildings, roads, and parcels of land, to the detriment of an understanding of the human activities occurring among those artifacts (Lynch 1972, p. 72). He feels preservation needs to explore in more depth the meanings implicit within the human context determining and being influenced by these relics. As such, he notes that:

> We need not be so concerned about perfect conformity to past form but ought rather to seek to use remains to enhance the complexity and significance of the present scene" (Lynch 1972, p. 57).

The implication here is that the physical intactness of a relic is not as important as conventionally believed in architectural preservation. Rather, the human mind is capable of gleaning a strong sense of history from fragmentary remains in a matrix of anachronistic structures. Thus, preservation should concern itself more with giving voice to the interconnections underlying artifacts and history than with the obsessive, precise restoration of an artifact to its original designed form.

One technique for creating a more complex preservation is to allow for the fruitful juxtaposition of different subjects and ideas. Lynch calls this process "layering," and he feels it is useful in creating an environment with complexity and diversity (Lynch 1972, p. 171). He then goes on to extend this layering idea to encompass the artistry of "collage":

> A collage is the product of esthetic judgment, the deliberate juxtaposition of seemingly disparate elements so that the form and meaning of each is amplified and yet a coherent whole is maintained (Lynch 1972, p. 173).

Lynch focuses on the idea of "temporal collage," the juxtaposition of different buildings or artifacts from different periods in the same environment, but his ideas can be extended to address their cultural contexts. The Pop Artists of the late '50s and early '60s employed collage techniques to evoke the contradictory attitudes and images prevalent in culture during that period. Would it also be possible for a preservationist to use a similar "cultural collage" to juxtapose contradictory and seemingly unrelated points of view in a preservation treatment? (Lynch 1972, p. 171)

Knowing History, History as Narrative

In his seminal work *The Past is a Foreign Country*, David Lowenthal tackles some of the issues involved in the problem of presenting history. One of the most crucial points he continually drives home is the idea that we can never truly *know* history.

> We may fancy an exotic past that contrasts with a humdrum or unhappy present, but we forge it with modern tools. The past is a foreign country whose features are shaped by today's predilections, its strangeness domesticated by our own preservation of its vestiges (Lowenthal 1985, p. xvii).

History occurred within an entirely unknowable set of contextual circumstances that make it impossible for individuals of today, equally constrained by a myriad of contextual circumstances, to grasp the true essence of what it was like to be alive and functioning within that time period. In other words, "historical knowledge however communal and verifiable is also invariably subjective, biased both by its narrator and its audience" (Lowenthal 1985, p. 216).

Lowenthal suggests the reasons for this unbridgeable distance between past and present are threefold. True knowledge of history is limited by the fact that: 1) the past is immense and infinitely detailed, 2) accounts of the past are merely edited views of this complex larger picture, and 3) bias in the account itself and in the interpretation of that account is inevitable (Lowenthal 1985, p. 214). As dwellers in the present, we are not privy to the past except through our own memories and the accounts of others. As an historian, however, Lowenthal does not feel this fact implies that history is "invalidated". Rather, we should assume that history contains at least some truth and sheds some light on the past, bringing home the relevance of that past to those struggling to live in the present (Lowenthal 1985, p. 235). Thus, an objective, "true" vision of the past is unobtainable, and as such should not be the goal of preservation. Preservation should instead accept the definite limitations on historical knowledge, and strive to work within those limitations

One of the most direct ways to recognize the impossibility of objective history is to embrace the concept of history as a type of storytelling. Most people distinguish between "storytelling," which they perceive as fictional, and "history," which they perceive as truth (Lowenthal 1997, p. 38). This is an oversimplified world view. As Lowenthal explains,

> The contingent and discontinuous facts of the past become intelligible only when woven together as stories. Even the most empirical chroniclers invent narrative structures to give a shape to time... Indeed, the better a narrative exemplifies an historian's point of view the more credible his account...subjective interpretation gives [history] life and meaning" (Lowenthal 1985, p. 218).

Though the rigors of academia and scientific inquiry force historians to be as "objective" as possible, it is important to realize that attempts at maintaining total objectivity can be

counterproductive. History only resonates with individuals if they can understand and appreciate it, and human understanding is typically predicated on the construction of narratives. "Only by selectively shaping available sources can any historian, whether a professional academic or a creator of romance, coherently convey knowledge of the past" (Lowenthal 1985, p. 237). Not to edit, rearrange, and make connections with the available evidence would make it indigestible and unpalatable for readers. In other words, in terms of understanding history, there is an imperative for narrative.

Moreover, because there is no "true" history, historians should not be content to accept a finalized, inflexible narrative about the past. "To span the mental gulf between past and present, to communicate convincingly, and to invent historical accounts with interpretive coherence requires their continual reshaping" (Lowenthal 1985, p. 235). Historical preservation, like other academic disciplines, should invite constant controversy and revision. While one narrative may elucidate one aspect of the past, another very different narrative may be necessary to elucidate other ideas of equal importance. A passive, universally accepted historical view is sure to be false, steeped in indoctrination and a lack of critical reflection. "We require a heritage with which we continually interact, one which fuses the past with the present...Only by altering and adding to what we save does our heritage remain real, alive, and comprehensible" (Lowenthal 1985, p. 410-411). This has grave implications for preservation, a field that fundamentally strives to keep our heritage alive and comprehensible. Is it possible to preserve a rigid structure like an ICBM, and still allow for a dynamic narrative to be told?

Dialogue in Public History

Concurrent with the idea that narrative-based history should be dynamic, is the idea that the narrative should also be multivalent and complex. Recent controversies in the realm of public history in America have suggested the need for increased dialogue in the realm of American preservation. David Thelen argues that memory (and by logical extension history) is an active, constructive process rather than an objective retrieval of passively stored facts (Thelen 1989, p. 1119-1123). History in this way is synthetic and collaborative, relying on the juxtaposition and interpretation of various narratives to create a richer idea of the past. This implies that inclusive history, like inclusive preservation, should be a Lynchian collage, exhibiting multiple layers of meaning. This inclusion helps highlight who we are both as individuals and as a nation. "We synthesize identity not simply by calling up a sequence of reminiscences, but by being enveloped...in a unifying web of retrospection" (Lowenthal 1985, p. 198).

This web of voices, stories, and images helps enrich our understanding of our pasts. Consequently, the role of preservation should be as a medium for creating "spaces for dialogue about history and for the collection of memories, and to ensure that various voices are heard in those spaces" (Glassberg 1996, p. 14). Pluralism is predicated on the idea of multiple viewpoints, and it is only by the expression of these multiple viewpoints in the same venue that we can hope to come closer to an understanding of the possible pasts associated with a relic. Conventional historic preservation techniques have not allowed for this pluralistic treatment of the past. In fact, narrow interpretations of artifacts have plagued the credibility of many public history projects, from Colonial Williamsburg's notorious failure to recognize the role of slaves in Antebellum Virginia

culture (Alanen and Melnick 2000, p. 6-7) to the government's squelching of dissent about the necessity for dropping the atomic bomb on Hiroshima in the 1995 Smithsonian exhibit of the Enola Gay (Shackel 2001, p. 7). In light of this, Edward Linenthal suggests there is a real need for "demilitarized zones" of dialog, where people can explore and express differing views and interpretations of our past in a public space (Linenthal 1997, p. 45-46). If we were to allow for a multivalent, culturally mediated interpretation of the past in such a zone, we would find "multiple valid solutions able to coexist as a mosaic of interpretations" (Cook 1995, p. 9).

Transformative Preservation

The traditional methodology underlying preservation makes the mistake of codifying the means for treating historic properties. Especially prevalent in the understandably bureaucratic approach of the NPS, this strategy seeks to simplify the approach to preservation, ignoring the more difficult controversies and cultural implications of the preservation project itself. As such, this inflexible preservation approach "holds the potential to negate the very idiosyncratic landscape qualities that set one place apart from another" (Alanen and Melnick 2000, p. 17). Preservation should be a complex, thoughtful response to the unique challenges and characteristics posed by a given site. To create narratives that can be comprehended and appreciated by users, preservationists need to be more intuitive, adaptive, and responsive to preservation dilemmas. They need to "strike a reasonable balance between 'blind' application of regulations and a purely emotional response to historic and cultural landscapes" (Alanen and Melnick 2000, p. 18).

In this intuitive process, preservationists need to avoid overemphasizing the issues of "false history" and "physical restoration," and embrace the complexity, ambiguity, and inclusiveness of interpretation. Catherine Howett suggests that fears of subjectivity in preservation circles were born from the legacy of Modernism in architecture and the idea of uncovering objective truth through scientific enquiry (Howett 2000, p. 199). Howett declares conventional preservation methodology as a "pseudoscience" without legitimate claims to objectivity, and she calls for a more transformative preservation approach.

> The rhetorical and poetic dimensions of history are still what move human hearts and enlighten human understanding...Cultural landscape preservation, as a form of history telling, is not less than science; it is more than science (Howett 2000, p. 205).

To these ends, she suggests preservationists should reject the pseudoscientific underpinnings of conventional, codified artifact preservation and embrace the subjectivity of the interpretive role. Preservationists should not be satisfied with merely analyzing a relic's physical integrity in favor of telling stories (Howett 2000, p. 206). In other words,

> If we saw our task from the beginning as transformative- artfully to transform the raw data, the physical facts, the historical record, into a comprehensible vision with potential meaning for men and women today...we might be less afraid to expand rather than restrict the options for interpretation (Howett 2000, p. 207).

This vision has particular relevance for a cultural icon as influential as the Atlas ICBM. With some careful consideration, it might be possible to expand the possibilities for preservation of military sites through this transformative approach.

Military Landscapes and Sacredness:

Preservations of military landscapes have long been dogged by controversies rooted in the fact that these landscapes are heavily imbued with patriotic associations

evocative of national character and pride. Edward Linenthal contends that many military sites and their corresponding narratives have acquired a sacredness that resists open interpretation. The fact that these narratives have become "sacred" implies that they can not be questioned, that they "set forth authoritative truths about who we have been and who we are" (Linenthal 1997, p. 46). To challenge the conventional interpretation of their relevance is seen as questioning national myths, consequently weakening national unity and dishonoring those who made difficult sacrifices in the line of duty (Linenthal 1997, p. 46). Perhaps this is best exemplified in the *Enola Gay* debacle that took place at the Smithsonian's National Air and Space Museum in the mid '90s.

Similar controversies arise in the attempted preservation of other historic military artifacts, battlefields, forts, monuments, and the like. The pressure to conform to traditional views in the interpretation of these sites is often promoted by vested interests within the political establishment or the military-industrial complex itself. Because the sites are typically managed by various departments of the federal government, these pressures are usually quite effective at curtailing open interpretation programs. Fortunately, however, the preservation of the Atlas-F ICBM being proposed in this thesis is assumed to be undertaken by private interests and private funds, and as such is less prone to the influences of the military. Though dialogue at many preserved military sites is interpreted as weakening national unity, Edward Linenthal suggests "when dialogue is interpreted as weakness, it will not lead to a more nuanced product, but to capitulation and deformity" (Linenthal 1997, p. 46). History, as such, becomes a victim to national myth making, presenting a stagnated and overly biased view to the public. Keeping this

in mind, it seems imperative to leave the interpretive program for the Atlas-F ICBM more open-ended and subject to revision.

Synthesis

The above ideas on preservation and history suggest that the treatment strategy for the Atlas-F ICBM silo, a relic born from and reflective of myriad cultural and political contradictions, should incorporate alternative preservation strategies. A thoughtful, innovative preservation could in fact simultaneously address all the above-delineated issues. Such a preservation would be:

1) complex and layered, creating a collage of fragmentary associations and ideas
2) narrative and dynamic, unafraid to tell subjective stories that change over time and challenge the conventions of the sacred military narrative
3) inclusive and multivalent, juxtaposing many different views, incorporating contextual elements, and allowing for open dialogue about these elements
4) transformative and interpretive, synthesizing ideas and emphasizing human connections over physical integrity.

With careful application of these parameters, it seems conceptually realistic to adapt a historic military site to accommodate a flexible, interpretive, dialogue-driven preservation, something unique in preservation as a field. This is especially true for preserved military landscapes.

Case Studies

The three case studies to be briefly explored in this analysis include the Titan Missile Museum in Sahuarita, Arizona, which was already introduced in chapter 1; the United States Air Force (USAF) Museum in Dayton, Ohio; and Fort Moultrie National Monument in Sullivan's Island, South Carolina. These sites were chosen because they are military sites used as venues for relating military history to the general public. As such, they all embrace an educational role, and they all claim some accurate perspective on the history they describe.

Historic battlefields were intentionally avoided in this analysis. These sites in particular are often constrained by the desire to honor and commemorate specific men and women who made mortal sacrifices in the line of duty, and as such are already laden with a "sacredness" that precludes most aspects of a truly open interpretation. Edward Linenthal describes the problem inherent in battlefield preservation:

> The evocative power of battlefields has engendered various forms of veneration: patriotic rhetoric, monument building, physical preservation, and battle reenactment...These forms of veneration are both an articulation of patriotic orthodoxy and a symbolic defense against various forms of ideological defilement (heresy) and physical defilement (Linenthal 1991, p. 4-5).

Because battlefield sites have been sanctified in blood, the introduction of unconventional, non-sacred views becomes problematic and difficult, resulting in serious controversy. ICBM silo sites, however, have suffered few casualties over the years, and as such are less sacred by nature. In addition, a battlefield differs markedly from an ICBM silo in terms of function and purpose. Whereas an ICBM silo can be essentially considered a defensive fortification or a landscape-sized weapon, monuments and battlefields usually mark either an artificially delineated public tribute space or the area

of convergence between two different warring factions. Thus, their preservations would imply different needs and approaches than would be appropriate for an ICBM.

Titan Missile Museum

The Titan Missile Museum is the only site in the U.S. where the public is currently allowed access to a fully preserved ICBM silo, and as such is the case study most directly applicable to analysis of the Atlas F ICBM. The Titan series of missiles includes the generation of nuclear missiles the Air Force introduced after Atlas in the mid 1960s. Also fueled by volatile liquid propellants, the Titan was considered to be more reliable than the Atlas, which suffered numerous setbacks in operational tests and performance checks. As a result, Titan II missiles remained operational long after the Atlas F became obsolete. In fact, Titan IIs were still in use as late as the mid 1980s, whereas the Atlas F was obsolete by 1965 (Day 1988, p. 14). The particular silo preserved for use as the Titan Missile Museum was once part of launch complex 571-7, operated by the Strategic Air Command, and it was officially decommissioned in 1984 (Vanderbilt 2002, p. 36).

Of the 54 existing Titan Missile silos in existence at the time of their decommissioning, this site alone was spared in response to the efforts of local enthusiasts who saw its potential as a tourist attraction. On May 8, 1986, the Air Force turned this site over to the Arizona Aerospace Foundation, the non-profit organization that administers the Pima Air and Space Museum (Walton 1998). On April 6, 1994, the museum was recognized as a National Historic Landmark, one of few structures to receive that distinction in America while still under 50 years old (Titan Museum 2003).

And today, the silo serves as a tourist destination where individuals can tour a silo that looks essentially as it looked during its tenure as a functional defense installation.

The complete restoration of the silo exterior and interior provided in the existing museum space presents an image of what the silo was like when it was operational (see Chapter 1 for more description). The restoration includes such details as the installation of mannequins carrying out "maintenance tasks" on the missile itself as well as replacement of most of the equipment that was necessary to launch and maintain the missile. Tours of the silo involve explanations of the technological significance of the Titan II in relation to other conventional, nuclear, and ICBM technologies, as well as descriptions of the daily activity of the missileers responsible for maintenance of the silo. In addition, the tour also details the procedure that would have been employed to launch the missile if the need had ever arisen.

Fig. 4-1:
Titan II missile launch
(SiloMan 1997-2003)

Fig. 4-2: Surface view of the Titan Missile Museum
(Titan Museum 2003)

Fig. 4-3: Nose cone as seen from surface (Walton 1998)

Fig. 4-4: Restored cableway connecting launch complex and silo chamber (Walton 1998)

Fig. 4-5: Restored launch complex 1998)

Fig. 4-6: Mannequin "checking" (Walton systems on the deactivated missile (Titan Museum 2003)

Of course, the tours and visual displays offered by the museum, while evocative of the working conditions experienced by the soldiers that worked there, are conspicuously lacking in the type of preservation experience that would provide a more in depth understanding of the missile's impact on the culture at large. The story told here is uni-dimensional and static, offering only one, non-controversial point of view, that presumably is never refined or updated. In fact, one visitor noted that when asked about where the missile was aimed and what nuclear payload the missile carried, the tour guides refused to answer (Masters 1995). This demonstrates that the Titan Museum

refuses to tackle some of the tougher issues underlying the preservation of such a controversial artifact. Their presentation is not complex and layered, nor is it inclusive and multivalent. To some degree, the preservation is interpretive and narrative. It does relate the daily lives of those who kept the missile operational. This narrative, however, is not dynamic or constructive, and as such fails to give the kind of "transformative" interpretation that Catherine Howett described.

USAF Museum

Museums featuring atomic, military, and Cold War artifacts have become fairly numerous in recent years. Some of the more recent examples include the Strategic Air and Space Museum at Offutt Air Force Base in Bellevue, Nebraska; the National Atomic Museum at Kirtland Air Force Base in Albuquerque, New Mexico; the Bradbury Science Museum at the Los Alamos National Laboratory in Los Alamos, New Mexico (Kirstein 1989, p. 57); the International Spy Museum in Washington D.C. (www.spymuseum.org); and the Cold War Museum, which is still seeking permanent residence in the Washington D.C. area (www.coldwar.org). While these various museums address the theme of atomic history from somewhat different perspectives, there is some striking similarity between them. In general they present a non-critical assessment of the role of nuclear weapons in defending our country during the cold war era, an attitude that seems to "border on atomic reverence" as one art historian points out (Kirstein 1989, p. 45). It is rare for the weapons' destructive capabilities or for the grave consequences of a nuclear exchange to be elucidated in any of the displays in these museums. (Kirstein 1989, p. 45)

One particular military museum that falls into this category is situated in a historic military landscape on a still active base. The USAF Museum in Dayton, Ohio, is "the oldest and largest military aviation museum in the world" (USAF Museum(b) 2003). In 1923, the Engineering Division of the Army Air Service opened a museum for display of aircraft from around the globe. This Engineering Division Museum went through several name changes and relocations throughout the Twentieth Century, eventually becoming situated on historic Wright Field of Wright-Patterson Air-Force Base, and eventually adopting the name, United States Air Force Museum in 1971 (USAF Museum (a) 2003). Today, the museum exhibits and cares for over 42,000 objects (USAF Museum (a) 2003), including more than 300 aircraft and missiles (USAF Museum(b) 2003). The location of the USAF Museum on Wright Field was a befitting tribute, as Wright Field had operated as a development and testing grounds for experimental aircraft materials before, during, and after WWII (Cornelisse 2002). The preservation treatment of this historic landscape included its adaptation to house the museum in a new series of buildings atop the field grounds.

The museum is free to visitors and attracts large crowds from around the world. In fact, over one and a half million individuals visit each year. Currently, the museum consists of two immense exhibit halls built on the scale of, and designed to resemble, aircraft hangars, as well as an outdoor "airpark" that displays aircraft and nuclear missiles within a network of meandering paths. Plans, however, are underway to add four more buildings in the near future, including a hangar devoted largely to Cold War artifacts currently dispersed throughout the museum and an exhibition hall to display the museum's extensive collection of missiles, including nuclear missiles like Titan and

Minuteman (see Fig. 4-8). The exhibits in the museum are arranged both by chronology and by theme. The themes relate to all aspects of American aviation history, beginning with the experiments of the Wright Brothers at KittyHawk and including some of the more recent hardware developments still in use today by the military (USAF Museum(b) 2003). Tours through the museum are self-guided and open, allowing visitors to meander through the wide variety of artifacts in any order they wish. Interior displays include paraphernalia used by soldiers, such as uniforms, trinkets, and equipment, as well as different military hardware. Many displays incorporate "faux" landscape materials and wax dummies to provide scale and context for the aircraft or articles on display (USAF Museum(b) 2003).

In terms of the preservation methodology, Peter Kirstein contends that the USAF Museum displays are as guilty of squelching pluralistic dialogue as many other military museums with nuclear displays and themes. He asserts that in most such museums, the assemblage of artifacts "has preserved the material past, but has failed to give any meaning to it. Glorifying weaponry, dehumanizing our country's adversaries and ignoring the potential consequences of nuclear war, these museums fail to fulfill their educational role" (Kirstein 1989, p. 57). Specifically, he notes that the treatment of the atomic bomb dilemma in such displays is lacking in alternative, non-military viewpoints. For example, the "Atomic Bombs" display at the USAF Museum in the late 1980s claimed that "over one million Americans would have perished if an invasion of Kyushu and other Japanese Islands had been necessary," despite recent scholarly evidence that suggests this assertion is not necessarily true. He also notes that a nearby sign declares that "the destruction of Hiroshima and Nagasaki actually 'prevented...indescribable

carnage'" (Kirstein 1989, p. 47). Considering the fact that the USAF Museum is administered and maintained by the Air Force, this limited viewpoint is not surprising.

Fig. 4-7: Aerial photo of current USAF Museum Complex (note "Airpark" in lower right-hand corner) (USAF Museum (b) 2003)

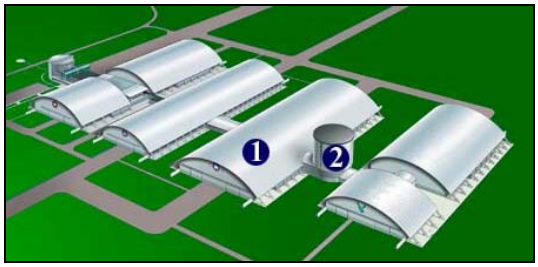


Fig. 4-8: Proposed additions to the museum, including the new Cold War Wing (1) and Hall of Missiles (2) (USAF Museum (c) 2003)

Fig. 4-8: Typical interior museum display of Wright Brothers plane (USAF Museum (b) 2003)

Fig. 4-9: Jupiter ballistic missile in outdoor "Airpark" (USAF Museum (b) 2003)

In terms of satisfying the criteria outlined by recent scholarship in the preservation field mentioned above, the USAF Museum fails to fulfill its role in

preserving a rich historical account. While the artifacts on display in the museum are given some technological context, primarily in a developmental sense as compared to other military aviation innovations, very little cultural context is provided outside of the attitudes and life-stories of military personnel. In addition, the layering and juxtaposition of artifacts, while definitely present and suggestive of a collage approach, is limited to military paraphernalia only. As a consequence, little contrast in theme and meaning is apparent. Some attempt is made to keep the displays dynamic. Exhibits are temporary and change at regular intervals, but the treatment is not complex and multivalent. In addition, very little interpretive narrative is offered to enliven the reading of these artifacts or to add a transformative, human dimension to their impact on civilization. In essence, the displays are uni-dimensional, over-simplified treatments of a historical topic rich with possibilities.

Fort Moultrie National Monument

Fort Moultrie National Monument is included here as a counterpoint to other military preservation projects because its restoration attempts to convey the Fort's role in defending America's coastal areas during several distinct time periods. As such, it offers a more pluralistic account of its history than is generally provided at other sites. Moreover, its function as a defensive fortification is similar to the alleged function of the ICBM silos. Administered by the National Park Service as part of Fort Sumter National Monument, the professed agenda is to tell the "story of two centuries of seacoast defense through a unique plan of restoration." The park's official brochure goes on to note that "five sections of the fort and two outlying areas, each mounting typical weapons,

represent a different period in the life of the three Fort Moultries" (NPS 2001). The three Fort Moultries refer to the three different footprints the fort occupied and the three different physical incarnations the fort exhibited, during the Revolutionary War, the late 1700s, and the rest of its active history, including WWII. Most of the fort's current structure, originally built in 1809, dates from the last period of significance.

The layout of the park attempts to accommodate over 171 relevant years of service history. It does this by juxtaposing artifacts and information from different historical periods all within the same fort (see Fig. 4-10). Following the established, meandering path through the fort's most recent footprint, the visitor is gradually taken back through time, encountering artifacts (mostly weaponry) from different periods, beginning with the underground bunkers associated with WWII, continuing to battlements present in the early 1900s, then to post-Civil War battlements, and subsequently to Civil War battlements and early 1800s Barracks. The path then extends out of the footprint of Fort Moultrie III and continues to two smaller areas that encapsulate the Fort Moultrie of the late 1700s and the Fort Moultrie of the Revolutionary War (NPS 2001). Though the majority of the fort accommodates only military artifacts, one of the subterranean bunkers in the WWII section does recreate a military classroom and office. Within these recreations are artifacts typical of the period, including cultural memorabilia such as centerfold calendars, issues of *Life* magazine, coffee mugs, and comic strips.

Fort Moultrie does succeed in being pluralistic in its presentation. Primarily, however, this context is established for individual sections of the Fort when relating it to other sections, rather than relating the fort to the outside world. For example, the portion

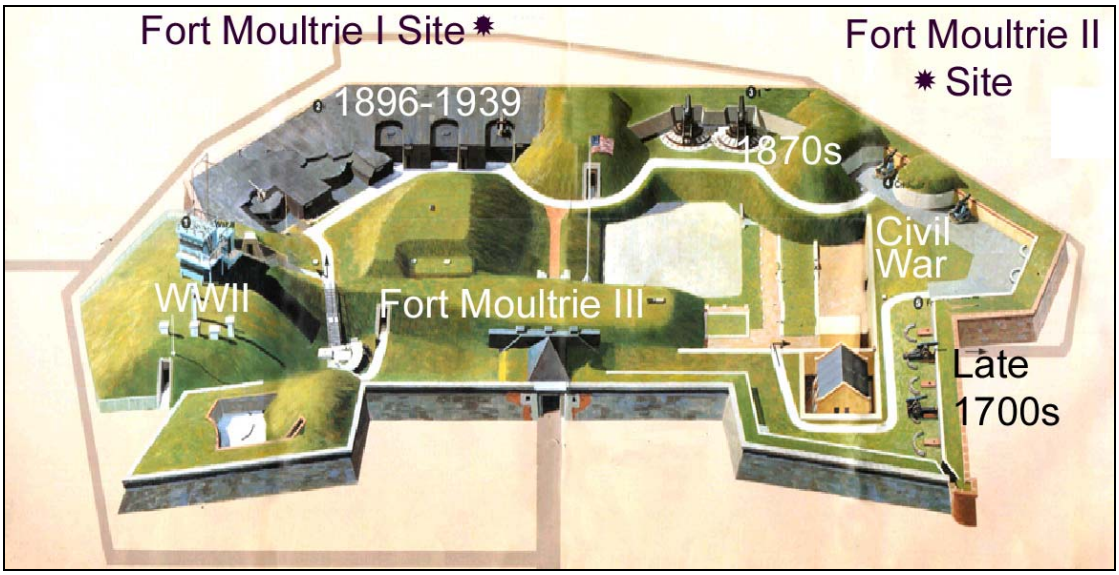


Fig. 4-10: Axonometric drawing showing the different time periods arranged along the path within the fort. (NPS 2001)

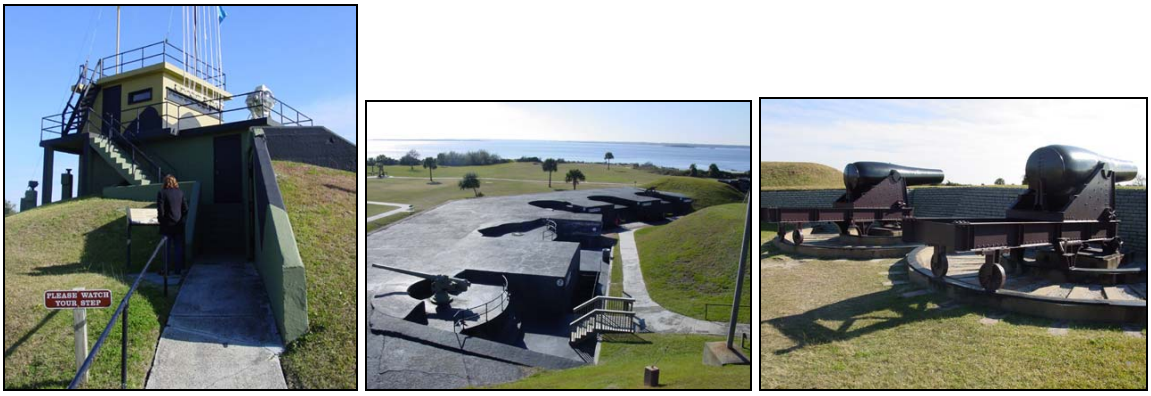


Fig. 4-11: (from left) Military battlements indicative of WWII period, 1896-1939 period, and 1870s period. (photos by author)

Fig. 4-12: Recreation of fort's WWII office environment below ground and behind glass. Note the presence of pop culture on the desk: e.g. *Life* magazine and a comic book. (photos by author)

of the fort devoted to WWII artifacts is given some context by comparison to adjacent portions of the fort indicative of other periods. As with the USAF Museum, however, the presentation seems most concerned with each section's technological context within the evolving fortification structure. The underground office recreations in the WWII section hint as some wider cultural contexts, most directly through the memorabilia on the desks, but it is a minimal gesture that still only alludes to the daily lives of military personnel. In this sense, it is little better than the presentations at the USAF Museum in Dayton. So, although the collage of different time periods is incorporated on site, Fort Moultrie still fails to offer a truly multivalent, dynamic, complex perspective on the fort's role in American culture. In fact, little reference is made to the fort's relevance outside the immediate military purposes it was designed to serve. The resulting narrative is not very inclusive or in-depth, and, like the other case study examples, it fails to provide for a transformative historical experience.

Conclusion

Public history and preservation today demands a more integrative approach. History, in order to be compelling for a wide variety of audiences, needs to be constructive, interpretive, engaging, evolving, and bold. Recent scholarship in these areas indicates a paradigm shift is underway, tending toward this more inclusive historical methodology, but the shift is slow. Few preservation projects have taken this theory to heart as of yet. The three case studies examined here illustrate this well. The goal of the design alternatives proposed for the Atlas ICBM in this thesis is to illustrate

this new model for historic preservation. The next chapter will begin to outline how this can be realized within the actual physical context of the ICBM itself.

CHAPTER 5

ANATOMY OF ATLAS

> *"The greatest, or rather the most prominent, part of this city was constructed with the design to offer the deadest resistance to leaden and iron missiles that might be cast against it. But it is a remarkable meteorological and psychological fact, that it is rarely known to rain lead with much violence, except on places so constructed."* (Thoreau 1853, p. 26).

Atlas Groaned

The military preservation case studies outlined in the previous chapter, while exploring some aspects of the technological context in which the artifacts existed, failed to integrate aspects of the broader cultural context into their treatments. The preservation proposed for the Atlas-F ICBM silo in this thesis goes further in terms of inclusive cultural exploration along these lines. But before an appropriate program of interpretation can be recommended, the site features and structural dimensions of a specific Atlas F site need to be considered. The physical layout of the landscape and the anatomy of the ICBM itself will strongly influence and limit any potential interpretation approaches. This chapter establishes the physical framework that will be used in generating the three final design alternatives.

Atlas ICBMs

On January 14, 1955, the U.S. Air Force awarded the Convair Corporation the contract for development and testing of the "Atlas" series of intercontinental ballistic

missiles- long-range, liquid-fuel propulsion missiles theoretically capable of launch in less than 15 minutes time from land-based facilities in the continental U.S. and with a target accuracy of 1 mile or better from over 6,000 miles away. Cutting-edge advances in high-yield, low weight thermonuclear devices and a marked increase in defense spending had recently made the production of such an intercontinental ballistic missile feasible (Gibson 1996, p. 10-11). Simultaneous development of an alternative liquid-fueled ICBM, the Titan I, was contracted out later that same year to the Martin Corporation as a hedge against the possible failure of the Atlas program (Gibson 1996, p. 15). Though Titan was considered to be a more promising ICBM prospect in terms of reliability, range, speed, and payload delivery, the USAF estimated the Atlas could be made operational in less time. Pressure to produce a functional ICBM force as soon as possible was fueled by recent Soviet scientific advances and pervasive fears of the Communist threat, and as such, pushed the speedy development of the Atlas missiles to the top of the USAF agenda (Neufeld 1990, p. 185-190). However, concurrent development and deployment of the Atlas and Titan series continued.

The Atlas series of missiles were to be the first operational ICBMs ever developed and put on alert. Several configurations of the "Atlas" concept were developed and tested prior to operational installation, each major design adjustment being designated by a sequential letter. Atlas "A", "B", and "C" were considered "proof-of-concept" prototype configurations, while the later "D", "E", and "F" series were the "deployed configurations" (Stumpf 2000, p. 8). Flight testing of the first Atlas "A" models began in the summer of 1957. After two unsuccessful attempts to launch different models (both had to be destroyed due to engine malfunctions), the Soviet Union

announced to the world the successful launching of Sputnik on October 5, 1957. Fears prompted by this event spurred the USAF and the Convair Corporation to even faster development of the Atlas program (Gibson 1996, p. 11). The first successful test of an Atlas missile (and, the first substantiated successful test of an ICBM in history) occurred on December 17, 1957, with the test flight of another version of the Atlas A. Testing of various Atlas configurations occurred simultaneously with deployment of the missiles over the next five years (Stumpf 2000, p. 10). After successful testing of the "B," "C," and "D" configurations, the first successful launch of an ICBM by the Strategic Air Command (SAC), the division of the Air Force put in charge of the ICBM programs, was conducted on September 9, 1959 from Vandenberg Air Force Base. The occasion served to inaugurate the first operational U.S. ICBM base in history. The first nuclear armed missile later went on Combat alert on October 31, 1959 on the same base (Gibson 1996, p. 12). At this point, the ICBM became a functional reality, soon to be deployed across the American landscape in vast numbers.

Operational Atlas Missiles

The primary differences between the operational "D," "E," and "F" configurations of the Atlas missile had to do with their guidance systems and how they were stored. The Atlas D relied on a radio-inertial guidance system, which used radio signals to correct the flight trajectory of the missile as it proceeded to its target. The USAF realized, however, that this radio system was susceptible to jamming, and as such was not totally reliable. The later Atlas E and F configurations employed an "all-inertial guidance system" that

was self contained in the rocket and negated the need for radio communications (Stumpf 2000. p. 11).

In terms of storage, the initial operational Atlas D missiles were stored vertically and completely above ground on what was termed a "soft pad," an open, unprotected launch surface. Realizing the vulnerability of such an arrangement, the USAF decided that later Atlas D missiles would be stored horizontally in above-ground concrete and steel protective structures called "coffins" (Gibson 1996, p. 12). From this coffin, the missile would be raised to a vertical position for firing (in a process eerily evocative of Dracula raising stiffly from his coffin). The coffins were clustered in groups of three per launch facility, with two or three launch facilities, separated from each other by several hundred yards, composing a "missile squadron" that was administered by a nearby Air Force Base. The Atlas E improved on this design by partially burying the coffin structure, resulting in a "semi-hardened" design that could withstand as much as 25 PSI of overpressure (15 PSI of overpressure is considered sufficient to bring down a typical frame house). This provided a markedly improved ability to withstand a nearby nuclear blast. In addition, the missiles in an Atlas E squadron were distributed in a "1x9 dispersal pattern," with each missile coffin controlled separately and located on a separate launch facility. Nine missiles comprised a full squadron. Launch facilities were separated by a distance of 18 miles to reduce the potential losses that could be effected in a Soviet strike (Neufeld 1990, p. 187-196). Theoretically, at this distance, no single Soviet missile could disable more than one missile in the squadron.

The Atlas F, the final ICBM made operational in the Atlas series, went even further in terms of protective storage. Though Atlas F missile launch facilities were

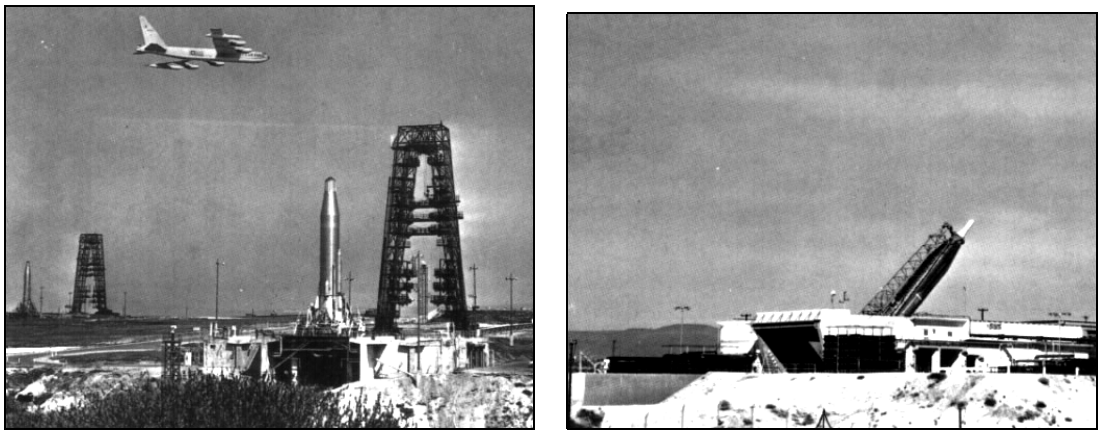


Fig. 5-1: Atlas D ICBMs on “soft pads” (left) and being raised from a surface coffin (right) (Gibson 1996, p. 12)

individually controlled and separated from each other by distances of only seven to ten miles (Neufeld 1990, p. 196), the missiles compensated for this reduction in dispersion by being designed to withstand greater blast pressures. Atlas F missiles were situated in a "1x12 dispersal pattern" and were stored vertically below ground in the first true "silo" configuration, employing a vertical concrete shaft (reminiscent of grain silos of the Midwest) buried below the surface and "hardened" to withstand as much as 100 PSI overpressure. As with the Atlas E, this hardening helped to ensure that contemporary Soviet nuclear missiles could not disable more than one missile with a single direct blast (Neufeld 1990, p. 114). During operations, an elevator brought the missile to the surface for launching. With this improvement, the Atlas F became the most protected member of the operational Atlas family, and this led to it being deployed in greater numbers than the other two configurations. By December of 1962, a total of 129 operational Atlas missile sites were deployed, including 30 Atlas Ds , 27 Atlas Es, and 72 Atlas Fs (Gibson 1996, p. 11). These were all that were to be built. In Spring of 1963, the Air Force announced plans to phase out the Atlas series in favor of the more reliable solid-fueled Minuteman missile system (Stumpf 2000, p. 11).

Fig. 5-2: An Atlas E ICBM raised for Launch. (Stumpf 2000, p. 12)

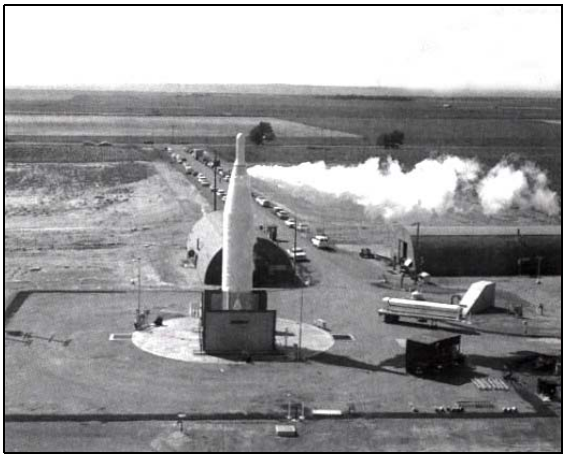


Fig. 5-3: An Atlas F ICBM being raised from its silo in a fueling exercise (Gibson 1996, p. 13)

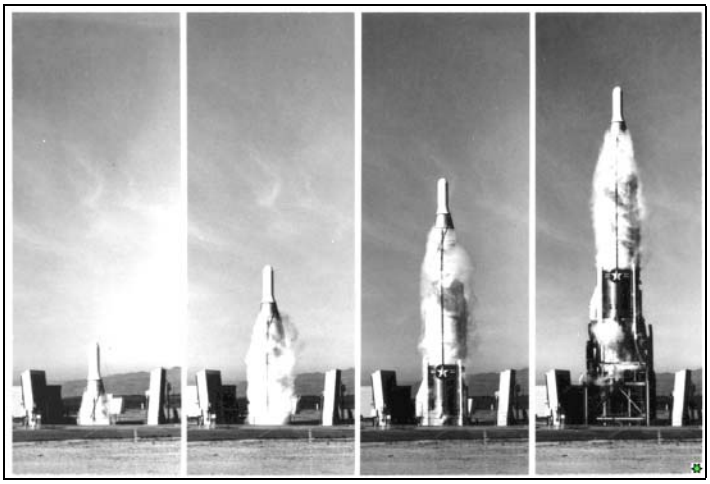


Fig. 5-4: Atlas F missile being fueled and raised from its silo for a launch test. Note the hydraulically raised silo doors (USAF Museum(b) 2003).

Atlas F Site Locations

Air Force selection of specific sites for establishing Atlas F silos was based on satisfying four major selection criteria: "1) maximum operational capability, 2) minimum vulnerability, 3) minimum hazard to the population, and 4) the most economic investment possible" (Isaacs 1993, p. 357). As a result, silos were to be arranged near existing Air Force Bases capable of supporting the missile facilities, but also removed from dense

population areas, production plants, and communications zones. Silos were to be separated from any communities with populations of over 25,000 residents by a minimum of 18 miles, land of marginal value was to be used whenever possible, and the silos were to be easily accessed by nearby state highways or county roads (Isaacs 1993, p. 357). A total of six Atlas F Strategic Missile Squadrons (SMS) were deployed at different Air Force Bases (AFB) around the country, including SMS 550 at Schilling AFB, Kansas; SMS 551 at Lincoln AFB, Nebraska; SMS 577 at Altus AFB, Oklahoma; SMS 578 at Dyess AFB, Kansas; SMS 579 at Walker AFB, New Mexico; and SMS 556 at Plattsburgh AFB, New York (Neufeld 1990, p. 234). Each squadron manned 12 missiles distributed in a ring about the support Base.

Fig. 5-5: Map of Air Force Bases housing Atlas F ICBM Squadrons (diagram by author).

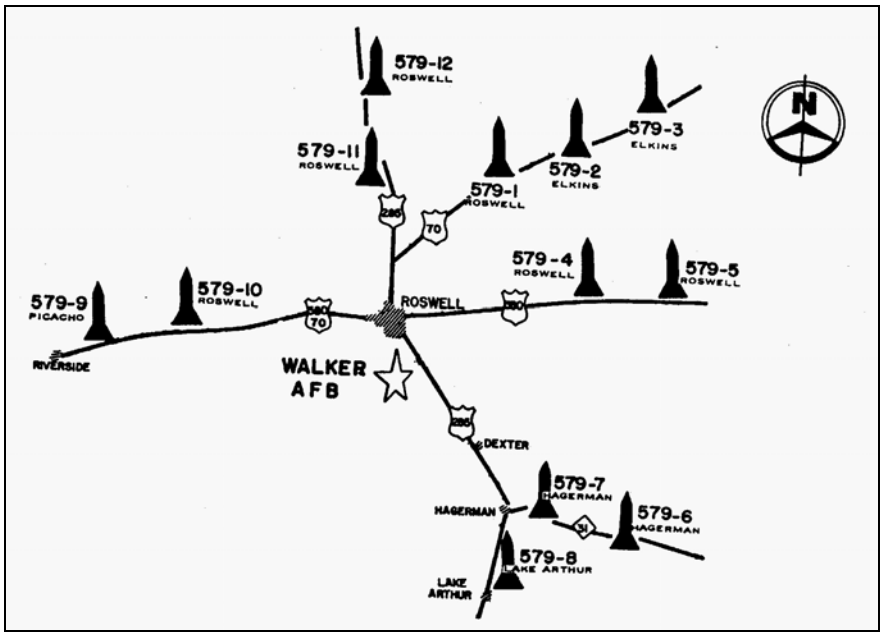


Fig. 5-6: Dispersal of 12 missile silos around Roswell, NM and Walker AFB. These missiles operated by Strategic Missile Squadron (SMS) 579. (SiloMan 1997-2003).

After all the existing Atlas F missile squadrons around the country were inactivated in March and June of 1965, many of the sites were gutted of the more easily salvaged machinery and infrastructure, sealed shut, left to decay, and eventually sold to private interests (Neufeld 199, p. 235). Fortunately, most of these sites were not completely destroyed, and many still contain remnants of the silo's infrastructure, though the remnants are invariably in poor shape, having been damaged from general neglect, moisture, and outright vandalism (SiloMan 1997-2003). Other than external site variations in geology, climate, and ecology, and in the present-day integrity of internal silo components, all of the Atlas F silos are essentially the same. They were by and large, pure engineering ventures, and the same design was used for all the sites with only slight modifications employed to contend with regional and site discrepancies in physiography and orientation (SiloMan 1997-2003). For the purpose of the design component of this thesis, it would be safe to assume that the design solutions could be applied to any

existing Atlas F Silo. The theoretical issues involved in rehabilitating and preserving the silos would be essentially the same for them all.

In the interest of having a concrete example of the typical Atlas F site characteristics, however, this thesis will specifically investigate Silo Site #4 of the 579th Strategic Missile Squadron outside Roswell, NM (SMS 579-4) (see Fig. 5-6). This choice was based largely on the following considerations:

1) An abundance of documentary photos of the site's present condition exist (available online at <http://www.siloworld.com/579thSMS/PRESENT%20DAY/SITE%204/SITE_4A.HTM>),.
2) The site was recently on sale to private interests.
3) The character of the site accurately reflects Atlas F sites in general.
4) The climate offered by that region of New Mexico is more suitable to year-round visitation than other sites.
5) There are a preponderance of major nuclear-related tourist sites located less than 250 miles from Walker Air Force Base. These include the Bradbury Science Museum in Los Alamos, which documents the history of the Los Alamos National Laboratory, birthplace of the Atomic bomb; the Trinity Atomic Test Site, where the first successful atomic explosion was initiated; The White Sands Missile Range (WSMR) Museum and Missile Park, which celebrates the historic development of missile technologies in the WSMR; and others.

Atlas F Landscape

Because of the Air Force's desire to establish missile silos away from population centers and on relatively cheap land, Atlas F silos were typically nestled within isolated natural areas or agricultural landscapes. It is common to find the remnants of these sites completely enveloped by grazing land, crop fields, or scrub brush. The size of the original tracts incorporating the Atlas F launch complexes were about 19-21 acres, with the inner five acres of each plot surrounded by barb-wire topped, chain-linked security fence. This 5 acre sub region, which contained the silo and all the important infrastructure components, was connected to a nearby county road or highway through an access road (Peden 2001).

During its active use, the site layout within this security fencing was spartan. From the surface, only a few concrete and steel structures were visible- two Quonset huts housed administrative facilities and storage space. A small guardhouse and two power substations flanked the security gate along the entrance drive and parking area. The circular concrete launch pad was the centerpiece of the site, below which was the missile silo itself. The lines of the blast doors, which were to be hydraulically opened when raising the missile, are evident on the surface. Nearby, the top of the entrance tunnel corridor and escape hatch poked above ground. A cooling tank for the power generator was also situated close to the pad, as were a water filtration shed and a few storage tanks for fuel and water. Air intake ducts poked above ground in scattered patterns about the site. And while operational, several tanker trailers would be parked on site to provide support services for the launching of the missile (SiloMan 1997-2003).

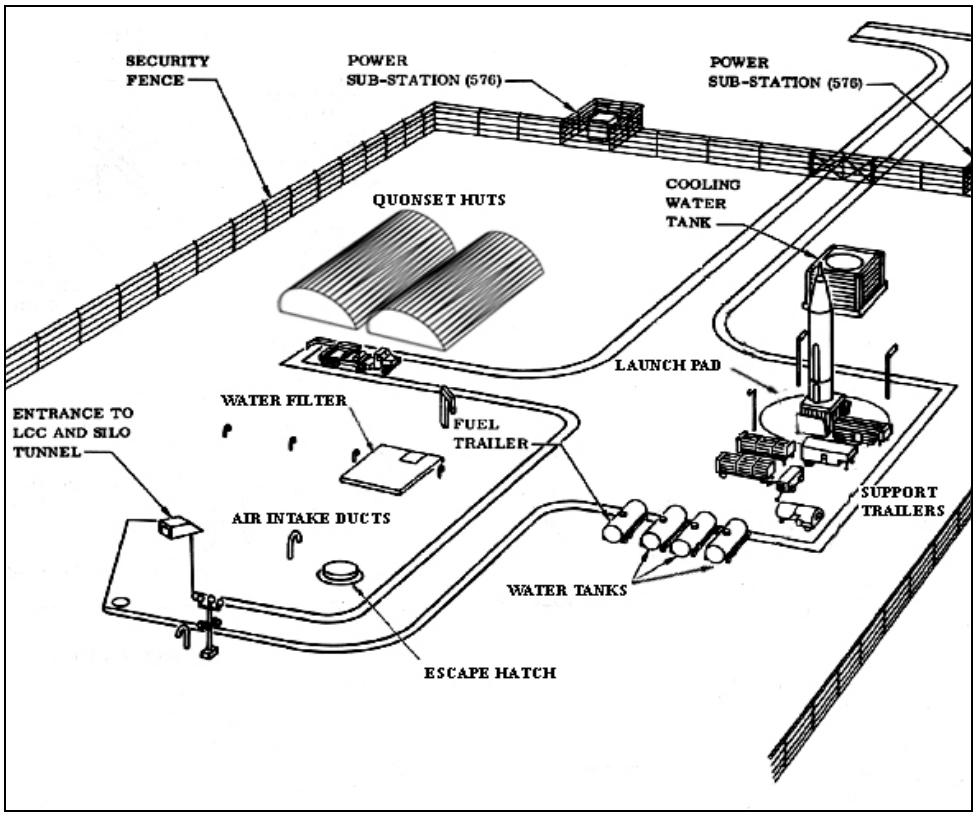


Fig. 5-7: Axonometric drawing of a typical Atlas F launch site during operation.(after Atlas F Operational Manual (T.O. 21M-HGM16F-1)) (SiloMan 1997-2003) with graphic modification by the author

Today, the launch site of SMS 579-4 is still relatively barren, leaving little indication of what lies beneath the surface. Most of the above-ground operational structures have been removed, including the Quonset huts, the guardhouse, the cooling tank, the power substations, the support tankers, the air ducts, and the fencing . The concrete pads and cement slabs are still present, demarcating the location of some of these structures, but offering no hint as to their size and structure. The silo doors, escape hatch, and entrance tunnel are sealed shut, marred by graffiti, and crumbling in places. The vegetation of the surrounding landscape, once rigorously maintained and kept largely at bay outside the fenced area, has encroached more and more on the site. Weeds and scrub brush litter the gravel drive and envelop some of the smaller site features. In

addition, a large sink-hole has formed next to the entrance tunnel. The landscape of SMS 579-4 gives ample evidence of the neglect and decay that has been allowed to overtake the site since its deactivation nearly 40 years ago. The patina of time is evident on this surface, and though this patina often obscures the functions and forms of the launch pad structures, it does offer a picture of eerie desolation that is not without charm.

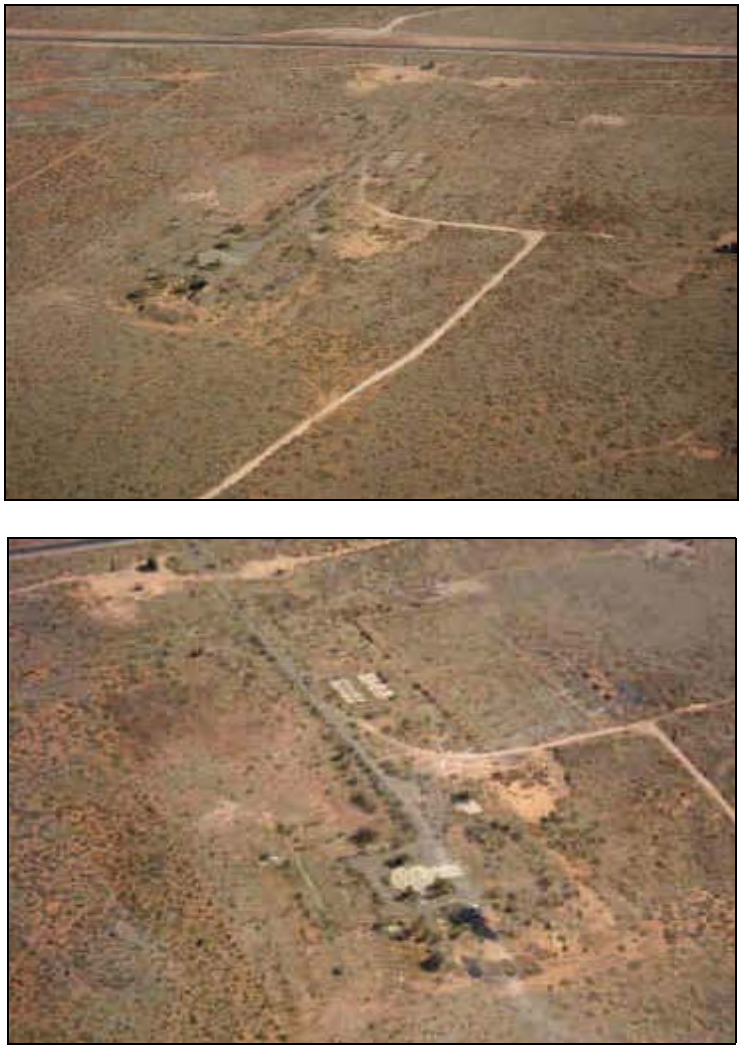
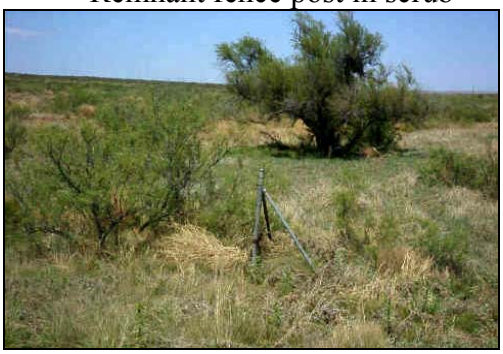


Fig. 5-7: Recent aerial photos of SMS 597- Site 4. Note the surrounding scrubland/ grassland typical of this region of New Mexico and the nearby public road at the end of the access drive. Also note the dilapidated conditions of the site (SiloMan 1997-2003).

Entrance drive

Remnant fence post in scrub



Concrete support for cooling tank

Concrete pads for Quonset huts

Silo pad with Sealed blast doors

Sealed escape hatch and entry corridor

Entry to Underground

Waste water treatment manhole

Fig. 5-8: Surface photos of Silo Site SMS 579-4 (SiloMan 1997-2003)

Underground Structures

The subsurface features of an Atlas F site consist primarily of 1) the entrance corridor that allows access from grade, 2) the Launch Control Center (LCC), 3) the utility corridor, and 4) the silo itself. Entrance to the operational underground facility is via a surface door that opens onto a 5-foot wide, 9-foot tall stairwell (see Fig. 5-11). This stairwell descends to an elbow corridor and 2-door entrapment area. Beyond this is a short corridor that leads to a blast lock, composed of two blast resistant doors in sequence, and then a vestibule stairwell that spirals down to allow access to the LCC as well as the utility corridor (National Aerospace Trust). This was the primary access point to the underground structures for the "missileers," the Strategic Air Command soldiers that were responsible for day to day operations in the LCC and silo, such as maintenance and testing of the missiles/ support structures, as well as interpretation of commands, codes, and data transmitted from outside the launch complex. Of course, these missileers were also responsible for raising, fueling, and launch of the missiles in the event of a decision to strike (SiloMan 1997-2003).

The Launch Control Complex (LCC), typically staffed by 5-man crews when operational, was the nerve center of the site, where orders were received, interpreted, and ultimately executed. Missileers spent the majority of their time here while underground, busily attending to transmissions and awaiting the confirmed signal to launch, a signal that never came. The launch console itself, the panel from which doomsday could be initiated through the turning of two keys simultaneously, was located in the LCC. The

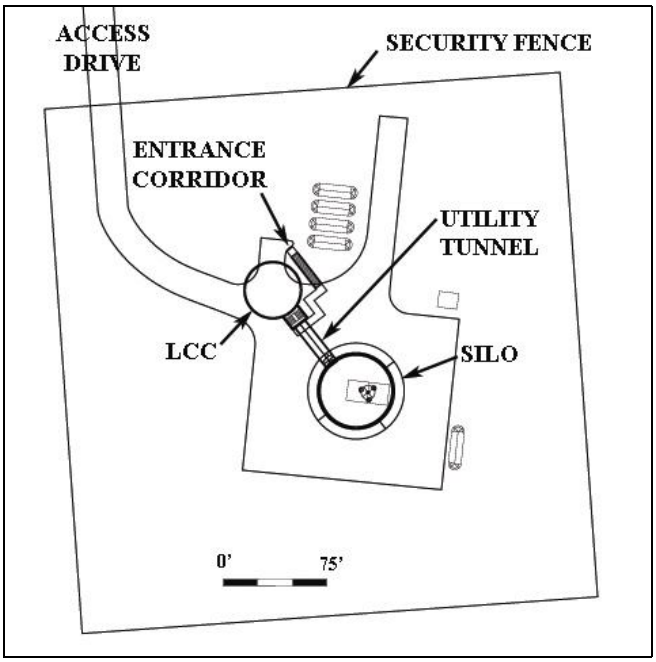


Fig. 5-9: Base plan of Atlas F subsurface structures (diagram by author)

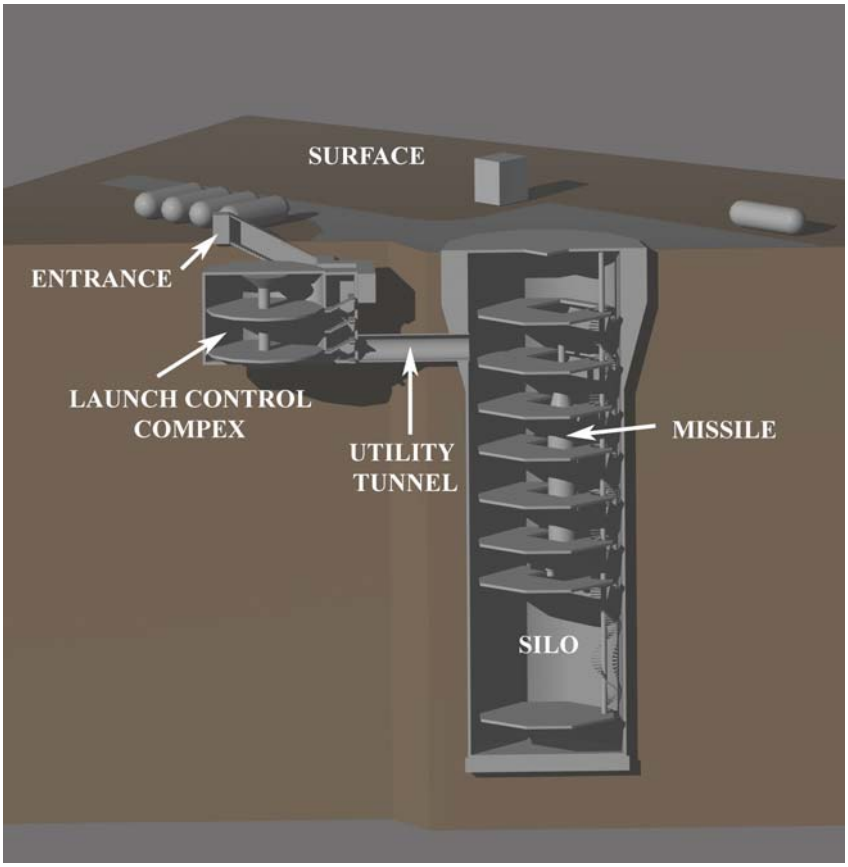


Fig. 5-10: Perspective/ Section of a typical Atlas F silo complex (diagram by author)

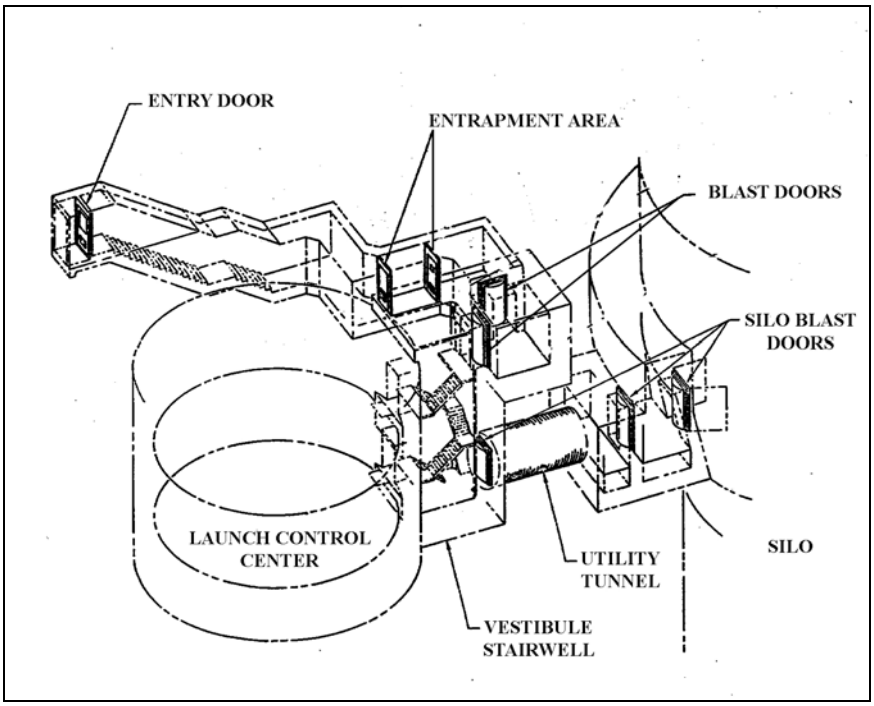


Fig. 5-11: 3-D diagram of the entrance corridor and utility corridor (SiloMan 1997-2003)(adapted by author)

LCC is a two-story cylindrical concrete structure, 40 feet in diameter and 6.5 feet below grade. The two floors are not attached to the adjacent walls, but rather are suspended from the ceiling on a shock-absorbing steel structure that could absorb ground shocks caused by potential nuclear blasts (SiloMan 1997-2003). In the center of this "hung floor", a concrete column supports the earth above the LCC. The upper floor of the LCC served as living quarters for the missileers, who spent extended periods of time below ground in multi-day shifts. This floor included storage space, a janitorial closet, a latrine/ shower, a kitchen and dining areas, a medical supply room, and a climate control room. The lower floor of the LCC contained the actual launch control equipment itself. This included the launch console, the command center, and the communication equipment room (SiloMan 1997-2003). In the event of a nuclear attack, a vertical escape hatch was located on the upper floor of the complex to allow the missileers to leave if the entry

corridor became blocked. Access into and out of either floor in the LCC is through the vestibule stairway at the end of the entrance corridor.

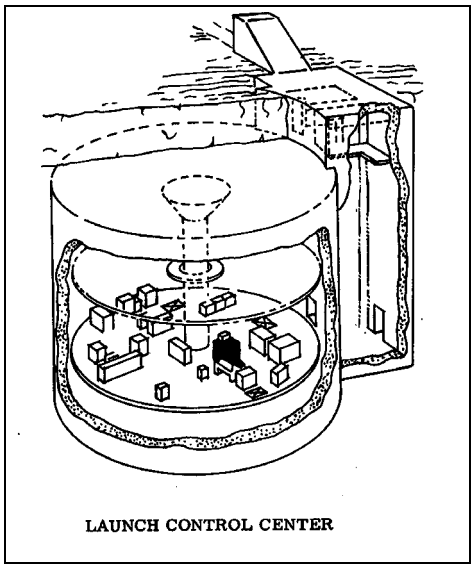


Fig. 5-12: Diagram of typical LCC (SiloMan 1997-2003)

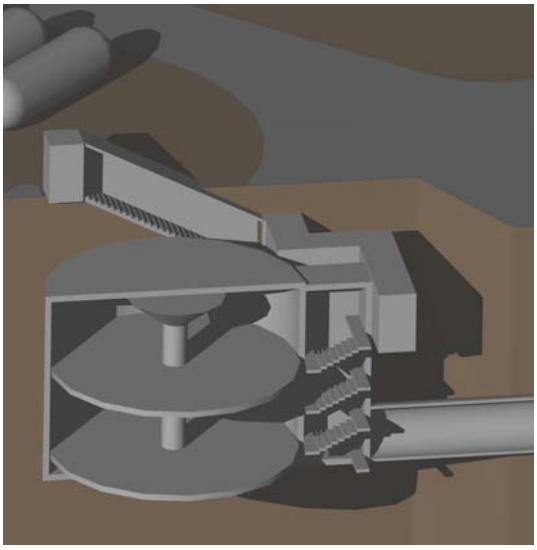


Fig. 5-13: Perspective/ Section of LCC (diagram by author)

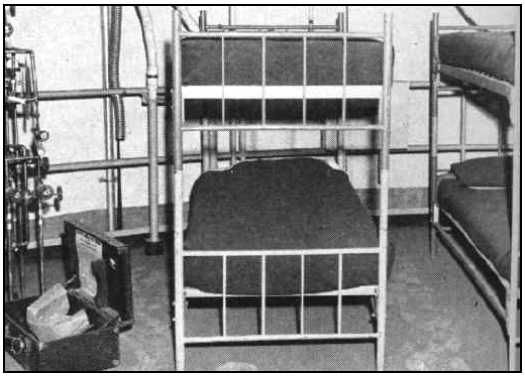


Fig. 5-14: Operational photos of the upper floor of the LCC (SiloMan 1997-2003)

Fig. 5-15: Operational photos of the launch console on the lower floor of the LCC (SiloMan 1997-2003)

The LCC is connected to the main silo chamber through the utility tunnel, an 8 foot diameter, 50 foot long corrugated metal cylinder. From the LCC, entrance to the tunnel is gained through a "fire and debris" door, located at the bottom of the vestibule stairwell. At the other end of the tunnel is an additional pair of blast doors separating the main silo complex from the rest of the structure (see Fig. 5-11). The tunnel exits onto the second highest floor of the silo (SiloMan 1997-2003).

Fig. 5-16: Photo of utility tunnel (Peden 2001)

The missile silo itself is a huge structure, approximately 185 feet deep and 52 feet in interior diameter, with eight floors suspended at different intervals (Peden 2001). Like the LCC, the floors of the silo are "hung" on a complex system of shock-absorbing steel

springs. The entire hanging floor structure, called the "crib," was intended to protect the machinery, the volatile fuel kept in the lower levels, and the missile itself from blast effects (National Aerospace Trust). Offset from the center of the silo is the missile elevator shaft, which allowed technicians access to the missile from different floors. The elevator was used to raise the missile to the surface for firing, as the missile was not designed for launch from within the silo. Because the missile was fueled by volatile liquid propellants, including liquid oxygen that is highly explosive at normal temperatures, fueling of the Atlas F missile could only occur just before launch. The fueling process took place below ground, while the missile was being raised to the surface (National Aerospace Trust). Movement between floors by the missileers was accomplished either by a spiral staircase or a utility elevator. Equipment necessary for maintenance and fueling of the missile were kept on the different floors of the crib when the silo was operational.

The atmosphere in the silo, as with most of the underground structures, is cold and dark. Along with the machinery and gas tanks, duct work, conduits, steel-beams and unadorned concrete are all left exposed. The interior offers little in the way of human comfort. The silo was an engineering venture rather than an architectural one, a massive structure built to serve a single purpose. Though seemingly anti-architectural, this approach to design resonates well with the architectural theory of the period, which was dominated by Modernist ideology. In fact, in many ways, the Atlas F silo represents the ultimate fulfillment of the Modernist dictum- "form follows function."

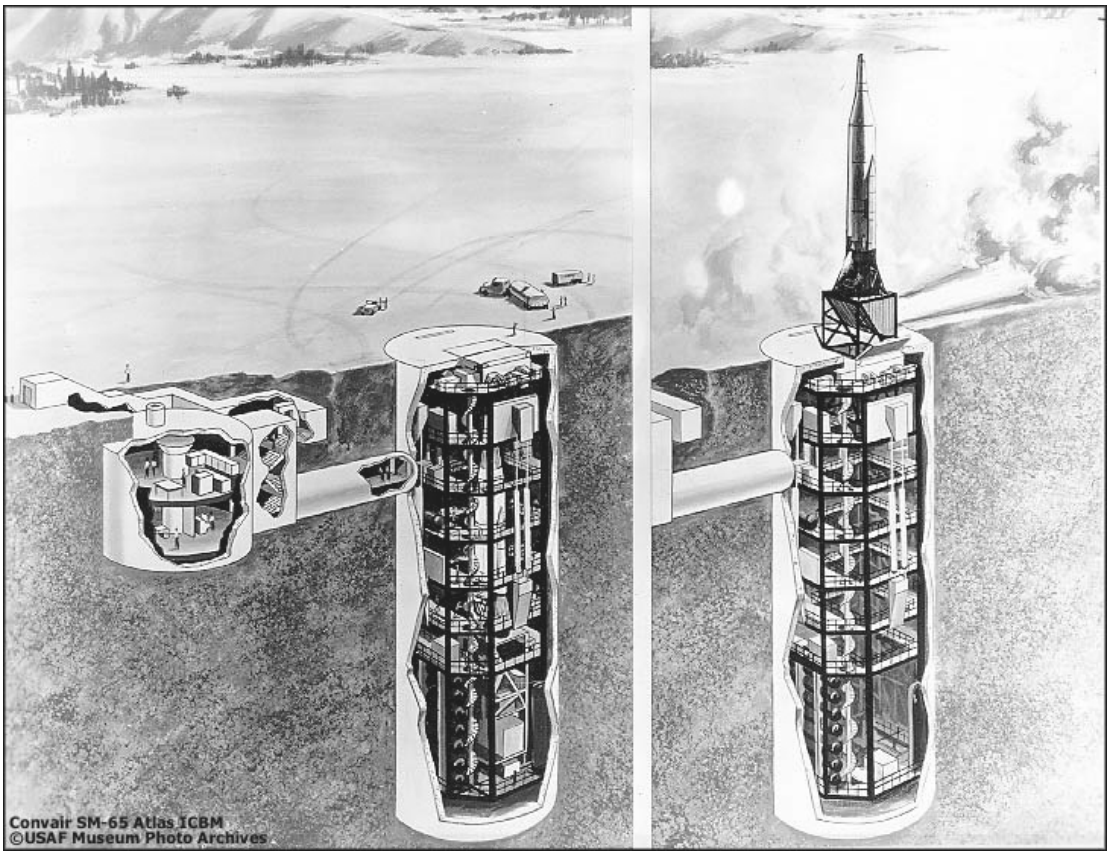


Fig. 5-18: Artist's concept of the Atlas F before and after being raised for launch (USAF Museum(b) 2003)

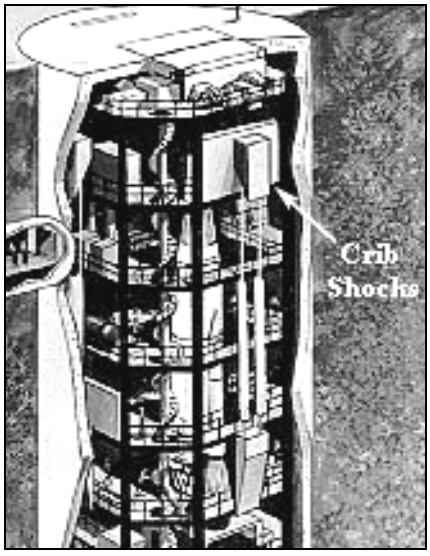


Fig. 5-19: Close-up of crib support structure (USAF Museum(b) 2003)

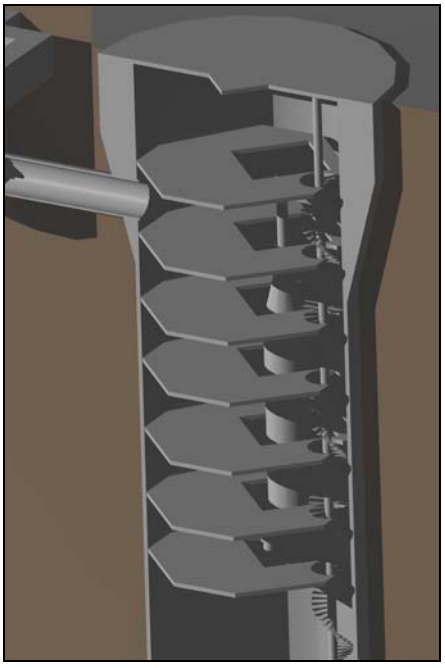


Fig. 5-20: Perspective/ Section of silo and missile (diagram by author)

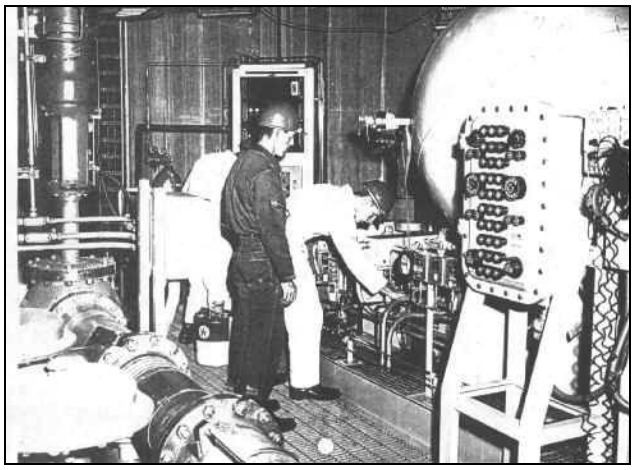


Fig. 5-21: Operational photo inside silo (SiloMan 1997-2003)

The underground structures of Silo Site SMS 579-4 are in fairly poor condition, as is common at Atlas F sites (see figures 5-22 to 5-24). Most of the interior machinery and equipment has been salvaged and removed. That which remained after deactivation was largely vandalized and/or allowed to decay. All of the interior spaces have been covered in graffiti, allegedly by a group of Satan-worshippers that held black mass services in the abandoned silo (SiloMan 1997-2003). The launch control console and some other launch equipment was left on site, but was essentially destroyed when dropped over 150 feet through the elevator shaft. Much of the flooring in the upper level of the LCC and on silo levels 2 and 7 has either been removed or lost to decay. The spiral staircase in the silo has collapsed under its own weight. And presumably, much of the crib structure and many of floor supports are unsafe and in need of repairs to make them safe for public use (SiloMan 1997-2003). As such, any preservation treatment that allows public access to SMS 579-4 will necessitate some restoration or rehabilitation of the interior to bring it up to safety codes. On the plus side, however, most of the interior duct work, piping, and conduit connections, are still largely intact, as are the crib springs and most of the floor infrastructure (SiloMan 1997-2003). The sense of being enveloped in a vast machine still

permeates the silo. As such, it still has the potential to convey a sense of the brutal, inhuman, purely functional qualities that characterized the silo while operational, which implies the interior has a lot of potential for restoration or rehabilitation.

Conclusion:

The physical configuration and dimensions of Atlas F silo SMS 579-4 offer some challenging design problems. The patina of time, while adding character and an appropriate sense of decay to the surface and subsurface features of SMS 579-4, has also damaged operational integrity of the site. The arrangement of space in the silo is often constricted and compartmentalized, complicating the circulation. In addition, strong spatial dichotomies, such as the contrast between the surface and the subsurface, and between the LCC and the silo, segment the complex into contrasting areas suggesting different treatment approaches. These issues bring up some interesting questions: How can these physical limitations and characteristics be exploited in a preservation treatment? How can they be integrated with narrative approaches to best present a sense of history to the public? The next chapter explores these questions and synthesizes design alternatives for final analysis.

Entrance Stairwell

Blast door outside vestibule

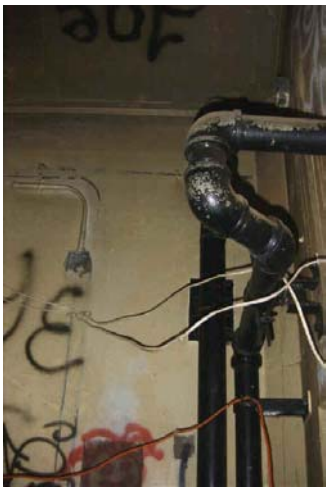
Another blast door

Looking down the vestibule stairwell

The upper floor of the LCC

Electrical conduits

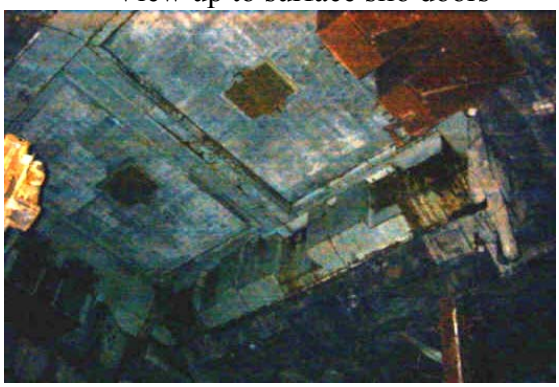
Intact sewer piping



The escape hatch in the LCC

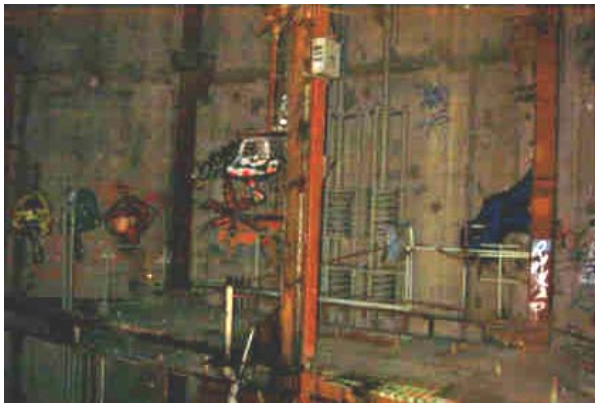
Fig. 5-22: Recent interior photos of the entrance corridor and the LCC of Silo Site SMS 579-4 (SiloMan 1997-2003)

View up to surface silo doors



View down onto level 3

Level 3



Level 5

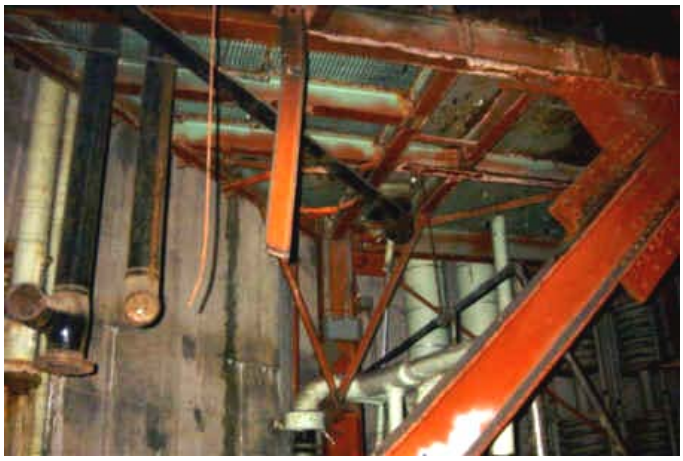
Exhaust ducts

Crib springs

Fallen spiral staircase

Fig. 5-23: Recent interior photos of the main silo on
Silo Site SMS 579-4 (SiloMan 1997-2003)

View up toward level 3 from below



Freight elevator at level 6

Fig. 5-24: Recent interior photos of the main silo on Silo Site SMS 579-4 (SiloMan 1997-2003)

CHAPTER 6

THE RESURRECTION

> *"All wars end in tourism. Battlefields are rendered as scenic vistas, war heroes are frozen into gray memorials in urban parks, tanks and other weapons bask outside the American Legion posts on suburban strips... [Cold War] tourism curiously combines 'what if' with 'what was'; as one tours never-before-seen secret installations that seem familiar, one is looking at abstract doomsday scenarios poured in hard concrete."* (Vanderbilt 2002, p. 135)

Aims

This thesis strives to present a novel experience of Cold War history that goes beyond the histories presented at other military sites and museums. The design alternatives suggested below do more than simply espouse the "sacred narrative" view of nuclear weapons. They coordinate more elaborate treatment strategies, strategies that attempt to be complex and layered; narrative and dynamic; inclusive and multivalent; transformative and interpretive. At times, these ends can be contradictory and seemingly irreconcilable. Complex narrative relationships and physical dichotomies challenge attempts to convey a clear history to a wide audience. In light of this, three design alternatives are included here to explore multiple possibilities for approaching this difficult task.

The different methods used to generate the three alternatives are based on the resolution of two major issues- 1) how to exploit the *physical integrity* of the site, and 2) how to present an effective *interpretive narrative*. Sub-issues that fall under the first category include the need to exploit *spatial dichotomies* evident within and around the

silo, the need to manipulate *circulation* to effect a more educational experience, and the need choose broad preservation *treatment approaches*. Sub-issues that are included in the second category include the need to balance different *techniques* for generating interpretative narration and the need to thematically *organize* the different narratives. This chapter begins by analyzing these issues independently in an effort to produce alternatives that explore each of the issues from different angles.

Spatial Dichotomies:

Based on the physical analysis of SMS 579-4 discussed in the last chapter, some interesting treatment concerns present themselves. First, there is the question of how to respond to the various spatial dichotomies existing on site. For example, the surface and subsurface regions present a stark contrast. Above ground, the landscape is brightly lit, well vegetated, visible to anyone who takes the time to stop and look, nestled within the surrounding New Mexico environment, and subject to the fluctuating weather. Underground, the space is dark and uniformly cool, enveloped in machinery and concrete, lifeless and claustrophobic, and totally divorced from weather patterns and from the spaces above ground. Whereas the surface is obviously part of this world, and of New Mexico in particular, the subsurface spaces seem otherworldly, almost like the interior of a decaying space station. The subsurface could be situated anywhere. These poles present the contrasts of the seen and the unseen, the real and the unreal, the picturesque and the placeless.

Another dichotomy is evident in the separation of the LCC and the silo proper. When operational, the LCC served as the brain of the site, housing the equipment

relevant to interpretation of data and messages, as well as the equipment used to respond to these signals. Here, the missileers weighed incoming communications, vigilantly awaiting the call to unleash the unthinkable. The silo proper, in contrast, was the body of the complex, where the missile itself rested and was hooked to life-support. It awaited orders sent from the LCC. The connection between the two is tenuous, a narrow tunnel that is reminiscent of the spinal chord connecting the brain to the torso. The clear physical distinction between the silo and the LCC suggests a distinction between spaces that embody contrasting ideas such as interpretation versus reaction, humanity versus machine, stimulus versus response.

The third major dichotomy that presents itself involves the relative openness of spaces in the silo complex. On the one hand are narrow corridors, such as the entrance corridor, the utility tunnel, the spiral staircase, and the missile elevator. Here, space is narrow and movement is restricted to two directions only. The corridors allow little room for deviation from straight progression to a goal. The LCC and the silo complex proper, however, are comprised of separate, relatively open circular spaces. Here movement is less restricted. The spaces were designed to be un-programmed in the sense that missileers were able to move freely about the rooms, attending to equipment and machines. Therefore, the arrangement of space and movement patterns within the subsurface structures of the site varies between the poles of the controlled and uncontrolled, the restricted and the open, the determinate and the indeterminate.

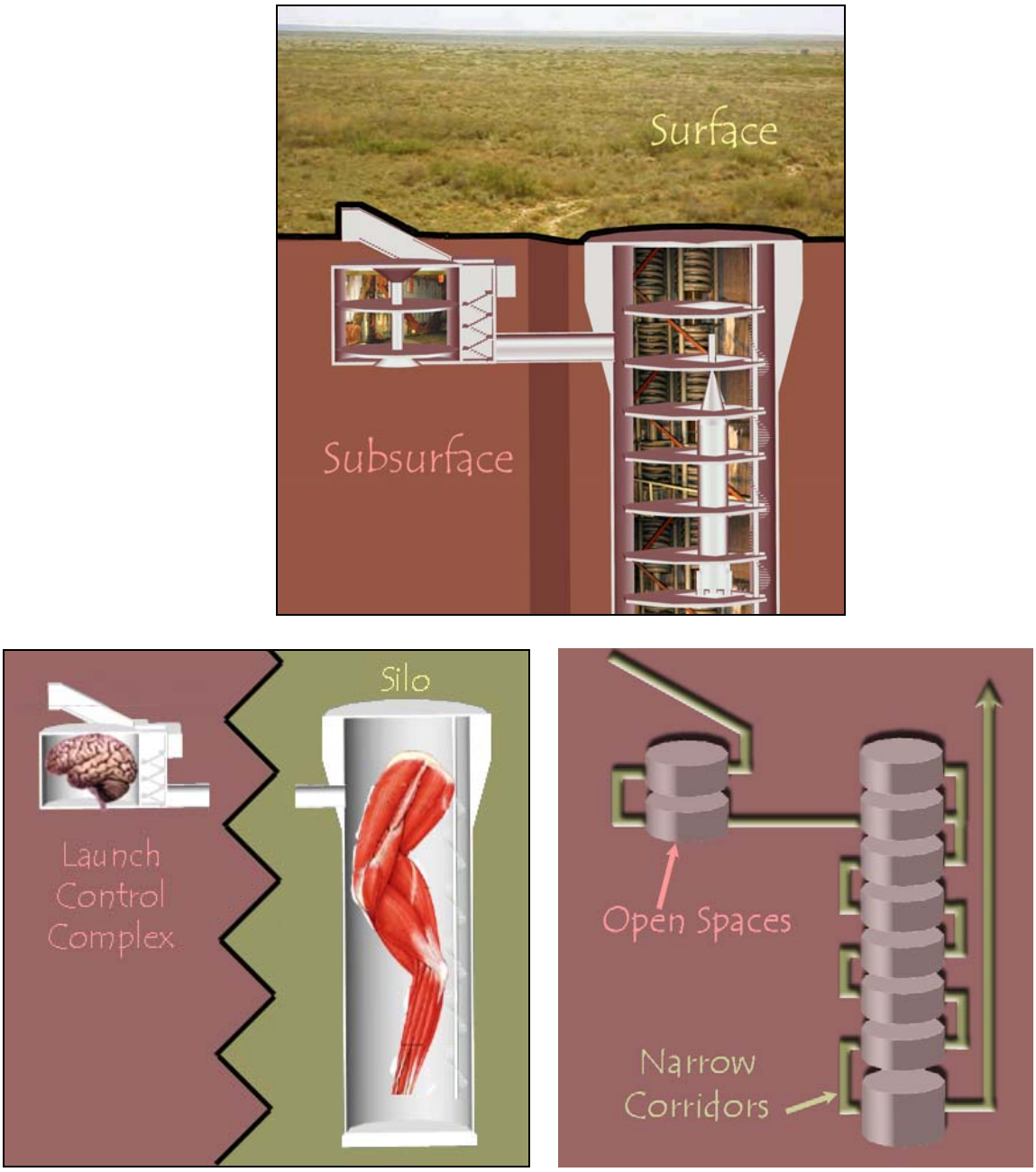


Fig. 6-1: Different spatial dichotomies in SMS 579-4. Clockwise from top: 1) surface vs. subsurface, 2) LCC vs. silo, and 3) open space vs. corridors (diagrams by author)

Circulation Patterns:

In considering the preservation of the silo for the purpose of visitation, human movement through the space becomes an important concern both above and below the

surface. For example, the large-scale movement patterns in the landscape or in the silo complex could be arranged in a few different ways. Overall, movement could be restricted and controlled, with people moving along an established route; it could be left open and unrestricted, with people moving about freely in various directions; or it could be a combination of open and restricted. On a smaller scale, adjacent sections of the landscape or adjacent rooms below grade could be arranged in the same ways. Also of importance to circulation are issues peculiar to the subsurface structure. For example, the interior spaces are highly segmented, most noticeably in the silo proper, where floors are stacked atop one another as in a skyscraper. Movement between these floors could be accomplished in a number of ways, such as via ramps or stairs, which would give a sequential experience of each floor, or through an elevator, which would give a more open experience by transporting the visitor to any floor at the touch of a button.

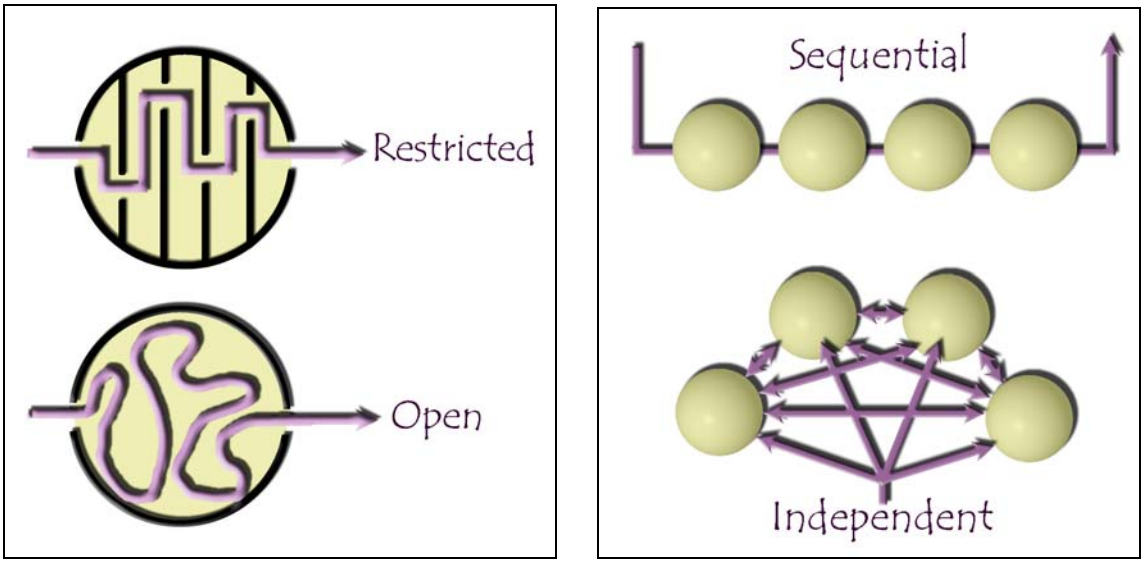


Fig. 6-2: Potential circulation patterns for the silo spaces. (diagrams by author)

Integrity and Standard Treatments:

These movement patterns relate to larger concerns about the physical integrity of the site and the appropriate choice for preservation treatment. As the site exists now, it is unsafe for visitation. Obviously, if any of the subsurface structure is to be publicly used, some rehabilitation or restoration must occur to make it safe. But, how far should the treatment go beyond the minimal intervention necessary to ensure safety? Three standard approaches suggest themselves for both the surface and the subsurface areas: preservation, restoration, and rehabilitation.

Preservation would involve leaving the site as it is, making only the minimal changes necessary for safety and to prevent further decay. The marks of age, vandalism, and prior decay would be left largely intact. The conspicuous absence of much of the operational equipment would not be remedied. Rather, the site would be left transformed by the patina of time, clearly demonstrating its age, its obsolescence, and the fact that it is a relic of the past. *Restoration*, however, would involve a much more ambitious effort to return the site to its operational appearance. Decay and damage would be erased. Missing equipment would be replaced and repaired. The structure would be overhauled to appear relatively new and well-maintained, helping to recreate the ambience present during the site's historic period of use. As such, it would hint at what it was like to work in the silo during the early 1960s. *Rehabilitation* would address other concerns. In this treatment, the silo would be physically adapted to accommodate new uses, trying to achieve a balance between the historic integrity of the site and the demands of the new use.

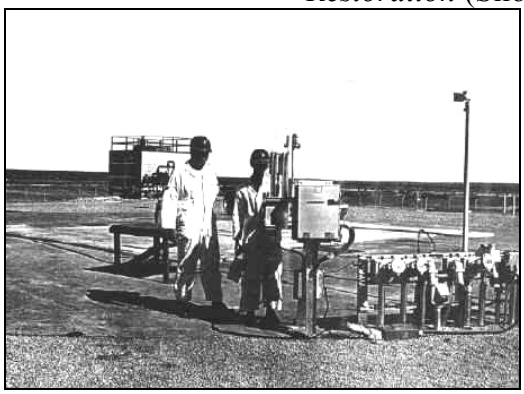
Of course, these are the same issues regularly tackled by the National Park Service when weighing possible treatment alternatives for historic sites and structures (see *NPS Preservation Brief 36* by Charles Birnbaum). Unlike the NPS, however, this thesis will not base its decision about treatment approach solely on the artificial construct of physical "integrity." A high degree of physical integrity on the site does not necessarily mean it conveys a rich sense of history. Sometimes, a more intrusive treatment approach might be necessary to promote this richness. In the same vein, a lack of physical integrity does not necessarily imply an artifact is incapable of conveying a rich sense of history. In such a case, it might not be necessary to treat the site at all, though it may display what many consider to be a distasteful corruption due to the marks of time. The NPS recommends adopting a primary treatment strategy rather than mixing alternate treatments, but in this thesis, it seems relevant to consider the possibility of combining different treatment schemes. The strong spatial dichotomies on site, and the desire to create juxtapositions in the presentation of the narrative, suggest this would be an appropriate way to explore the alternatives.

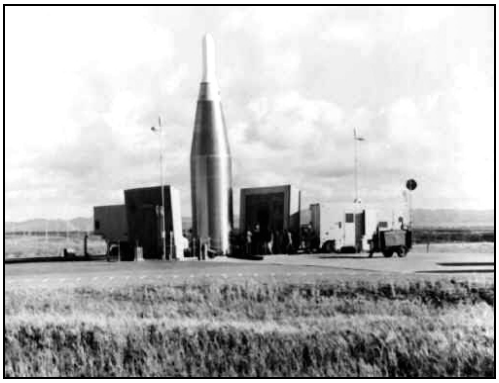
Interpretive Narration:

Lowenthal and Howett argue that history should be presented to individuals as stories. To effectively communicate in this way, clarity is essential. Considering this, a simple, linear narrative may be the best means of synthesizing history and making it comprehensible to the general public. But Lynch suggests that history might also be presented as a fragmentary collage, a juxtaposition of alternative views and ideas from which individuals can draw their own connections and weave their own concepts of

Preservation (SiloMan 1997-2003)

Restoration (SiloMan 1997-2003)





Rehabilitation (Peden 2001)

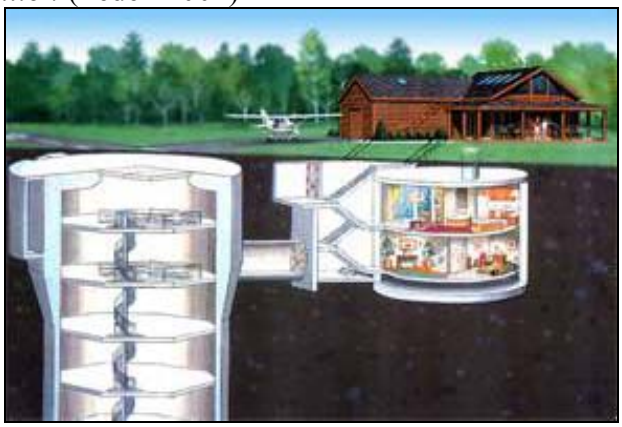


Fig. 6-3: What different treatment strategies might look like when applied to SMS 579-4.

history. Both a linear and noon-linear narrative are predicated on the idea that history is subjective and synthetic, but they differ in their approach. One approach assumes the public is a passive recipient of information. The other requires the public to be active

participants. It seems desirable to leave room for both approaches. After all, the silo site is fairly large and could easily be segmented or arranged to accommodate both. Thus, for the purpose of this design exercise, it will be assumed that both narrative techniques should be incorporated in the three alternative designs.

The question then becomes how to physically present the two different storytelling techniques in real space. Three interesting possibilities suggest themselves. First is the possibility of using a linear gradient. At either end of this gradient would be the most extreme versions of the two narrative approaches. On the one end would be pure collage, on the other, straightforward storytelling. The linear sequence between these poles could then demonstrate a gradual shift in the proportion of each narrative device employed. Second, there could be an arrangement involving alternating spaces devoted to collage and linear storytelling. In this case, nodes of collage, where ample room is left for individual exploration, could be interrupted and elaborated upon by connecting corridors of linear interpretation, where a narrative is presented which builds upon or introduces the spaces for collage. In this case, the alternating presentation of collage and linear interpretation would help reinforce each other as the visitor proceeds through the site. Third, the site could simply be divided into two general areas, one devoted to pure collage and one devoted to pure linear interpretation.

Paralleling the issue of linearity is the issue of multiplicity. In presenting the wide cultural context of the Atlas F ICBM, a method of organizing multiple stories is necessary, and there are many possibilities for this. For example, the cultural context could be presented in a systematic fashion, such as through temporal sequencing. In such a presentation, all aspects of cultural context, from high art to political rhetoric, could be

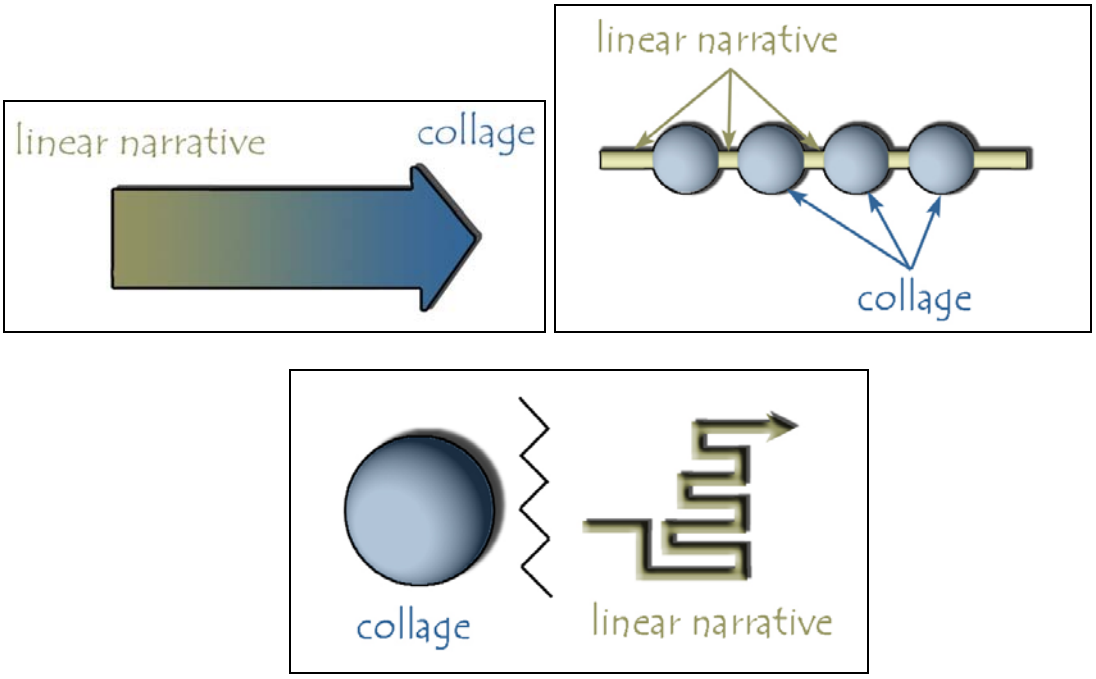


Fig. 6-4: Methods of combining linear interpretations and collage in the same design. Clockwise from upper left: 1) Along a transitional gradient, 2) Alternating nodes of collage and corridors of linear interpretation, and 3) Simple segmentation (diagrams by author)

presented together but segmented into different time periods. The resulting sequence would focus the narrative on changing cultural dynamics that occur over time. Another organizing possibility would be the presentation of context within different media. For example, there could be a separate room examining the effect of the ICBM on television programs, another examining social movements, and yet another investigating literature. This type of organization would highlight the wide range of responses exhibited by the culture and the wide range of techniques for registering these responses. Another possibility for narrative organization is to arrange displays thematically, with different media and time periods being juxtaposed to reinforce certain recurring ideas. Examples of thematic possibilities were presented in chapter 2. For instance, one display could emphasize how culture perceived the ICBM as embodying global apocalypse, while

another display could focus on the ICBM as indicative of a war without boundaries. The value of this approach would be to allow more complicated interpretations of the true cultural relevance of the ICBM.

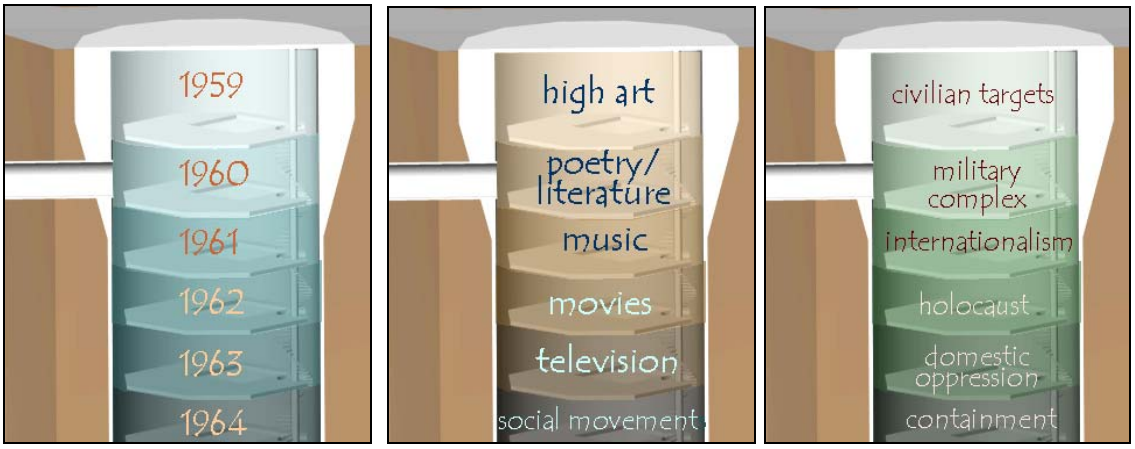


Fig. 6-5: Different methods of organizing interpretive narrative in the silo.
From left: 1) Temporally, 2) By media, and 3) Thematically (diagrams by author)

Treatment and Interpretation Alternatives:

In considering the possibilities for the preservation treatment of silo SMS 579-4, we need to address both physical treatment and interpretation issues. For each issue, a range of plausible designs suggest themselves. This thesis will explore some of the possibilities through delineation of design alternatives that attempt to incorporate provocative combinations of treatments and interpretations. There are of course, many other possible combinations, but these alternatives are meant to illustrate some of the opportunities for the site. Comparison of the three alternatives may help to synthesize a more refined treatment strategy. Below is a matrix that summarizes the attribute combinations used in the generation of the three alternative designs.

Table 6-1: Matrix of Treatment Options for the Three Design Alternatives

Physical Integrity Issues			
	Alternative 1	**Alternative 2**	**Alternative 3**
Dichotomy Exploited:	surface vs. subsurface	corridor vs. open space	LCC vs. silo, (surface vs. subsurface also)
Circulation: Surface:	unrestricted, independent	restricted, sequential	partially unrestricted, partially independent
Subsurface:	restricted, unidirectional, by stairs	alternating restricted/ unrestricted, alternating unidirectional/open, by ramps	unrestricted, open, by elevator
Treatment: Surface:	preserve	restore	rehabilitate
Subsurface:	combination restore/ preserve	rehabilitate	combination preserve/ rehabilitate
Interpretive Narrative Issues			
Narrative Techniques:	gradient from more linear narrative to more collage	nodes of collage connected by corridors of linear narrative	3 broad separate zones: collage, linear narrative, neither
Narrative Organization:	temporal	thematic	by media

Alternative One: Design Ideas:

The starting point for developing this alternative was the spatial dichotomy existing between the surface and subsurface regions. On the one hand is the surface, which is connected to the surrounding landscape and promotes a sense of reality. On the other hand, is the subsurface, which is self-contained, divorced from the living landscape, and evocative of the unreal. As one descends deeper into the silo and further from the surface, one descends deeper into the unreality of the subsurface space. This sense of

increasing unreality in physical space has a temporal corollary. Initially, response to the introduction of nuclear technologies in the American landscape was marked by complacency, mute acceptance, and a sense of "business as usual". As time went on, however, voices of cultural dissent gradually became louder, more prevalent, and more distressed. The culture of consensus and assimilation changed into the culture of rebellion and dissonance, fragmenting into a myriad of voices. There is a strong potential for using time as a narrative organizational device when exploiting the surface/subsurface dichotomy. In this case, increasing depth comes to imply increasing temporal penetration into the unreality of the nuclear age, a world increasingly affected by nuclear weapons.

The decision to use temporal arrangement, combined with the metaphor of increasing unreality, suggests the use of a gradient when addressing the issue of narrative technique. In deciding how to incorporate linear narrative and collage in this approach, the increasing prevalence of dissent in American culture over time suggests a gradual increase in the proportion of space devoted to collage. As time progressed during the age of the Atlas ICBM, more and more voices of dissent were heard, contributing to a greater sense of cultural disunity and a lesser sense of the "sacred" interpretation of nuclear weapons. Thus, it seems appropriate to physically manifest this idea along a gradient in the silo, moving gradually from the pole of "sacred narrative" at one end, to the pole of "dissident collage" at the other. This decision in turn suggests the physical treatment approach should shift along a gradient as well. In the case of this silo complex, most of the operational equipment has been gutted from the silo. As such, a preservation treatment would involve leaving the spaces relatively open, allowing ample room for a collection of artifacts presented as a collage. A restoration, on the other hand, would

limit the space available for such a collage, and seems more appropriate for reinforcing the infallibility of the "sacred" narrative. Thus, the design gradient should progress from a state of complete restoration with no collage to a state of complete preservation with abundant collage. In an effort to reinforce the sense of "reality" above ground, it seems prudent to preserve the surface landscape without additions, so that it continues to meld with the surrounding scrub ecology of New Mexico. If any visitor services are deemed necessary, such as a gift shop or an interpretive center for introducing the concept behind the preservation approach or the official history of the Atlas F, then restoration of the Quonset huts on the surface could accommodate these activities.

In order to emphasize the idea of cultural collage and to ensure the inclusion of genuine dialog in the design, an opportunity should also be given to the visitors to participate in the collage displays. This participation could draw upon visitors' varied personal recollections and memorabilia in an effort to reinforce the idea that all levels of American culture were strongly affected by nuclear weapons. The venue for this participation should go beyond a mere guest book and comment sheet to include solicitation for actual memorabilia and narratives that could be incorporated into the collage spaces in the design. In particular, visitor submission of photos, written accounts, video footage, and personal artifacts related to the cultural response to nuclear weapons could be encouraged. These artifacts and personal memories could then be incorporated into the final display spaces as a means of promoting a stronger sense of connection between the visitors and the Atlas ICBM. This would make the overall experience more transformative and personally meaningful to visitors. Moreover, it would allow for a gradual accumulation of collage over time, making the design more dynamic and

representative of the changing perceptions of the relevance of such a site. This venue for visitor participation could be adapted in one form or another to all three designs outlined in this thesis.

As for the circulation pattern, progression through the space should be fairly restricted, unidirectional, and sequential. Movement along a linear temporal gradient calls for this type of approach. Above-ground, however, circulation could be left unrestricted and open, in order to reinforce the connection of the surface to the outside world. Moreover, the sense of openness and vastness in the surrounding landscape implies an open, indeterminate exploration might be appropriate.

Alternative One: The Experience:

What would the experience of such a place be like? When arriving on site, visitors would see a landscape of decay- rusting metal, crumbling concrete, and uncontrolled vegetation- a site ravaged by time, neglect, and obsolescence. Upon stepping into the entry corridor, however, they would be transported back in time. As they worked their way down the corridor to the fully restored upper level of the LCC, they would begin to get a sense of the arrangement of the silo complex and how it functioned in its operational days. Displays at this point would be few and far between, restricted to the occasional monitor display, poster on the wall, or text on the desk. These displays would only present the official political and military narrative for visitors, such as speeches by Eisenhower on atomic power, diagrams by the RAND corporation on the effects of a Soviet first strike, official news footage of missile tests and Communist

insurgency abroad, clips from civil defense propaganda films and Red menace films, and other consensus-culture artifacts.

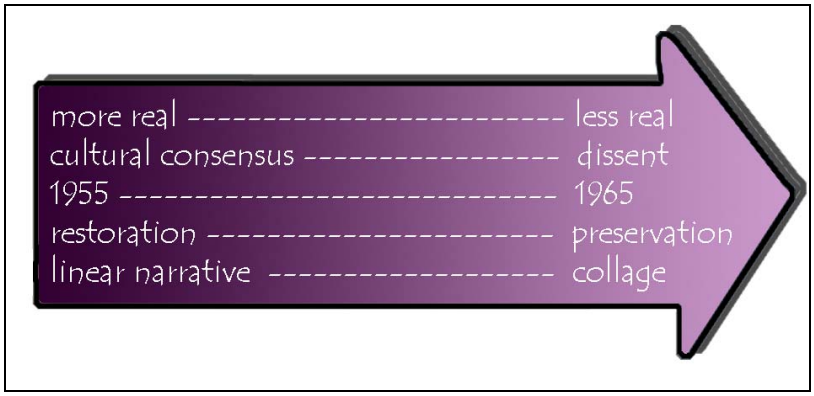


Fig. 6-6: Different conceptual gradients used in organizing Alternative One (diagram by author)

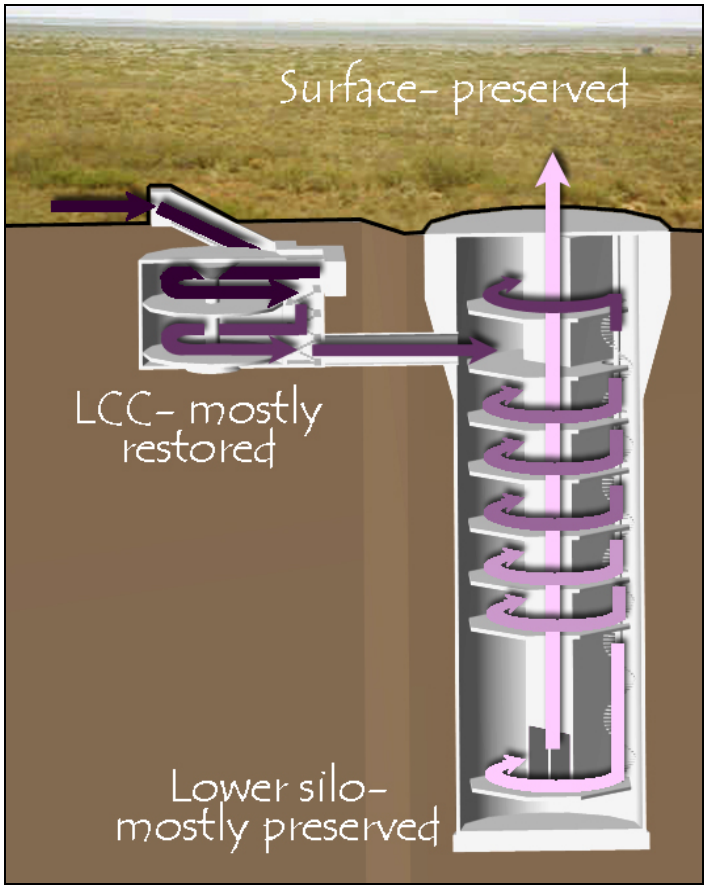


Fig. 6-7: Circulation patterns along gradients: shown in perspective/ cross-section (diagram by author)

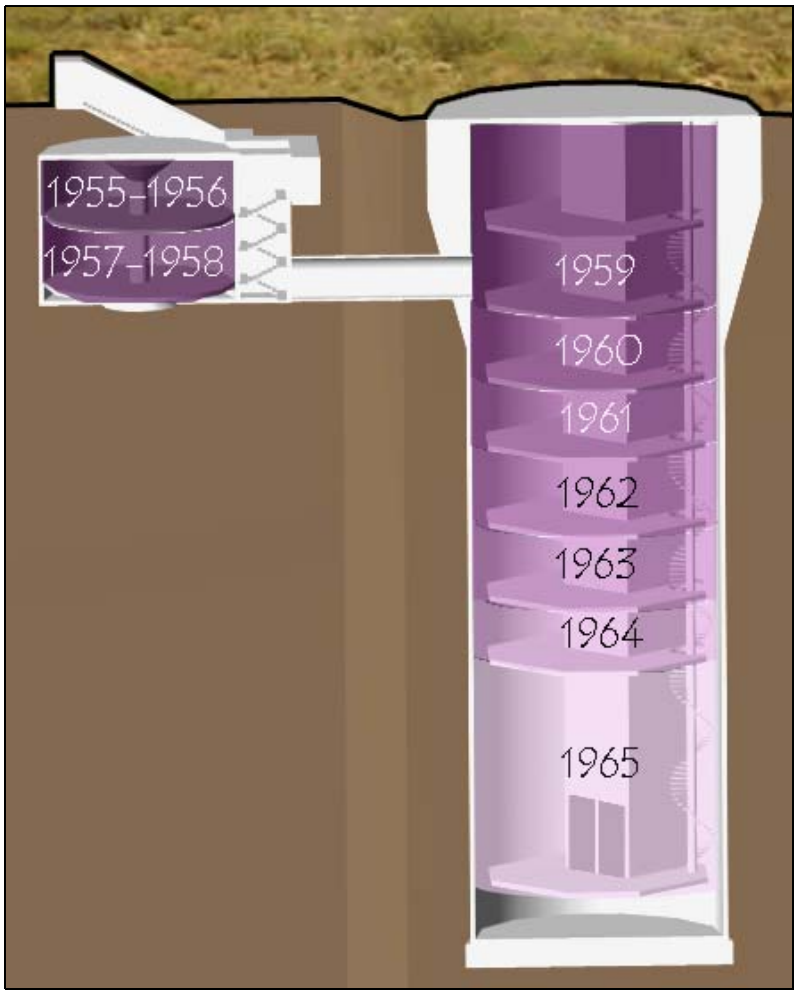


Fig. 6-8: Temporal organization of floors in Alternative One: shown in perspective/ cross-section (diagram by author)

Fig. 6-9: The appearance of the restored LCC chamber- note that the restoration is layered with artifacts which convey a linear narrative (collage by author)

Fig. 6-10: The appearance of the lowest, most heavily preserved level in the silo for Alternative One: note the juxtaposition of artifacts to produce a collage (collage by author)

Fig. 6-11: The view up the elevator shaft as the visitors are taken to the surface: note the collage of monitors that dot the exterior walls (collage by author)

As the visitors continued through the stair vestibule and into the first level of the LCC, they would still see a largely restored silo complex, but there would be the occasional inclusion of a voice of dissent, such as a poem by Allen Ginsberg or a painting by Jasper Johns, amongst the official narrative artifacts. From here the visitor would enter the utility tunnel and then the silo itself, moving downward from floor to floor via a spiral staircase. As visitors went deeper and deeper in the silo, the levels would become progressively less restored and more filled with the collage of cultural dissent. The lowest level of the silo (level 8) would consist of a great melange of artifacts from every cultural media possible- from popular music to literature to social movements and beyond. By this point, the collage will have become so diverse, that the few pieces referring to the official narrative may remain relatively unnoticed. In addition, visitors would be invited to contribute their own ideas and artifacts to the collage, either through writing or through contribution of personal memorabilia. Photographs, personal stories and anecdoates, videos, and other nuclear-related memorabilia collected from previous visitors would be on display in the surrounding space. In effect, the visitors would realize they have the opportunity to become part of the display, participating in open dialog and revealing their own personal connections to nuclear culture.

The tour would conclude with a slow assent in the elevator shaft. The elevator would be open at the top- allowing the light from the surface to pour through the blast doors and into the immense chasm of the silo. As the elevator rose, the visitors would notice the walls of the shaft were covered in several hundred monitors, each belching out sound and competing with each other for the visitors' attention. This would be the final collage, with images and sounds from every point of view and every type of media

flashing intensely as the elevator slowly ascended to the surface. At the end, the visitor would be pushed back into the "real" world on the site's surface.

Alternative Two: Design Ideas

Rather than using a spatial dichotomy to spark the design idea, Alternative 2 begins by addressing the issue of how best to combine narrative techniques. Storytelling is done by piecing together fragments of information into an organized narrative structure. At the same time, historical interpretation could be reinforced by exposure to fragmentary pieces of artifacts and memory charged texts. This suggests a strong approach to historical presentation could involve alternating presentations of fragmentary collage connected by narrative interpretations.

This approach seems best suited for exploiting the spatial dichotomy between the narrow, unidirectional corridors and the larger, open circular spaces in the silo complex. The contrast of these spaces would reinforce an alternating narrative approach. Interpretations, which readily lend themselves to linear presentations, could be sequentially ordered along the corridors. The larger spaces could then accommodate the juxtaposition of various artifacts in an open collage format. This in turn suggests a logical circulation pattern for the subsurface spaces. The overall circulation pattern should be linear, so that each collage space is preceded and possibly followed by a corresponding linear narrative space. If circulation is not well organized, then the linear narrative might be bypassed or associated with the wrong collage space. However, within the collage spaces, circulation should be more free and indeterminate, so that visitors can pick and choose the collage pieces they find most compelling. In this way,

they can more freely construct their own interpretation, which could either build on or challenge the one they were presented beforehand.

The need for distinct, self-contained corridors between open spaces means the missile silo would have to be rehabilitated. In particular, the circulation connection between the floors of the silo and within the LCC would have to be improved in this design. A spiraling ramp around the perimeter of the silo and LCC interior is porposed, which would allow for a gradually ascending, enclosed connecting space between floors. This space could accommodate wall-mounted displays to be used in creating narrative exhibits. The construction of a new ramp would entail a major modification of the physical structure located below ground, but this seems preferable to the option of adapting the narrow, unenclosed spiral staircase for such a purpose. In addition, because the missile elevator is large and intrudes into the floor space of the silo, this should also be modified. If it was reduced to a smaller size, it would open up space for an interpretive collage display.

As for physical treatment of the surface, a restoration is proposed in order to provide a provocative foil to the fully rehabilitated subsurface structures. Moreover, this restoration would reveal how the site physically functioned when operational. Along with this restoration, the surface could include some interpretive exhibits, such as signage, photos, text, and schematic diagrams that describe the site's layout and the changes made to the silo during rehabilitation. This would help make visitors aware of what was actually part of the historic structure, and what was added later. The movement of visitors at the surface should be organized to promote understanding of this linear interpretive exhibit.

The last issue to be resolved is selection of the narrative organization. In this case, the thematic approach, exemplified in the themes discussed in chapter 2, seems most logical, as each collage and corridor can become self-contained. As such, each area could be laid out to treat unrelated topics. A wide variety of different themes could be explored over time, allowing for dynamic interpretations through rotation of displays and concepts.

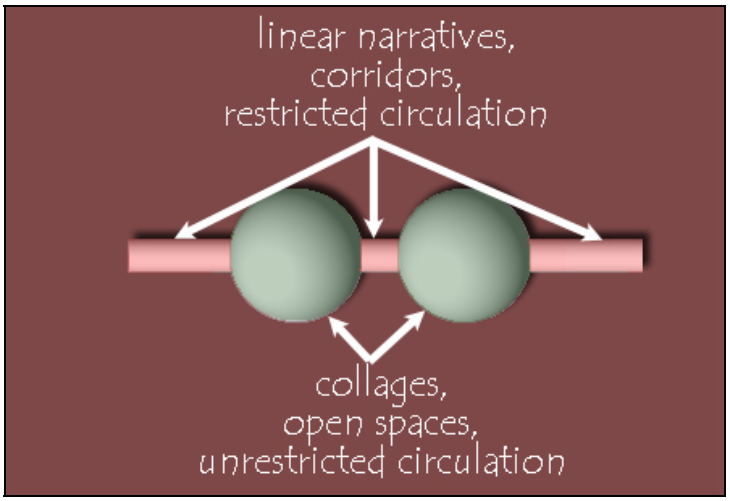


Fig. 6-12: Conceptual diagram of the separation of spaces in Alternative Two (diagram by author)

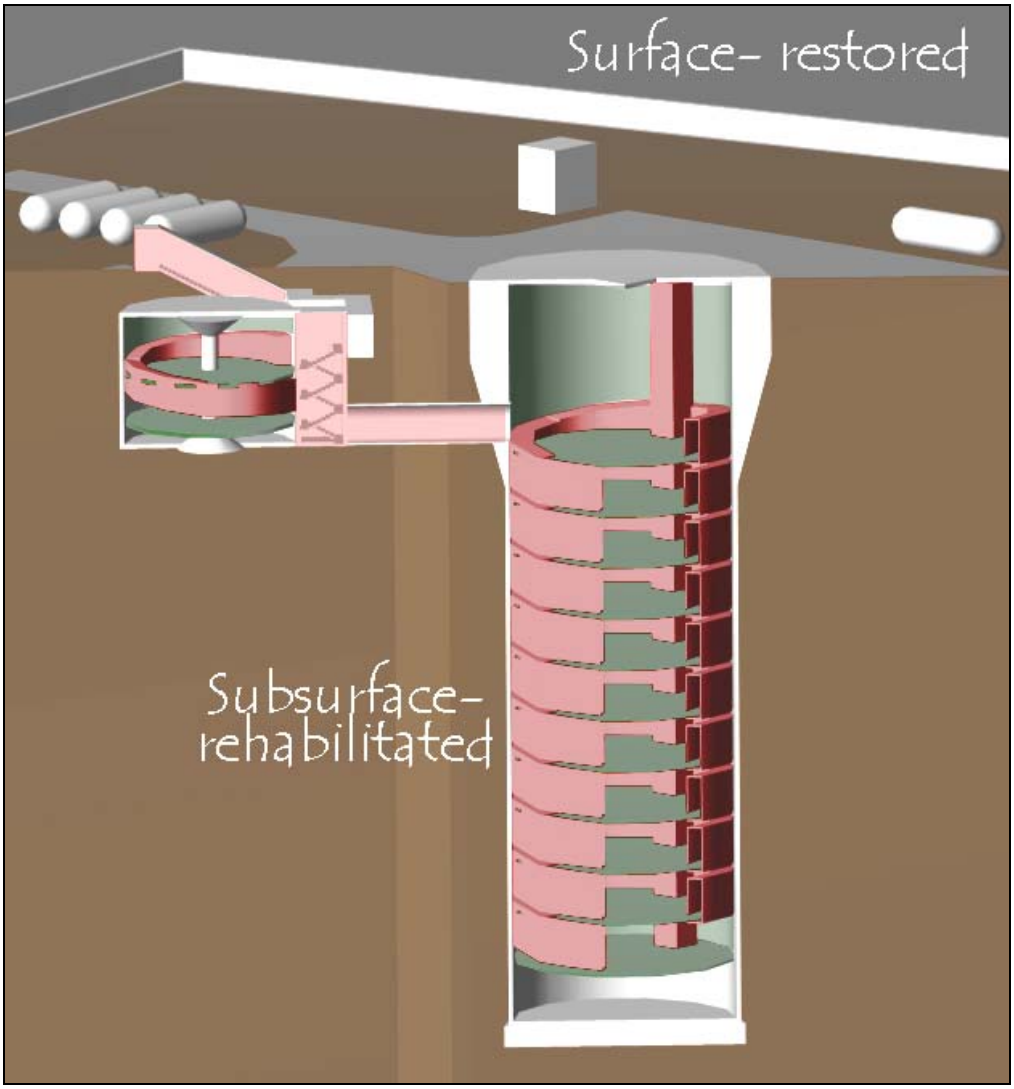


Fig. 6-13: Segmentation of spaces and treatment strategies for Alternative Two: shown in perspective/ cross-section (dagram by author)

Fig. 6-14: Organization of interpretive themes in Alternative Two:shown in perspective/ cross-section (see subheadings in Chapter Two for examples of some themes) (diagram by author)

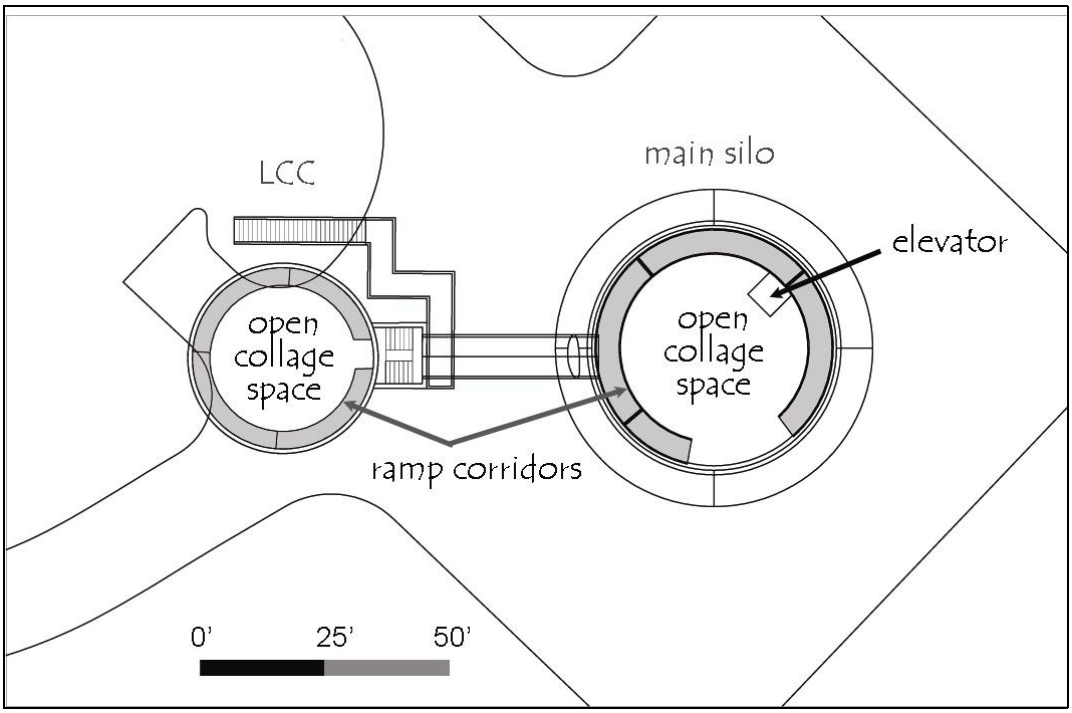


Fig. 6-15: Plan view of rehabilitated subsurface structures for Alternative Two (diagram by author)

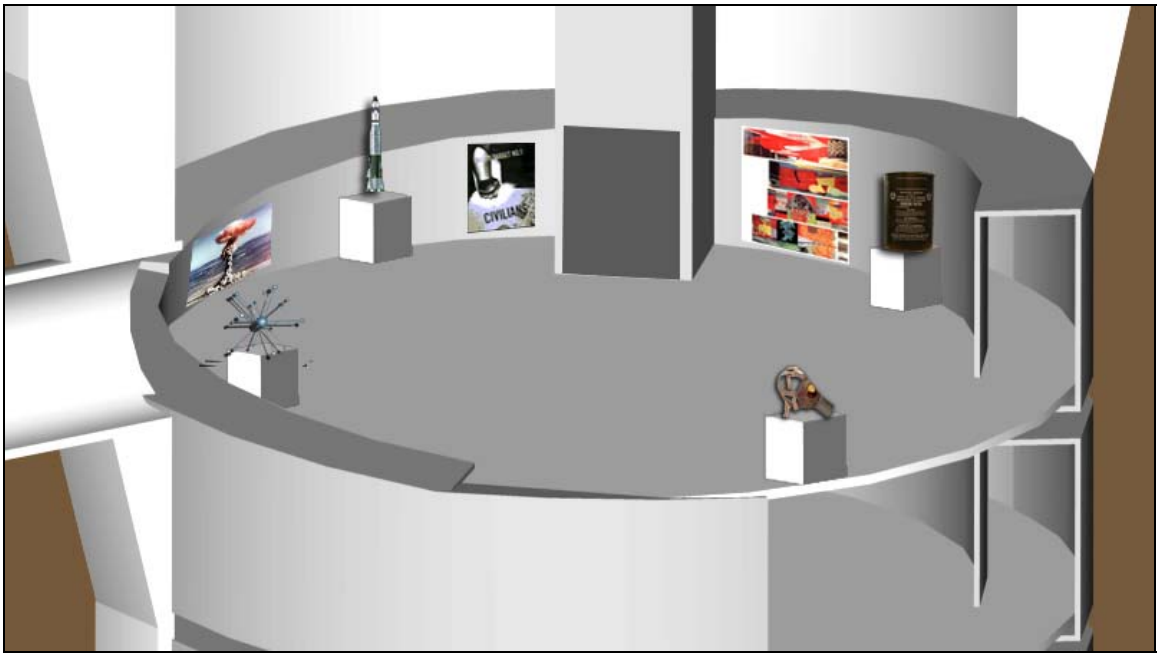


Fig. 6-16: Conceptual appearance of the open collage space on one of the silo floors: shown in perspective (diagram/ collage by author)

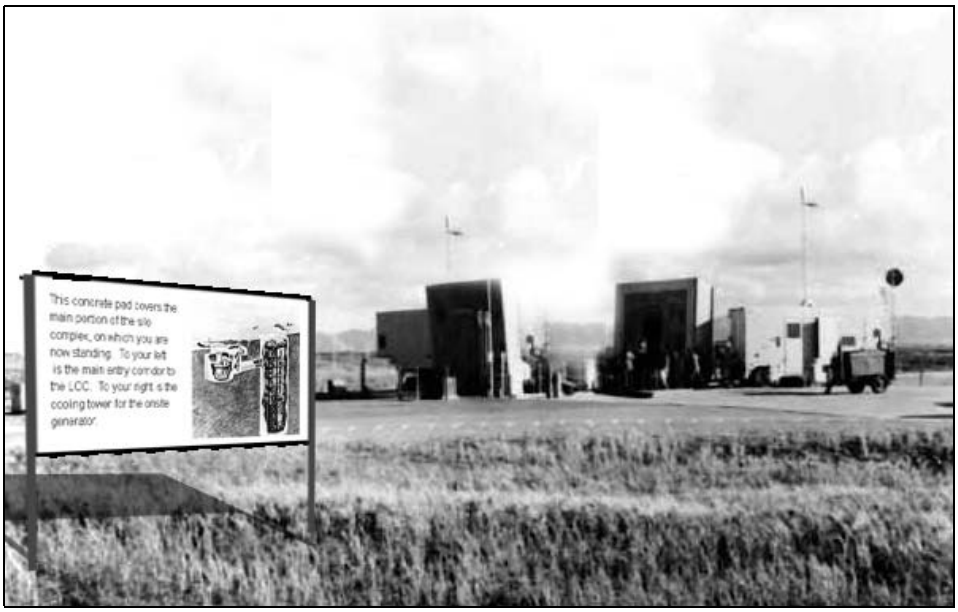


Fig. 6-17: Appearance of the restored surface in Alternative Two: note the addition of interpretive signage to explain the functions of the altered subsurface structures (collage by author)

Alternative Two: The Experience:

A visitor's experience of Design Alternative 2 would be quite different from Alternative 1. Upon entering the site, visitors would pass through a restored gate flanked by a guardhouse where a sign would introduce them to the site. As they worked their way through the landscape from interpretive point to interpretive point, they would get a glimpse of what the site looked like during the operational period, including such features as the cooling tower, chemical storage tanks, the Quonset huts housing old equipment, and the radar antenna. Accompanying these features and marking the silo cap/ entry gate would be signs that gradually unfold the specific construction history of the site, including the more recent changes made to the subsurface structures.

Entrance to the silo could either be through the elevator located in the missile silo or through the missileer entry corridor. Below ground, visitors would slowly proceed along the corridor ramps, digesting narrative interpretation about each theme, before

entering the open space at the end of the ramp, which is peppered with a collage of artifacts and film/ video footage that relates to the theme. For example, one corridor could detail the technological development of urban place annihilation and the shift in American policy with regard to targeting cities during and after WWII. This could be documented and described through signs, videos, images, and various artifacts presented in a sequential fashion.

Upon entering a collage space in the silo, the visitor would be free to wander about and look at how the fear of urban place annihilation was embodied in the ICBM, and how this idea was realized in cultural media- such as through some of the hectic collages of James Rosenquist or through a replica of a family bomb shelter. Individual artifacts could all be numbered and an audio device provided so that the visitors could access more information on what they were viewing. The last subsurface collage space in the sequence would include a set of computers that allow visitors to interactively explore in further detail any artifacts or issues they found particularly compelling, before they left the complex.

Alternative Three: Design Ideas:

The final design idea is driven by the use of metaphor as a storytelling device. For Design Alternative 3, the design process begins with a desire to show how the creation of the Atlas F ICBM had a "ripple effect" on American culture. The introduction of the Atlas F to the landscape did more than merely upgrade American military fortifications, it changed the way Americans thought and conducted their everyday lives. It needled its way into our nightmares and into our daily routines. This is evidenced in

the broad range of cultural reactions outlined in chapter 3. Symbolically, nuclear weapons were like a great drop of water falling into the pool of the American cultural subconscious, a drop that caused ripples to emanate throughout society. This abstract symbolism could be exploited in the treatment of site SMS 579-4.

The immediate spatial dichotomies that come to mind for purveying this metaphor are the contrast between the LCC and the silo proper, as well as the contrast between the surface and the subsurface. As mentioned earlier, the Launch Control Complex was essentially the brain of the site, and the silo itself was the body, responding to the decisions made in the LCC. In other words, the LCC housed the stimulus, and the silo housed the response. Moreover, this analogy could be taken another step further to suggest a more long-term effect, one in which the world outside the silo suffers the ultimate effects of the missile. In this adjusted analogy, the LCC comes to house the stimulus, the silo houses the immediate response, and the outside world houses the long-term response. This analogy resonates with the idea of the cultural "ripple effect." As a stimulus, members of the military and political establishment made the decision to pursue the development of these ICBMs. The short-term response was the introduction of the missile sites to the landscape. And the long-term response was evidenced in the anxiety and dissent seen throughout many aspects of American culture. So the metaphor could be embodied in the tri-partite separation of the site into the LCC, the silo, and the surface. The segregation of the site into three distinct areas suggests that the method of storytelling should be divided into three segments as well. Such a split could involve one area which is devoted to a linear narrative, one area which is dominated by fragmentary collage, and one connecting area that is devoted to neither.

This brings up the issue of physical integrity. If the metaphor of the ripple effect is to be manifest, it seems more appropriate to include the collage of cultural effects above-ground. This area symbolizes the outside world and also offers more physical space for the inclusion of a wide-variety of media from sources outside the military. But, in order to house such cultural artifacts and ideas, considerable physical change has to occur at the surface. The LCC, which represents the source of stimulus within this metaphor, should also be rehabilitated in order to accommodate a large viewing area where an interpretive, narrative film could introduce the ideas that prompted the military and political establishment to introduce ICBMs to the landscape. The silo, on the other hand, should be preserved as a provocative contrast to the rehabilitation of the other two areas. This would drive home the idea that the Atlas F ICBM is obsolete. In addition, the preservation of the decayed ruin of this silo would add a sense of the passage of time, a sense that is fitting considering the literal passage of time that occurred in the years between political stimulus and eventual cultural response.

In terms of overall circulation patterns, a sequential, linear arrangement of the three spaces on the site is appropriate in this design. The visitor should start at the LCC "stimulus," then move to the silo "response", and end up in the surface collage space. However, within this overall sequence, movement in the silo and on the surface should be kept open and unrestricted. This would promote individual exploration in the silo, which seems an appropriate means of presenting a historic ruin with various nooks and crannies of interest to some, but not to all. In addition, the open, unorganized approach to circulation would also allow for the effects of the cultural collage to be fully explored above ground. Movement within the silo should occur via the elevator, so that the floors

can be visited in any order the visitor wishes. The elevator also offers a convenient exit point to the surface. Above ground, the cultural collage could be arranged around the silo exit point in a literal series of rings that manifest the ripple metaphor on the ground plane. Movement within these rings and between them could be facilitated by multiple open points throughout the collage structure.

In terms of the narrative organization, the use of media as an organizing theme seems appropriate. Early on, some media such as high art and literature were exploited to quickly react to nuclear fears. It took longer for these effects to show up in other media such as broad social movements. Thus, it seems logical to arrange different media by spacing them in rings further and further out from the silo exit. Media that exhibited a more immediate response could be located in rings closer to the silo. Media that exhibited later responses could be located further away. The most powerful collage would occur in juxtaposing artifacts that express dissent about nuclear technology against artifacts from the same media that express complacency, acceptance, or support for these same technologies.

Alternative Three: The Experience:

The actual experience of Design Alternative 3 might be as follows. Visitors entering the site might notice a new cylindrical, one-story, wide-diameter concrete structure dominating the surface features of the site, which otherwise have been left unchanged. The top of an Atlas Missile, surrounded by a scaffold, and protruding from the central void of this building, would be visible from the outside. Entrance into the silo would be through the missileer entry corridor that pokes above ground just outside the

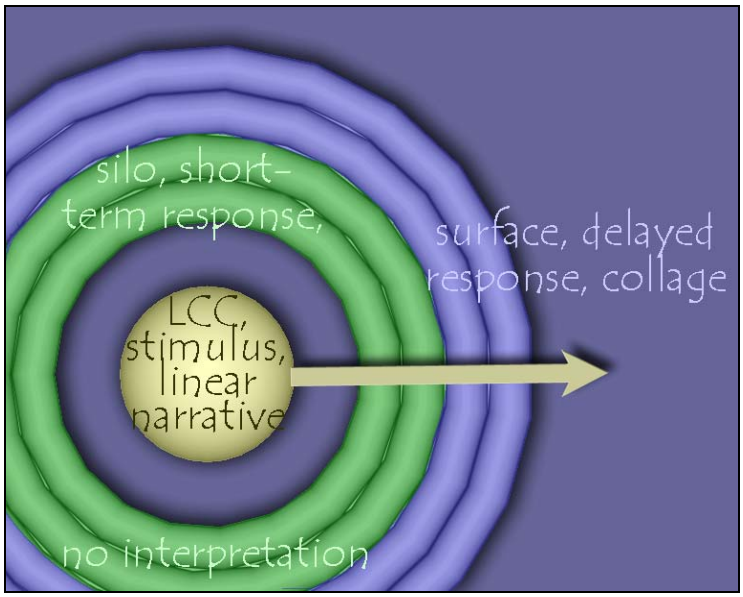


Fig. 6-18: Conceptual diagram of the "ripple effect" metaphor used in Alternative Three (diagram by author)

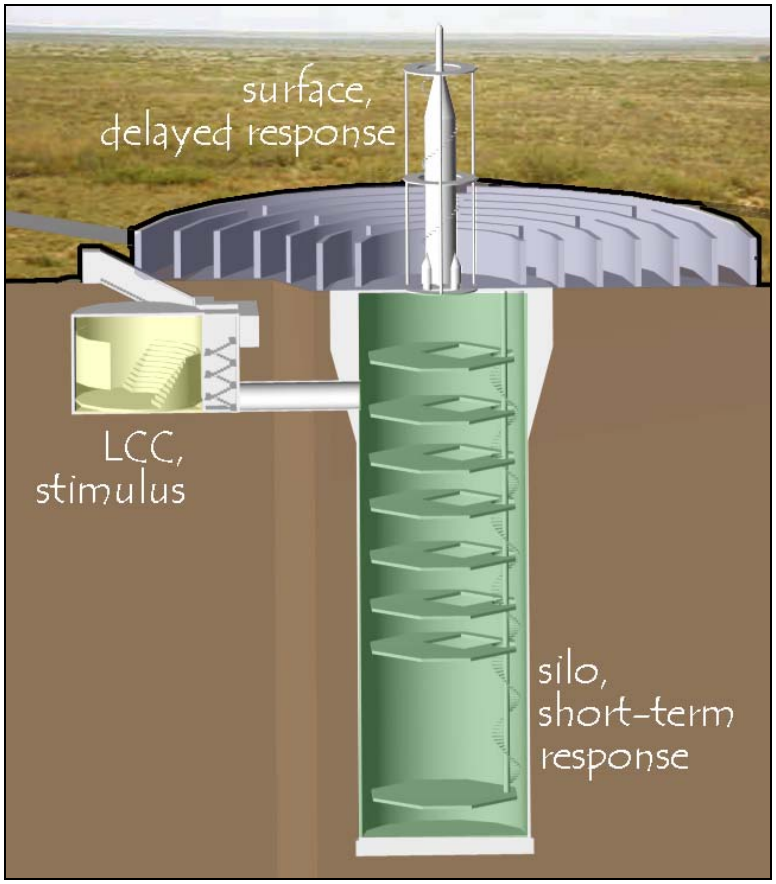


Fig. 6-19: Segmentation of the "ripple effect" metaphor in different sections: shown in perspective/ cross-section (diagram by author)

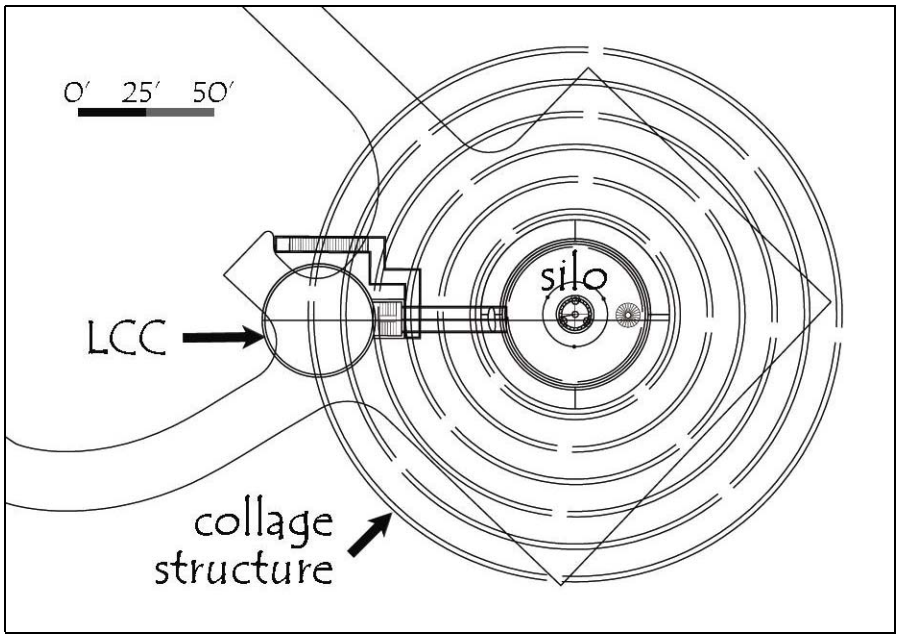


Fig. 6-20: Plan view of the surface/ subsurface features in Alternative Three
(diagram by author)

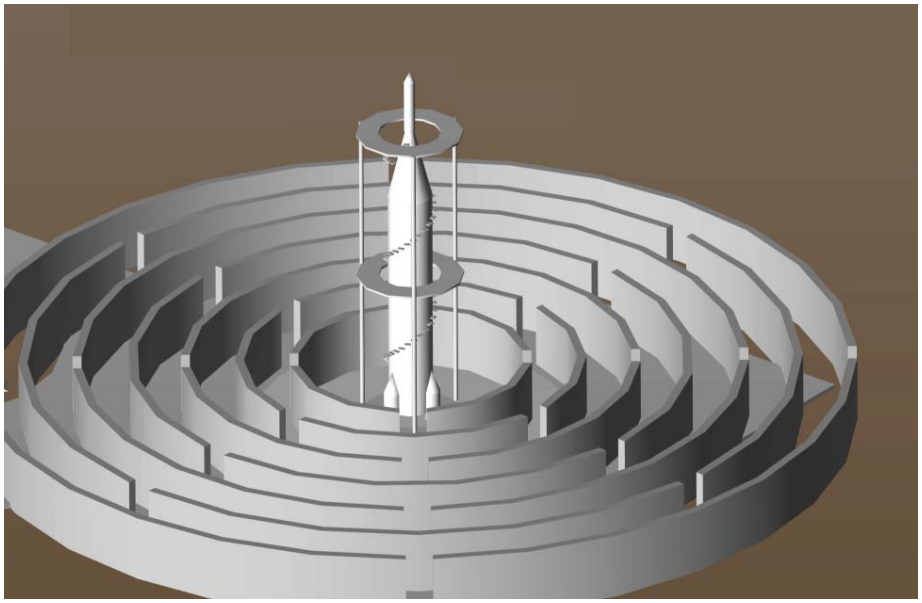


Fig. 6-21: Perspective view looking down on the new surface features- including a scaffold encircling a restored Atlas F missile, and a circular collage maze
(diagram by author)

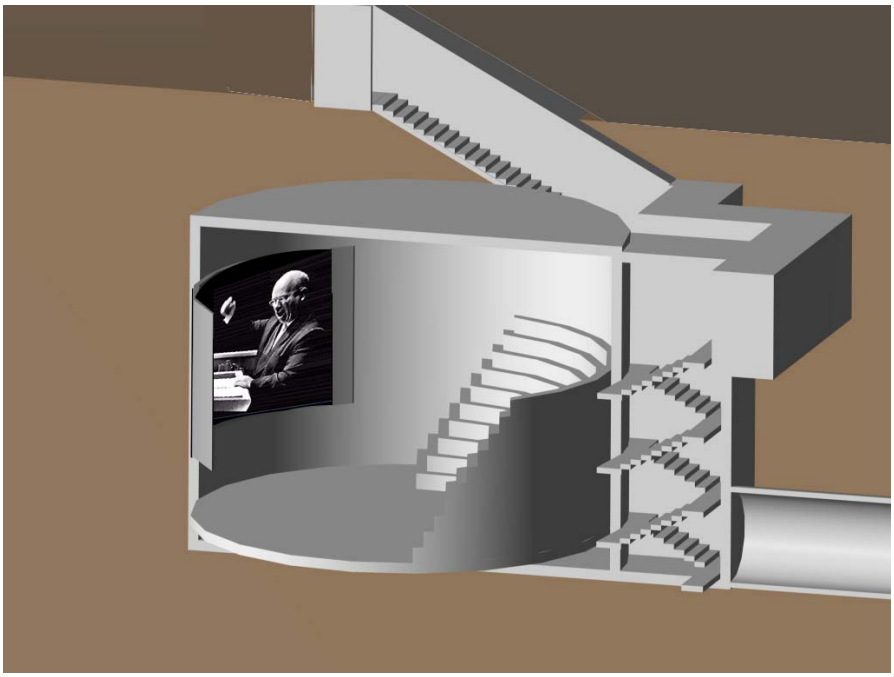


Fig. 6-22: Appearance of the rehabilitated LCC: shown in perspective/ cross-section- note the amphitheater seating and movie screen for presenting linear narrative (diagram/ collage by author)

Fig. 6-23: Appearance within the center of the new circular collage structure on the surface: shown in perspective (diagram/ collage by author)

cylindrical structure. As visitors descend into the silo, they would be directed into the upper section of the rehabilitated LCC, where a small amphitheater would be situated, facing toward a film screen. Here the visitors would watch an interpretive film that explains the political and military rationale for the necessity of the Atlas program, with an additional interpretive focus on the cultural symbolism that became embodied in the ICBM.

From this "stimulus" area, visitors would proceed through the utility corridor into the eerie, dilapidated remains of the silo, or the "short-term response" area. The impact of time on the silo would be unmistakable, driving home the idea that this is a military artifact long past its technological prime. The renovated elevator would allow visitors to descend down the silo to any of the eight levels for a more careful inspection of the silo's structure. Once satisfied, the visitors would ride the elevator to the surface to be deposited in the center of the cylindrical collage structure. The vertical scaffold enveloping the nearby Atlas missile could then be climbed to get an aerial perspective on the site's layout. Seen from above, this structure would literally resemble the ripple pattern emanating about the point in a pool of water where a drop disturbed the surface. Or, it could alternately be conceived as a giant target, with the silo itself as the bullseye. The circular corridors within the collage structure would be visible due to the absence of a complete roofing structure. Shade and protection from the elements would be provided by overhangs and arbor structures.

Once back on the surface, visitors would move freely throughout the circular collage structure, traveling between concentric rings through multiple transition points, and meandering their way toward the outermost ring. In each ring, they would happen

upon a different cultural medium. For example, in the first ring, they might see a collage of poetry and literature ranging from the Beats to science fiction juxtaposed against images and speeches generated by McCarthy and Eisenhower. In one of the later rings, they would see images, clips, and artifacts from the countercultural movement juxtaposed against images of Khrushchev and Kennedy pushing the world to the nuclear brink in the Cuban Missile Crisis. Interactive audio devices with headphones could be provided to describe in greater detail, artifacts and displays along these halls which the visitors found especially provocative.

CHAPTER 7

CONCLUSION

Design Critique:

The purpose of this design exercise is to show some possible treatment strategies for Atlas F silo site SMS 579-4 that go well beyond the established "sacred narrative" encountered in most military preservations or rehabilitations. The cultural relevance of the Atlas F ICBM in America demands a more multifaceted cultural treatment than typically given at historic military sites. Based on the criteria outlined in chapter 4, presentation of public history for such a purpose should be:

1) complex and layered

2) narrative and dynamic

3) inclusive and multivalent

4) transformative and interpretive.

How well do these design alternatives meet these objectives?

In terms of criteria 1, all three alternatives allow for layering and complexity. Generally this complexity and layering occurs in the spaces allotted for the collage of cultural artifacts, providing fragmentary glimpses of different ideas and viewpoints in the same space. Alternatives 1 and 2 in particular could capitalize on this use of collage to drive home multiple perspectives throughout the designs. Alternative 3 is probably somewhat less successful. The collage areas are limited solely to the surface structure

added on site, with none included below ground. In addition, true collage is more difficult to achieve when separating media as in Alternative 3. The potential benefits of juxtaposition would undoubtedly be heightened if some space were offered for combination of different media.

The success in satisfying criteria 2, which advocates for a narrative and dynamic presentation, is more variable. All three designs provide some space for the inclusion of subjective narrative. Alternative 2, however, seems to do the best job of this, incorporating many distinct spaces to illuminate many distinct narrative ideas. Moreover, these narrative spaces are spread throughout the subsurface and surface areas. Alternative 1 does the least toward these ends, only offering glimpses of the "official" narrative near the beginning of the subsurface sequence, and providing little narration that explores alternative points of view at all. Alternative 3 does provide more narrative variety in the LCC amphitheater space than Alternative 1, and the film could be made to incorporate a variety of narrative subjects, but the interpretive areas are not linked throughout the complex as effectively as in Alternative 2. In particular, there is no obvious, direct link in Alternative 3 between the linear narrative in the LCC and the collage on the surface. As for being dynamic, Alternative 2 seems to be the most successful at this, primarily due to the use of the "thematic" narrative organization. Thematic displays could easily be rotated and changed over time. Theoretically, there is no limit to the number of different themes that could be explored in a museum space, whereas a temporal arrangement or arrangement by media seems more restricted. In addition, Alternative 2 provides some space for the inclusion of an interactive computer space where visitors can explore topics in more depth. This adds to the potential for

dynamism, as webs of ideas could be linked electronically that could not be easily linked in three-dimensional space. Alternatives 1 and 3 are notably less dynamic in their historic presentation, though Alternative 1 does allow for some dynamism via the inclusion of a venue for visitor participation in the final collage spaces of the subsurface structures.

Criteria 3, which argues for an inclusive and multivalent narrative, seems well satisfied by all three alternatives. All the designs allow for multiple viewpoints in different areas. So in this way alone, all three alternatives do a better job of addressing the breadth of cultural reaction than evident in the existing museum sites discussed in Chapter 4.

Criteria 4, which asserts that history should be transformative and interpretive, is less well-satisfied. All three designs involve some interpretation on small scales, revealing a narrative story that explains history better than pure collage. However, Alternatives 1 and 3 do a better job of delivering a transformative interpretation than Alternative 2. They do this through the incorporation of strong metaphors that pervade the entire design. The end result after visitation of either alternative 1 or 3 would be a strong "take-home message" about the impact of the ICBM on culture. For example, Alternative 1 drives home the idea that American culture became more responsive and critical of nuclear technology as time progressed. This is evidenced in the increasing amount of collage and reaction included in the later floors of the visitor sequence as compared to the earlier floors. Alternative 3 drives home the idea that ICBMs had a long-term ripple effect on culture. The introduction of the missiles, a result of the fears and policies of a political elite, had a very real impact on the world outside the silos that

permeated all aspects of society. In both cases, the messages of these alternatives are byproducts of experiencing the site as a whole. Alternative 2, on the other hand, only offers isolated thematic lessons that do not truly reinforce one another for a clear overall narrative. The result is that the entire visitation sequence of Alternative 2 is not as transformative as the sequences of the other two alternatives.

In reviewing the three treatment alternatives outlined in the last chapter, it seems that no one approach is ultimately suited to the complex task of conveying cultural history as outlined in chapter 4. A combination of the 3 alternatives might conceivably address all the above concerns. However, the contradictory nature of the design alternatives precludes this as a realistic possibility. For example, the spatial organization necessary to provide the maximum interaction of linear narrative and collage demonstrated in Alternative 2 conflicts directly with the physical manifestation of the metaphors in Alternatives 1 and 3. In addition, the use of themes as a narrative organizational device in Alternative 2, while more successful at promoting a dynamic narrative than other techniques, is difficult to resolve with the temporal nature of the metaphor in Alternative 1 or with the physical separation of the linear narrative and collage space in Alternative 3.

Considering this, the best choice for interpretation and preservation is a question of priorities. If the first priority is to convey a number of flexible and well interpreted, themes, then Alternative 2 is clearly the best means of doing this. However, if a more didactic and more transformative interpretation is the ultimate goal, then either Alternative 1 or 3 would be more appropriate. If financing were a major concern, then

Alternative 1 would probably be the most practicable approach. Whereas, if a bold, design-oriented gesture is desired, then Alternative 3 would be the most daring.

The three design alternatives here express very different approaches to presenting public history. The differences are largely the result of the starting points used to catalyze the design processes. Alternative 1 began with a suggestive physical dichotomy that was exploited to arrange a shifting narrative. Alternative 2 began with a desire to efficiently balance the narrative techniques of linear interpretation and abstract collage. Alternative 3 began with a metaphor intended to reinforce the importance of the Atlas F in American history. For a real-world preservation treatment, it seems obvious that a list of priorities should be established before any design approaches are adopted. These overall priorities are key in driving the design process to desired ends.

Questions:

In addressing the preservation treatment possibilities for an Atlas F ICBM silo, this thesis seeks to demonstrate the application of new ideas for relating history to the public on a real physical site and in a real cultural context. The analytical process used for this investigation brought up many questions that remain unanswered due to the deliberate limitation of the scope of this thesis. Many possible investigations that would build on this study suggest themselves.

For example, any multivalent, consensus-challenging interpretation of a military site like the Atlas F ICBM silo is sure to encounter some resistance. In particular, many members of the military, especially those with close ties to the SAC members that served in the Atlas F silos, would possibly balk at a historical rehabilitation or preservation that

questions the ethics of maintaining such a nuclear deterrent, even if the questioning viewpoint is one of many alternatives presented. This is an especially difficult issue, because those who are most likely to be offended by such a preservation treatment are also likely to be the very people who still live in close proximity to these sites. Considering this, would the pluralistic preservation approach suggested by this thesis offend those who value the sacred narrative? On a broader level, is it possible for a pluralistic history to be presented in a meaningful way without disenfranchising many of the people most directly involved?

Another issue that seems relevant involves the presentation of Cold War history to youth who have no experience of the Cold War. The cultural context of the Atlas F ICBM was directly experienced by a large segment of the population, but as time goes on, more and more youth have no sense of what it meant to be alive during this era. In fact, many people in college today have never suffered from anxiety about the potential for nuclear war with the Soviet Union, an anxiety that greatly defined the experience of the last few generations. Does this type of preservation go far enough toward involving the individuals that have no direct association with the Cold War? Are artifacts and loose fragments of memory arranged in collages effective at conveying any sense of history to those who have little to no exposure to it or to these artifacts? What possible concessions could be made in the treatment strategy to address these concerns?

Significance:

In discussing the relevance of Cold War architecture in American history, architectural historian Tom Vanderbilt notes that "the missile silo represents one of the

country's largest public works programs in history, one that had a profound impact on the landscape. Yet any single building by Mies van der Rohe has occasioned more architectural consideration than all these structures combined" (Vanderbilt 2002, p. 17). Despite the fact that the Atlas F ICBM was largely a hidden landscape not directly experienced by the majority of the American public during its operation, it is undoubtedly of more importance to American cultural history than the most celebrated works of professional architects. Yet its cultural significance is largely ignored by the military and political establishment that was responsible for its creation. Preservation as a field is beginning to grapple with the legacy of the Cold War and the unique military landscapes, artifacts, and institutions it created. When confronting these issues, preservationists have an opportunity to contribute to the dissemination of a fertile historical narrative that transcends the "sacred" military narrative, one that embraces subjective story telling and infuses interpretation with pluralistic viewpoints and ideas.

> *Suburban survivors of Hiroshima described the blast as a "mighty first boom, like a locomotive followed by a long, loud train roaring past, fading gradually away to a murmur." Wrong. They describe only the ear's inaccurate report. For that mighty first boom was only the first faintest murmur of an explosion that is still roaring down on us and always will be... For the reverberation often exceeds through silence the sound that sets it off; the reaction occasionally outdoes by way of repose the event that stimulated it; and the past not uncommonly takes a while to happen, and some long time to figure out.* (Kesey 1963, p. 529)

BIBLIOGRAPHY

Alanen, Arnold; Melnick, Robert. 2000. "Introduction: Why Cultural Landscape Preservation." in *Preserving Cultural Landscapes in America*. Edited by Alanen, Arnold; Melnick, Robert. Baltimore: Johns Hopkins University Press. p. 1-21.

Architectural Forum. 1958. "Fallout Shelters." *Architectural Forum*. vol. 108 (4). p. 131-134.

Authentic History Center 2003. "The Authentic History Center: Primary Sources from American Popular Culture." <http://www.authentichistory.com> viewed 3/22/03

Baldwin, James. 1963, 1962. *The Fire Next Time*. New York: Dial Press.

Beckman, Peter. 1992. "Sociology and Nuclear Weapons: A View from Outside." *Sociological Forum*. vol. 7 (1). p. 7-27.

Berrien, F.K.; Schulman, Carol; Amarel, Marianne. 1963. "The Fallout-Shelter Owners: A Study of Attitude Formation." Public Opinion Quarterly. vol. 27 (2). p. 206-216

Berne, Robert. 1964. "Civil Defense Official Describes Architect's Role." *Architectural Record*. vol. 135 (3). p. 50-56.

Blatti, Jo. 1997. "Public History as Contested Terrain: A Museum's Perspective on David Glassberg's Study of Memory." The Public Historian. vol. 19 (2). p. 57- 60.

Brawne, Michael. 1965. *The New Museum: Architecture and Display*. New York: Frederick A. Praeger Publishers.

Brians, Paul. 1987. *Nuclear Holocausts: Atomic War in Fiction, 1895-1984*. Kent, Ohio: Kent State University Press.

Brick, Howard. 1998. *Age of Contradiction: American Thought and Culture in the 1960s*. New York: Twayne Publishers.

Butterfield, Herbert. 1924. *The Historical Novel: An Essay*. Cambridge: Cambridge University Press

Cook, Robert. 1995. "Is Landscape Preservation an Oxymoron?" <http://www.icls.harvard.edu/ecology/cook2.html>. viewed 11/17/2002

Cornelisse, Diana. 2002. "The Legacy of Wright Field." <http://www.ascho.wpafb.af.mil/wpinfo/wrightfieldlegacy.htm> viewed 2/20/2003.

Davidson, Michael. 1998. "From margin to mainstream: postwar poetry and the politics of containment." *American Literary History*. vol. 10 (2). p. 266-290.

Day, Samuel H.(ed.) 1988. *Nuclear Heartland: A Guide to the 1,000 Missile Silos of the United States*. Madison, WI: The Progressive Foundation.

Dennis, Jack (ed.). 1984. *Nuclear Almanac: Confronting the Atom in War and Peace*. Reading, Massachusetts: Addison- Wesley.

Department of Energy. 2003. "DOE Nevada: Photo Library- Atmospheric." <http://www.nv.doe.gov/news&pubs/photos&films/atm.htm> viewed 3/23/03.

Duohet, Giulio. 1942. *The Command of the Air*. New York: Coward McCann.

Gamson, William A.; Stuart, David.1992. "Media Discourse as a Symbolic Contest: The Bomb in Political Cartoons." *Sociological Forum*. vol. 7 (1). p. 55-86.

Gibson, James. 1996. *Nuclear Weapons of the United States: An Illustrated History*. Atglen, Pennsylvania: Schiffer Publishing Ltd.

Ginsberg, Allen. 1956. *Howl: and Other Poems*. San Francisco: City Lights Books.

Gitlin, Todd. 1987. *The Sixties: Years of Hope, Days of Rage*. New York: Bantam Books.

Glassberg, David. 1996. "Public History and the Study of Memory." *The Public Historian*. vol. 18 (2). p. 7-23.

Henriksen, Margot A. 1997. *Dr. Strangelove's America: Society and Culture in the Atomic Age*. Berkeley: University of California Press.

Hewitt, Kenneth. 1983. "Place Annihilation: Area Bombing and the Fate of Urban Places." *Annals of the Association of American Geographers*. vol. 73 (2). p. 257-284.

Howett, Catherine. 2000. "Integrity as a Value in Cultural Landscape Preservation." in *Preserving Cultural Landscapes in America*. Edited by Alanen, Arnold; Melnick, Robert. Baltimore: Johns Hopkins University Press. p. 186-207.

Hughes, Robert. 1987. *The Shock of the New*. New York: Knopf.

Isaacs, Terry. 1993. "Silos and Shelters in the Pecos Valley: The Atlas ICBM in Chavez County, New Mexico, 1960-1965." *New Mexico Historical Review*. vol. 68 (4) p. 347-369

Jackson, John B. 1975. *Discovering the Vernacular Landscape*. New Haven, Connecticut: Yale University Press.

Kennedy, John F. 1961. "A Message to You from the President." *Life*. Sep. 15, 1961. p. 95

Kerouac, Jack. 1957. *On the Road*. New York: New American Library.

Kesey, Ken. 1983. *Sometimes a Great Notion*. New York: Penguin Books.

Kirstein, Peter N. 1989. "The Atomic Museum: Or, how push-button movies, Cold War-era graphics, heroic paintings of generals and playful displays of weapons teach Americans to stop worrying and love the bomb." *Art in America*. vol. 77 (6). p. 44-57.

Linenthal, Edward, T. 1991. *Sacred Ground: Americans and their Battlefields*. Urbana, Illinois: University of Illinois Press.

Linenthal, Edward T. 1997. "Problems and Promise in Public History." *The Public Historian*. vol. 19 (2). p. 45-47.

Lowenthal, David. 1985. *The Past is a Foreign Country*. Cambridge: Cambridge University Press.

Lowenthal, David. 1997. "History and Memory." *The Public Historian*. vol. 19 (2). p. 31-39.

Lynch, Kevin. 1972. *What Time is This Place?* Cambridge, Massachusetts: MIT Press.

Masters, John. 1995. "Megaton Fun: At the Titan Missile Museum, Nuclear Armageddon is a Roadside Attraction*." Planet Wired*. October 5, 1995. retrieved online: <http://hotwired.lycos.com/planet/95/40/index4a.html> viewed 2/20/2003

National Aerospace Trust. "Report: Atlas F (SM-65F/HGM-16F): Intercontinental Ballistic Missile- Walker Air Force Base, Roswell, New Mexico." transcript on <http://www.geocities.com/Area51/Corridor/4831/LANCE1.HTM> viewed 3/16/03.

Nelson, Anna. 1991 "President Kennedy's National Security Policy: A Reconsideration." *Reviews in American History*. vol. 19(1). p. 1-14.

Neufeld, Jacob. 1990. *The Development of Ballistic Missiles in the United States Air Force 1945-1960*. Washington D.C.: Office of Air Force History, USAF.

NPS, Dept. of Interior; USAF, Department of Defense. 1995. *Minuteman missile sites : management alternatives, environmental assessment*. Washington D.C

NPS, Dept. of Interior. 2001. *Fort Moultrie: Fort Sumter National Monument* (brochure). Washington D.C.: The National Park Service.

Peden, Edward. 2001. "20th Century Castles: Unique Underground Properties." <http://www.missilebases.com> viewed 3/15/03

Rector, Pamela. 1995. "Cold War Toys at the Strong Museum." *Historian*. vol. 57 (2). p. 285-290.

Rose, Kenneth. 2001. *One Nation Underground: The Fallout Shelter in American Culture*. New York: NYU Press.

Shackel, Paul A. 2001. "Introduction: The Making of the American Landscape." in *Myth, Memory, and the Making of the American Landscape*. Edited by Paul A. Shackel. Gainesville, Florida: University Press of Florida. p. 1-16.

SDS. 1962. *The Port Huron Statement of the Students for a Democratic Society*. New York: Students for a Democratic Society. Published online: <http://coursesa.matrix.msu.edu/~hst306/documents/huron.html> viewed 2/20/03.

SiloMan. 1997-2003. "Silo World." <http://www.siloworld.com> viewed 2/20/2003

Stich, Sidra. 1987. *Made in the U.S.A.: An Americanization in Modern Art. the '50s and'60s*. Berkeley: University of California Press.

Stumpf, David. 2000. *Titan II: A History of a Cold War Missile Program*. Fayetteville, Arkansas: University of Arkansas Press.

Thelen, David. "Memory and American History." *Journal of American History*. vol. 75 (4). p. 1117- 1129.

Thoreau, Henry David. 1853. "A Yankee in Canada." in *The Writings of Henry David Thoreau, vol. 5* (published 1906). Boston: Houghton Mifflin

Titan Museum. 2003. "Titan Missile Museum Homepage." <http://www.pimaair.org/titan_01.htm> viewed 2/20/2003

USAF Museum(a). 2003. "USAF Museum History." <http://www.wpafb.af.mil/museum/history/museum/museum1.htm> viewed 2/20/2003

USAF Museum(b). 2003. "USAF Museum Information." <http://www.wpafb.af.mil/museum/usafm.htm> viewed 2/20/2003

USAF Museum(c). 2003. " Museum 'Re-Creation'." <http://www.wpafb.af.mil/museum/pa/cwh.htm> viewed 2/20/2003

Vanderbilt, Tom. 2002. *Survival City: Adventures among the Ruins of Atomic America*. New York: Princeton Architectural Press.

Vonnegut, Jr.; Kurt. 1963. *Cat's Cradle*. New York (1988): Rinehart and Winston.

Walton, Andy. 1998. "The Death of a Titan: America's Deadliest Weapon Becomes a Unique Tourist Attraction." part of CNN's interactive *Cold War Website*. <http://www.cnn.com/SPECIALS/cold.war/experience/the.bomb/route/05.titan/> viewed 2/20/2003

Whitfield, Stephen J. 1996. *The Culture of the Cold War. 2nd Edition*. Baltimore: Johs Hopkins University Press.

Winkler, Allan. 1993. *Life Under a Cloud: American Anxiety About the Atom*. Oxford: Oxford University Press.

Worland, Rick. 1996. "Sign-Posts Up Ahead: The Twilight Zone, The Outer Limits, and TV Political Fantasy 1959-1965." *Science-Fiction Studies*. vol. 23. p. 103-122.