

PART II.

REMEMBRANCE AND
CULTURAL REPRESENTATION
OF THE SPACE AGE



CHAPTER 10

FAR OUT: THE SPACE AGE IN AMERICAN CULTURE

Emily S. Rosenberg

Space has long provided a canvas for the imagination. For me, the early Space Age intertwined with a sense of youth's almost limitless possibilities—the excitement of discovery, the allure of adventure, the challenge of competition, the confidence of mastery. As a girl in Montana, I looked up into that Big Sky hoping to glimpse a future that would, somehow, allow my escape from the claustrophobia of small towns separated by long distances.

But the Space Age was also bound up with the encroaching cynicism of my young adulthood: the fear of a future driven by thoughtless fascination with technique and a Vietnam-era disillusionment with the country's benevolence and with the credibility of its leaders. The night that the first American landed on the Moon, I was in the audience at the Newport Folk Festival. Someone from the audience yelled "What were the first words on the Moon?" The announcer replied, "They were: 'The simulation was better!'" A cluster of people grumbled that the Moonwalk was probably faked, a suspicion that my barely literate immigrant grandmother—and a few others in the country—shared.

The new Space Age could promise giant leaps and also threaten Hal of *2001: A Space Odyssey*. Space could be far away or "far out."

Anyone who has been around for the past half century harbors private memories of the early Space Age. A toy, a TV program, a book, a painting, a school science fair project can each touch off remembrance of a place, an emotion, the person we once were. For each individual, the Space Age offered an array of visual representations and symbolic threads that could, intimately and personally, weave a unique tapestry.

But the Space Age was not simply an infinitely personalizable canvas for individual memories. It also offered national and global imaginaries that projected assumptions about, and debates over, national identities and global futures.

The Space Age, of course, is in one sense as old as historical time—humans have long looked to the heavens for meaning. And it is also an age still of the present as the current schemes to militarize space and the renewed public visibility of public and private missions into space remind us. But this essay addresses that shorter moment of the Space Age, the couple of decades beginning in the early 1950s when transcending Earth's atmosphere and

gravitational pull so stirred emotions that space exploration became an intense cultural preoccupation.

Focusing on representations that comprise collective, not individual memory, this essay seeks to suggest some of the diverse symbols and narratives of the Space Age as they circulated in American culture. As a complex of collective signs and symbols, the Space Age intertwined with other rival designations for the postwar era: the Cold War, the Media Age, what Zbigniew Brzezinski called the Technetronic Age, and the Age of a Mid-century Modernist aesthetic. Space exploration augmented the Cold War with the space race, enhanced the Media Age with truly amazing dramas and visual spectacularity, heightened the Technetronic Age's moral and philosophical concerns over the implications of Technocracy and a so-called "Spaceship Earth," and inspired Mid-century Modernist impulses that emerged as Google and abstract expressionism. Refracting aspirations and fears, the Space Age held multiple meanings for foreign policy, politics, media, engineering, morality, art, and design.¹

1. THE COLD WAR: SPACE RACE

In October 1957, Sputnik I became a media sensation. Hurling into orbit by a massive rocket, the Soviet-launched space satellite, circling Earth every 95 minutes, appeared to demonstrate urgent strategic dangers. This "Sputnik moment," in which fear mingled with fascination, prompted significant changes in America's Cold War landscape. It by no means, however, began America's fascination with a new Space Age.

A vibrant spaceflight movement comprised largely of science fiction writers and engineers had preceded Sputnik and helped set a tone for the space race that emerged in Sputnik's wake. A team of mostly German rocket-scientists headed by Wernher von Braun had worked for the U.S. Army since the summer of 1950 under order to develop a ballistic missile capable of delivering a nuclear weapon.² On the side, von Braun had energetically promoted popular interest in spaceflight, and his efforts during the mid-1950s became part of a boom in both science and science fiction writing about space. A group that the scholar De Witt Douglas Kilgore has called "astrofuturists"—writers who based their tales of an intergalactical future on new scientific breakthroughs in physics—included Isaac Asimov, Robert Heinlein, Arthur C. Clarke, Willy Ley, and others.³

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1. The author wishes to express special thanks to Norman L. Rosenberg for his contributions to this essay.
 2. Tom D. Crouch, *Aiming for the Stars: The Dreamers and Doers of the Space Age* (Washington, DC: Smithsonian Institution Press, 1999), p. 118.
 3. De Witt Douglas Kilgore, *Astrofuturism: Science, Race, and Visions of Utopia in Space* (Philadelphia, PA: University of Pennsylvania Press, 2003) examines the major scientific and literary productions.

These astrofuturists offered especially powerful images and narratives about a new “age of discovery” in which brave individuals would guide interplanetary explorations. Walt Disney employed von Braun and Ley, both powerful advocates of human piloted spaceflight, as consultants to help design rocket ships and Moon rides for Disneyland’s Tomorrowland, which opened in 1955, and a series of TV episodes such as “Man is Space” (March 1955), “Man and the Moon” (December 1955), and “Mars and Beyond” (December 1957). Chesley Bonestell carved out a specialty as a spaceflight artist, illustrating in colored ink during the 1950s much of the equipment and procedure that later NASA scientists would construct for real. Bonestell’s collaboration with Ley in *The Conquest of Space*, for example, exuded technological authority in both words and illustration, moving the subject of space travel away from the interwar Flash Gordon style and into scientific respectability.⁴ Likewise, comics and popular magazines frequently featured human-piloted space travel, and Hollywood also filled screens with visions of space. *Destination Moon* (1950), a film whose images and messages influenced a generation of movie makers as well as scientists, celebrated the idea of a Moon landing.⁵ In the realm of popular music, songwriter Bart Howard’s *Fly Me to the Moon* (1951) became such a hit, especially after Peggy Lee sang it on the *Ed Sullivan Show* in the mid-1950s, that Howard was able to live out his life on its royalties.

Fiction writers and rocket scientists such as von Braun, in elaborating their dreams of manned flight and space stations, implied that control of the Moon and of outer space by any other nation would leave the United States abjectly defenseless. Hollywood’s *Destination Moon* had especially contributed to this idea. In addition, the well-developed popular fears associated with atomic power led credence to the idea that an enemy’s penetration of space might pose an existential threat. Might the rockets that launched Sputnik indicate that the Soviet Union’s intercontinental ballistic missiles (ICBM) had the power to send a nuclear weapon to the United States? Might Sputnik signal the enemy’s capability of mounting a Pearl Harbor-style attack from the skies, this time with atomic bombs coming from orbiting satellites?

Many scholars have argued that the ideas and literary productions of the astrofuturists “prepared the American public for the conquest of space with elaborate visions of promise and fear” and helped shape the nation’s cultural and political responses.⁶ As Sputnik orbited overhead, these space-exploration

4. Kilgore, *Astrofuturism*, pp. 72–74; Willie Ley, *The Conquest of Space* (New York, NY: Viking, 1951).

5. Kilgore, *Astrofuturism*, pp. 52, 56–58; Howard E. McCurdy, *Space and the American Imagination* (Washington, DC: Smithsonian Institution Press, 1997), pp. 41–43.

6. Crouch, *Aiming for the Stars*, pp. 118–121; Kilgore, *Astrofuturism*, pp. 31–48; McCurdy, *Space*, pp. 54–74 [quote p. 54]. Roger E. Bilstein, *Flight in America: From the Wrights to the Astronauts* (Baltimore, MD: Johns Hopkins University Press, 1984) traces the development of interest in early aerospace flights.

boosters, who had long advocated more energetic efforts, fused their previous visions of human-piloted voyages of discovery together with the heightened Cold War national security concerns to frame the parameters of an urgent new international competition—the space race.

President Dwight David Eisenhower tried to calm the alarm. His scientific experts saw no ICBM gap or even any parity in missile know-how between the United States and the Soviet Union. Had the White House pushed a program similar to that which produced Sputnik, they advised, a U.S. satellite could already have been aloft. While von Braun pressed for a crash program, promised that his team could launch a satellite in 90 days, and called for building a space station, Eisenhower embraced a measured approach with lower costs and greater focus on scientific and military applications. The chair of Eisenhower's science advisory committee, James R. Killian, issued a short *Introduction to Outer Space* that downplayed manned flight and advocated carefully constructed scientific projects that employed automation and robotics. Eisenhower ordered the government printing office to distribute Killian's pamphlet to the public for 15 cents a copy.⁷

As a seasoned military strategist, the President had always been his own most-trusted national security adviser. By 1957, Eisenhower believed he could see Soviet capabilities and likely military intentions more clearly than ever before. The public did not know that he recently had gained access to reconnaissance photographs taken by cameras carried on the newly operational U-2 spy plane. U-2 flights over the Soviet Union, begun during the summer of 1956, secretly confirmed the President's judgment that military necessity required no sudden change in strategic course. The U.S.S.R. had not raced ahead in military might. Moreover, a U.S. satellite-based surveillance system designed to replace the U-2 flights already had Ike's full support. (Satellite-based cameras would take their first pictures of the Soviet Union several months before Ike left office in 1961.) As a general, Eisenhower understood the value of aerial reconnaissance, and his backing of scientific satellites before 1957 had aimed to establish the precedent of free access in space—a principle that could then be adapted to the advantage of military intelligence. Sputnik, ironically, established this precedent, and Eisenhower thus saw advantages to Sputnik that military secrecy kept shrouded from the public.⁸

7. McCurdy, *Space*, pp.56-58; Crouch, *Aiming for the Stars*, pp.143-150. Matthew A. Bille and Erika R. Lishock, *The First Space Race: Launching the World's First Satellites* (College Station, TX: Texas A&M Press, 2004) provides a history of satellite development before 1958.

8. McCurdy, *Space*, pp. 58-59; Robert A. Divine, *The Sputnik Challenge* (New York, NY: Oxford University Press, 1993), pp. 11-12; On the background to and aftermath of Sputnik, see especially Walter A. McDougall, . . . *the Heavens and the Earth: A Political History of the Space Age* (New York, NY: Basic Books, 1985), and Paul Dickson, *Sputnik: The Shock of the Century* (New York, NY: Walker and Company, 2007).

The more Eisenhower tried to reassure the nation about the implications of Sputnik, however, the more his critics could portray him as inept and out of touch with Cold War dangers.⁹ Ike's popularity declined as an avalanche of scientific reports, newspaper editorials, and political speeches warned that the United States was losing its military lead because of Moscow's presumed technical superiority. The Democrats especially smelled blood in the water, and most Republican politicians joined in the alarm over Sputnik lest they become its victims.¹⁰

As the Soviet's 184-pound sphere circled the Earth, Sputnik's beeps, which people could hear on most home radios, appeared to dramatize Soviet technological expertise and military power. Appearances, of course, comprised a significant part of foreign policy calculations during the Cold War era, as capitalist and communist worlds vied for international prestige and waged a global contest over hearts and minds in developing nations.¹¹

The war of appearances turned even worse for Americans. On November 3, 1957, the fortieth anniversary of the Bolshevik Revolution, Moscow launched a second Sputnik. Weighing more than 1000 pounds, this satellite carried scientific instruments and temporary life-support equipment for a dog named Laika, the first mammal to orbit Earth. In early December, the U.S. answer to Soviet missilery, a Vanguard TV-3 rocket, lifted a full four feet off its Florida launch pad before toppling back to Earth. In response to the Sputniks, media wags quipped, the U.S. offered "Flopnik" and "Stayputnik." Soviet leader Nikita Khrushchev, recognizing his opportunity, gleefully ridiculed U.S. missile capability.

The *New York Times* saw the United States as entering a "race for survival" against the U.S.S.R., and the Democratic Speaker of the House, John McCormack of Massachusetts, claimed that the country faced "virtual extinction" if it failed to achieve dominance of outer space. Senator John F. Kennedy also endorsed a crash program to advance U.S. capabilities in space. And Lyndon B. Johnson, the Democratic majority leader in the Senate and head of the Defense Preparedness Subcommittee, judged Sputnik to be a disaster comparable to Pearl Harbor. He opened hearings into why the Soviets had beaten the United States into

9. David Callahan and Fred I. Greenstein, "The Reluctant Racer: Eisenhower and U.S. Space Policy," in *Spaceflight and the Myth of Presidential Leadership*, eds. Roger D. Launius and Howard E. McCurdy (Urbana, IL: University of Illinois Press, 1997). Divine, *The Sputnik Challenge* also emphasizes Eisenhower's reluctance to join an expensive space race.

10. McCurdy, *Space*, pp. 62–63; Divine, *The Sputnik Challenge*, pp. 74–78.

11. Important works on the space race, in addition to those already cited, include Rip Bulkeley, *The Sputniks Crisis and Early United States Space Policy: A Critique of the Historiography* (Bloomington, IN: Indiana University Press, 1991), Alan J. Levine, *The Missile and Space Race* (Westport, CT: Praeger, 1994), Matthew Brzezinski, *Red Moon Rising: Sputnik and the Hidden Rivalries that Ignited the Space Age* (New York, NY: Times Books, 2007), and Von Hardesty, *Epic Rivalry: The Inside Story of the Soviet and American Space Race* (New York, NY: National Geographic, 2007).

space.¹² *Time* made Soviet leader Nikita Khrushchev its “Man of the Year,” and its editors wrote that “the U.S. had been challenged and bested.”¹³

As “space race” and “crisis” became the dominant media frames of the Sputnik moment, Eisenhower recognized that his assurances, even if secretly informed by surveillance photographs and knowledge of America’s own reconnaissance and military satellite programs, offered insufficient response. The publicity value of U.S. rockets blasting from launch pads, of American satellites circling Earth, and of homegrown adventurers cruising outer space was inescapable. Eisenhower endorsed a speeded-up space program and supported the creation in July 1958 of NASA. The President, in effect, entered a seven-person team, the Mercury astronauts, into the manned-flight event of the space race. NASA and manned spaceflight—featuring astronauts with “the right stuff”—became the public focus of the space race.¹⁴

The establishment of NASA placed the human piloted space program in the spotlight and under civilian control, but the outcry over Sputnik also strengthened the military’s case for stepped up offensive and defensive systems. Less visible to the public than NASA, the Strategic Air Command (SAC) successfully promoted a great acceleration in the ballistic-missile arms race. And deploying military reconnaissance satellites took on greater urgency. Moreover, spending increased for many other unmanned satellites that specialized in weather, communications, and scientific investigations.¹⁵ Strong disagreements over the proper emphasis of space spending (scientific vs. military; manned vs. unmanned) persisted. Still, the Sputnik moment of 1957 intensified both the civilian and military aspects of superpower competition in space.

The responses to the two Sputniks reverberated far beyond bankrolling programs for space exploration. Who could run such programs? Were the American schools failing to produce the scientists and engineers of the future? A great fever of education reform gripped post-Sputnik America. In September 1958, Congress passed the National Defense Education Act, which authorized the allocation of one billion dollars over seven years to develop “those skills essential to the national defense.” Eisenhower had earlier opposed the principle

12. Divine, *The Sputnik Challenge*, pp. 62–65. Some prominent scientists broke with the Eisenhower administration by seizing on the Sputnik crisis to argue for increased federal spending on scientific research. See Allan A. Needell, *Science, Cold War, and the American State* (Australia: Harwood Academic Publishers, 2000), p. 148.

13. McCurdy, *Space*, pp. 75–76; *Time*, January 6, 1958.

14. Linda T. Krug, *Presidential Perspectives on Space Exploration: Guiding Metaphors from Eisenhower to Bush* (Westport, CT: Praeger, 1991), pp. 23–42 examines the metaphor of a space race. For a compact overview, annotated bibliography, and set of documents on the U.S. space program generally, see Roger D. Launius, ed., *Frontiers of Space Exploration* (Westport, CT: Greenwood Press, 1998).

15. Crouch, *Aiming for the Stars*, pp. 148–166; Divine, *The Sputnik Challenge*, pp. 34–42, 69, 84–85, 110–127.

of federal aid to education, but he reluctantly bowed to space-race clamor and backed this new extension of governmental funding.¹⁶

Even so, Eisenhower's sense of caution distanced him from the strident space race rhetoric adopted by future Presidents Kennedy, Johnson, and Nixon—all already maneuvering to succeed him. After hearing the news in early 1958 that the United States had finally orbited its own satellite, Eisenhower characteristically advised his press team not to “make too great a hullabaloo” of the event.

John Kennedy had few reservations about “hullabaloo.” He shaped his presidential campaign of 1960 around a critique of national complacency. Eisenhower was by now an aging figure whose stroke that occurred just seven weeks after Sputnik's launch attracted much media attention. By contrast, Kennedy offered youth and vigor (one of his favorite words). He warned against a supposed “missile gap” vis-à-vis the Soviet Union, and he portrayed the presumed gap in space technology as a visible sign of the Cold War challenge facing the United States.

Once in the White House, Kennedy drew effectively on the themes already well established in astrofuturist writings and the pervasive space race rhetoric. On April 12, 1961, Soviet cosmonaut Yuri Gagarin became the first human into space. NASA followed up by rushing Alan Shepard into his five minute ride in space. The popular media went wild over America's achievement and its new astronaut hero. Building on the excitement, Kennedy's famous message to Congress on May 25, 1961, set the goal “before this decade is out, of landing a man on the Moon and returning him safely to the Earth.” On September 12, 1962, a presidential address at Rice University, given during a trip to tour NASA facilities, elaborated the rationale for his lunar objective. Space was a “new frontier,” a “new sea” in the next great age of discovery. The conquest of space, a historic and strategic imperative, would challenge Americans to show their greatness and would signal national prestige and global leadership. Invoking the competition of the space race, the speech nevertheless transcended the Cold War by emphasizing a romantic and visionary national quest. It stressed how practical and technological greatness could mix with the noblest goals of human aspiration. It provided a chronology of urgency: “We meet in an hour of change and challenge, in a decade of hope and fear, in an age of both knowledge and ignorance.”¹⁷

16. Barbara Barksdale Clowes, *Brainpower for the Cold War: The Sputnik Crisis and National Defense Education Act of 1958* (Westport, CT: Greenwood Press, 1981); John A. Douglass, “A Certain Future: Sputnik, American Higher Education, and the Survival of a Nation,” in *Reconsidering Sputnik: Forty Years since the Soviet Satellite*, ed. Roger D. Launius, et al., (Amsterdam: Harwood, 2000), pp. 327–362; Juan C. Lucena, *Defending the Nation: U.S. Policymaking to Create Scientists and Engineers from Sputnik to the “War Against Terrorism,”* (Lanham, MD: University Press of America, 2005), pp. 29–53; Divine, *The Sputnik Challenge*, pp. 89–93.

17. John F. Kennedy, “Special Message to the Congress on Urgent National Needs,” May 25, 1961, at John F. Kennedy Moon Speech, <http://www1.jsc.nasa.gov/er/seh/ricetalk.htm> (accessed

As in so much of his political rhetoric, Kennedy appealed to (and helped construct) notions of “manly” virtues: risk, adventure, difficulty, competition. He decried opponents as those who wanted “to rest, to wait.” He constituted space travel within an inevitable trajectory of America’s historic mission to move forward, to rise to challenges, to expand.¹⁸ JFK’s exhortations to greatness in individual character and in national purpose appear to have motivated many Americans on a personal level as well as a national one. “A lot of people worked day and night” on NASA projects, observed one aerospace executive. “We were all swept up in it.”¹⁹

John Kennedy’s inspirational phrase that Americans would “pay any price” in their struggle against communism applied quite literally to the early space race. From 1961 to 1963, the NASA budget soared from 1.7 billion to 3.8 billion to 5.7 billion; funding for NASA surged to make its budget the fourth largest among all government agencies. At the height of the Apollo Program, NASA and its contractors employed 430,000 people.²⁰

When Senator William Proxmire (D-WI), a well-known budget hawk, was asked about the huge expenditures for NASA, he replied that government revenues were increasing because of economic growth and “there was a feeling that we wanted to maintain those revenues and not cut taxes. It was argued what we should do, in order not to slow the economy by running surpluses, was give a substantial amount back through revenue sharing. Therefore, there was funding available.”²¹ Kennedy, of course, also sponsored a tax cut, pleasing business both by tax-cutting and by offering new contracting opportunities from government-financed projects. In the economic thinking of the postwar years, such governmental expenditures would stimulate greater levels of growth that would, in turn, promote still higher levels of government revenue.

September 28, 2007). For background, see John M. Logsdon, *The Decision to Go to the Moon: Project Apollo and the National Interest* (Cambridge, MA: MIT Press, 1970) and Gretchen J. Van Dyke, “Sputnik: A Political Symbol and Tool in 1960 Campaign Politics,” in *Reconsidering Sputnik*, eds. Launius, et al., pp. 363–400.

18. John W. Jordan, “Kennedy’s Romantic Moon and Its Rhetorical Legacy for Space Exploration,” *Rhetoric and Public Affairs*, 6 no. 2 (2003): 209–231. Krug, *Presidential Perspectives on Space Exploration*, pp. 30–42 and James Lee Kauffman, *Selling Outer Space: Kennedy, the Media, and Funding for Project Apollo, 1961–1963* (Tuscaloosa, AL: University of Alabama Press, 1994) examine Kennedy’s metaphors for space exploration.

19. Quoted in Crouch, *Aiming for the Stars*, p. 203.

20. House Committee on Science and Technology, *Toward the Endless Frontier: History of the Committee on Science and Technology* (Washington, DC: Government Printing Office, 1980), pp. 171–172 on budget. Crouch, *Aiming for the Stars*, p. 203 on employees. James R. Hansen, *The Spaceflight Revolution: NASA Langley Research Center From Sputnik to Apollo* (Washington, DC: NASA, 1995) provides a rich history of the technological and organizational challenges of spaceflight by focusing on one of NASA’s space centers.

21. Quoted in Crouch, *Aiming for the Stars*, p. 203 from Wayne Biddle, “A Great New Enterprise,” *Air and Space Smithsonian* 4 no. 7 (June/July, 1989): 32–33.

Representative Olin “Tiger” Teague (D-TX) proclaimed in 1963 that space spending “started the blood coursing a little more fervently through the arteries of our economy.” It would, Teague predicted, spark “a new industrial revolution.”²²

Space Keynesianism thus joined military Keynesianism as a justification for pumping governmental spending into the economy and, thereby, besting the Soviets in both economic growth and technological prowess. The space race also introduced a new competitive element into the strategy of containment. As the Soviet leaders placed a high priority on winning the race to the Moon, their underdeveloped and increasingly stressed economy struggled to match America’s lavish expenditures. The space race appeared to fulfill the hopes of Democrats that enlarged government spending would simultaneously bring benefits to their party, stimulate prosperity while returning revenue to the Treasury in the form of a growing tax base, and help win the Cold War by weakening the Soviet economy.

The excitement and the rapidly mounting appropriations for the space race, however, did not last. The chastening effect of the Cuban Missile Crisis of October 1961 spawned a series of accommodations in both the U.S. and Soviet governments. The Kennedy presidency had demonstrated that Cold War competition could have its rhetorical thrills, but it also risked unspeakable dangers. With the Soviet pullback in the Missile Crisis, the superpowers’ high-pitched competitions abated somewhat. Moreover, after celebrating the flights of Alan Shepard (1961) and John Glenn (1962), and witnessing the other Mercury and Gemini missions of the early and mid-1960s, few Americans continued to maintain that the United States seriously lagged the Soviet Union. The Sputnik moment was quickly passing.

Drawing on the political skills of NASA Administrator James E. Webb, President Lyndon Johnson managed to continue Kennedy’s legacy by procuring for NASA a nearly blank check from Congress for awhile longer. Gradually, however, the public and their representatives tired of the costs and grew more confident about America’s ultimate successes in space. Moreover, the Great Society and the War in Vietnam vied with space programs over spending priorities, and the country spiraled into a paroxysm of dissent over national direction. As Kennedy’s soaring political rhetoric about “paying any price” to best Soviet communism slowly came down to Earth, other concerns challenged the imperatives of the space race.

Republican budget-cutters had sheaved their blades in the shadow of the Sputnik moment, but they gradually grew bolder in attacking governmental spending and taxation. As early as 1962, Representative H. R. Gross (R-IA) voted for Kennedy’s request for a greatly enlarged NASA appropriation while

22. Quoted in Kauffman, *Selling Outer Space*, pp. 125–126.

also asking pointed questions about why so much money was going to the Southern States and California, and why space contractors were paying their executives such high salaries. "It would be my hope that if and when we do get to the Moon," he remarked, "we will find a gold mine up there, because we will certainly need it."²³ In early 1963, former President Eisenhower sent a letter of protest, printed in the *Congressional Record* in April: "I have never believed that a spectacular dash to the Moon, vastly deepening our debt, is worth the added tax burden it will eventually impose upon our citizens . . . Having made this into a crash program, we are unavoidably wasting enormous sums."²⁴ The *Saturday Evening Post* in September 14, 1963, proclaimed that "the space program stands accused today as a monstrous boondoggle."²⁵ Amitai Etzioni summarized much of the developing critique in a book called *The Moon-Doggle* (1964).²⁶

Objections also emerged from those opposed to NASA's emphasis on human piloted spaceflights. Some scientists and their allies advocated less costly and potentially more scientifically valuable robotic exploration. Others, such as Representative Donald Rumsfeld (R-IL), stressed that emphasis should be placed on the military aspects of space—the control of the space closer to Earth—and less on NASA's manned explorations into far space. Such views grew out of, and also fed, the rivalry between the military services and NASA.

In addition, some politicians, scientists, and businesses began to question the regional tilt of NASA installations. In 1959, NASA selected Cape Canaveral, Florida, as the site to train the first group of astronauts. It opened as NASA's Launch Operations Center in 1962 and was renamed for Kennedy just after his death in 1963. Observers of Johnson's legislative career noted that an expanded space effort brought Texas lucrative government contracts. Complementing the center at Cape Canaveral, the Johnson Space Center (JSC), established in Texas in 1961, assumed the lead in human space exploration. The regional tilt of space spending, pouring into the newly expanding "sunbelt," became controversial because of its evident political ramifications.²⁷

Influenced by the various doubts and by changing priorities, Congress began trying to reduce NASA budget requests after 1963. The space race remained a useful frame that spaceflight promoters could call on, but its metaphorical power weakened, and it no longer connoted an unchallenged agenda or an open-ended flow of appropriations.

23. House Committee on Science and Technology, *Toward the Endless Frontier*, p. 124.

24. *Ibid.*, p. 171.

25. Kauffman, *Selling Outer Space*, pp. 116–125 summarizes the critics. [quote, p. 53].

26. Amitai Etzioni, *The Moon-Doggle* (Garden City, NY: Doubleday, 1964).

27. House Committee on Science and Technology, *Toward the Endless Frontier*, pp.185–190 discusses political maneuvers behind the positioning of NASA sites and some of the controversy.



The Sputnik moment of 1957 had telescoped fear and mobilized resources in response to a seemingly imminent enemy threat. Space exploration had been underway before Sputnik, of course, and had been driven by many factors: the nationalism inspired by World War II; frontier nostalgia for new lands to discover; public relations campaigns by scientists such as von Braun, entertainment moguls such as Disney, corporations interested in aerospace, and astrofuturist writers. But the Cold War's international rivalry shaped its character and accelerated its tempo into a space race. The space race was exhilarating because it seemed dangerous and character-defining. Boring things such as careful deliberation, cost-consciousness, and safety could be effaced as exciting "new frontiers" of risk and daring beckoned. Advocates of Space Keyesianism saw political and economic advantages—at least until arguments about "big government" and "Moon-doggles" gained traction. A remarkable conjuncture of popular culture, pressure from techno-scientific elites, and political imperatives may have initially produced the space race, but, over time, they also sparked contention over priorities.

After America's lunar landing in 1969, the space race abated and provoked neither the intense fear nor the vaunted inspiration of a decade earlier. But the race had made a lasting imprint. It helped deeply embed a rhetoric of peril into the nation's foreign policy and the practices of large-scale governmental contracting into the nation's political economy.

2. THE MEDIA AGE: SPACE SPECTACULARITY

The postwar Media Age fed the dynamics of the space race. New media forms—visible in photography, film, and television—helped project the beauties, mysteries, and dangers of space. Space was a star of this historical moment in which media spectacularity still seemed really spectacular.

The mass media of the era provided an ideal milieu for coverage of the Space Age, a term that suddenly circulated everywhere. A few weekly magazines and news services dominated the print media, and photography and television images—sometimes live—played a growing role in news delivery. It could be argued that Sputnik prompted little initial popular uproar until techno-scientific elites and politicians teamed with these influential media outlets to frame the event as a Cold War crisis.²⁸ The space race, after all, provided the attractions of a rich storyline punctuated by stunning images. The initial sensationalized sense of crisis flowed into the breathless score-keeping of

28. For example, Amitai Etzioni, "Comments," in *The First 25 Years in Space*, ed. Allan A. Needell (Washington, DC: Smithsonian Institution Press, 1983), pp. 33–36.

a race and finally found triumphant resolution in the nationalistic pageants that celebrated the dangers and successes of America's astronauts.²⁹

NASA's public affairs officers provided regular interaction with the media and carefully nurtured certain images and narratives. They controlled the media's access to astronauts and coached its people on making public appearances, regularly drawing up talking points for such occasions. They sponsored high-profile events that would attract media and developed close ties with congressional supporters. One study has concluded that NASA shaped its messages around the themes of nationalism (national pride, prestige, strength, and security), romanticism (heroism, individualism, glamour, frontier heritage), and pragmatism (economic, educational, scientific returns on investment). In its sophisticated public relations techniques and its central messages, NASA both exemplified and helped shape the new media strategies of the Space Age.³⁰

NASA crafted an image that united individual heroism with a competence arising from teamwork. Certainly there were plenty of failures, but the successes, especially of Alan Shepard in May 1961 and of John Glenn in February 1962, became spectacular national dramas that celebrated both individual bravery and group accomplishment. Both the intangibles of strong character and the practicalities of seemingly flawless engineering were on display. The media coverage of space in the early 1960s was all in the superlative, and when articles critical of the costs of manned flight began to appear after late 1963, NASA redoubled its efforts to put out positive news.³¹

Astrofuturists had attracted a devoted but limited following in the mid-1950s, but by the early 1960s the popularity of space themes had expanded into a broad-based cultural obsession. Kennedy's telegenic presence, exhorting Americans to reach the Moon, fused together politics and media culture and helped place the Space Age at the center of American life. Reported UFO sightings jumped sharply, and the new awareness of space permeated all kinds of cultural discussions and representational forms.³²

Life magazine, the famously image-laden staple of American living rooms, lavished attention on space themes and developed an especially close relationship

29. Dickson, *Sputnik*, pp. 22-27, summarizes press reaction based on a collection of press clippings at the NASA History Office in Washington, DC, and also summarizes public opinion polls. Writer for *Newsweek*, Edwin Diamond, *The Rise and Fall of the Space Age* (Garden City, NY: Doubleday, 1964) discusses the media's manipulative coverage. Jay Barbre, "Live from Cape Canaveral": *Covering the Space Race from Sputnik to Today* (New York, NY: Collins, 2007) presents another firsthand account from a reporter.

30. Kauffman, *Selling Outer Space*; Byrnes, *Politics and Space*.

31. McCurdy, *Space*, pp. 89-92; Kauffman, *Selling Outer Space*, pp. 50-66.

32. Carl Sagan and Thornton Page, eds., *UFOs: A Scientific Debate* (Ithaca, NY: Cornell University Press, 1972), and Curtis Peebles, *Watch the Skies! A Chronicle of the Flying Saucer Myth* (Washington, DC: Smithsonian Institution Press, 1994) examine the debate over visits by extraterrestrials. See also McCurdy, *Space*, p. 74, and Dickson, *Sputnik*, pp. 164-167.

with NASA. A weekly publication that surveyed worldwide events through glossy pictorial features, *Life* heralded the space race. Normally supportive of Eisenhower, *Life* had greeted Sputnik with a warning that it seemed time for his Administration to get “panicky.” It later paid the Mercury-7 astronauts the then-hefty sum of \$500,000 for exclusive rights to their life stories. Although Ohio’s John Glenn emerged as the star of the astronaut contingent, *Life* highlighted the entire Mercury team’s small-town, Protestant backgrounds and photogenic families. One story featured the “Seven Brave Women behind the Astronauts.” *Life*’s competitors in middle class living rooms, such as *Collier’s*, the *Saturday Evening Post*, and *Look*, followed suit as NASA and the press groomed the image of the astronauts as models of strength, honesty, and strong family values. To help wage an ultimately losing battle against the moving images carried on TV, *Life* and the other magazines faithfully monitored, through still pictures, the operations and personnel of the Moon-landing competition.³³

Television inexorably became the medium-of-record for the space race. Covering the potentially lethal spectacle of propelling all-American astronaut-heroes into space seemed a sure-fire ratings booster and a money-maker for the television industry. Space travel perfectly suited TV. Heroic dramas of triumph and tragedy could attract and hold viewers, and television generated a voracious demand for ever-more-sensationalized stories. Journalists of the new TV Age who wedded themselves to the space program saw their careers flourish. Still smarting from being overshadowed by NBC’s Chet Huntley-David Brinkley duo during the 1956 political conventions, CBS TV’s star journalist Walter Cronkite made outer space his personal beat. While seven young pilots, including John Glenn and Neal Armstrong, retrained to be astronauts, this veteran war correspondent retrofitted himself as TV’s premier space journalist. Displaying his grasp of the technical details of satellite-rocketry and of NASA’s jargon, Cronkite made his mark covering John Glenn’s flight in 1962 and continued to become almost the quasi official voice of the Apollo program. Honing his image as the “eighth astronaut,” Cronkite reassured TV viewers that the United States would emerge as the ultimate victor in the space race.³⁴ By the mid-1960s, Cronkite had become known as “the most trusted man in America.”

As part of the Cold War’s competition of appearances, NASA became adept at promoting the astronauts as international, as well as national, celebrities. The Giantstep-Apollo 11 Presidential Goodwill Tour in 1969, for example, touted the willingness of the United States to share its space knowledge with other nations and carried the Apollo 11 astronauts and their wives to 24 countries and 27 cities in 45 days. Indeed, especially from 1969 on, U.S. accomplishments in the space race often provided a public relations cover or counterweight to

33. McCurdy, *Space*, pp. 89-93.

34. CBS News, 10:56:20 PM EDT, 7/20/69: *The Historic Conquest of the Moon as Reported to the American People* (New York, NY: CBS, 1970) reproduces reporting on the Apollo 11 mission.

the generally negative news from Vietnam. In April 1969, President Richard Nixon's participation in a celebration for the Apollo 13 astronauts in Hawaii quite literally offered public cover for a secret high-level war meeting about stepping up pressure in Cambodia.³⁵ Space accomplishments projected the United States as cooperative, technologically superior, and successful in this era when news from Southeast Asia often marked the country as high-handed, technologically threatening, and wedded to a failed policy.

If the highly visual media helped promote Space Age projects, so the new technologies looped back to accelerate transformation in the media environment. In 1962, Congress created the Communications Satellite Corporation (Comsat), a public-private venture to manage an international system, Intelsat. Comsat paid NASA a fee for use of rocket and launch facilities, and within five years communication satellites had become a commercial success. In August 1964, a satellite telecast the opening ceremonies of the Olympic games in Tokyo. By 1969, with sixty countries belonging to Intelsat, geosynchronous satellites served the Pacific, Atlantic, and Indian Oceans.³⁶ Live space spectacles, which the United States displayed but the Soviet Union concealed, could now go global—in real time.

NASA worked especially closely with Representative Olin Teague, who became the space program's primary rainmaker and one of its most effective publicists. A Democratic representative from Texas, the chair of the Manned Space Flight Subcommittee, and one of Congress's most decorated combat veterans, Teague was in charge of convincing members of Congress to lavish funding on the space program. He kept them aware of how much space spending was going into their districts; brought models of spacecraft and rocketry to the House floor; and stressed the spinoffs of space spending for medicine, computerization, and fabrication of various kinds. Like other space race supporters, he emphasized that putting a man on the Moon was not an end in itself. The real benefit from the program would be to push the nation forward "in many important fields: science, engineering industrial development, design, mathematics, biology—the whole spectrum of scientific and technological accomplishment."³⁷ The media enthusiastically embraced this Teague/NASA message, which helped translate space accomplishments into the everyday realm of audience interest.

35. Robert Dallek, *Nixon and Kissinger: Partners in Power* (New York, NY: Harper Collins, 2007), pp. 191-192.

36. Wernher von Braun and Frederick I. Ordway, III, *History of Rocketry and Space Travel* (Chicago, IL: J. G. Ferguson Publishing, 1966), p. 186. Hugh R. Slotten, "Satellite Communications, Globalization, and the Cold War," *Technology and Culture* 43 no. 2 (2002): 315-350 provides a basic history and cites the relevant literature on this issue. Heather E. Hudson, *Communications Satellites: Their Development and Impact* (New York, NY: Free Press, 1990) is a thorough history.

37. House Committee on Science and Technology, *Toward the Endless Frontier*, pp. 163-172 [quote p. 172].

In cooperation with NASA, the Science Committee in the House of Representatives, beginning in 1960, published "The Practical Values of Space Exploration," a series of frequently updated studies that detailed productive new spinoffs (a NASA-coined word) from the space program. A few of the most celebrated included miniaturized electronics, spray-on foam insulation, microwaves, freeze-dried dinners, and Teflon. Magazines often featured these down-to-Earth bonuses from the space program, and perhaps left the misleading impression that robust consumer innovation ultimately depended on governmental expenditures in space.³⁸

NASA's Office of Public Affairs also used film to publicize NASA activities, taking advantage of NASA's advanced satellite imagery from research facilities and space flight centers around the country. Some of the most widely viewed titles from the first two Space Age decades included *The John Glenn Story* (1963), a film biography; *Assignment Shoot the Moon* (1967); *America in Space—the First Decade* (1968), a history of NASA; *The Eagle Has Landed* (1969), on the manned lunar landing; *Who's Out There?* (1975), on the possibility of extraterrestrial life; and *Planet Mars* (1979). These films (some award-winning for their cinematic technique), in addition to rich photographic collections, provided then, and preserve now, a stirring visual record of space program history. The National Archives currently holds 250 "Headquarters Films" made between 1962 and 1981.³⁹

Hollywood-produced films also found a congenial partner in NASA. Movies filmed at the space centers included *Apollo 13*, *Contact*, *Space Cowboys*, *Armageddon*, *The Right Stuff*, the 12-part HBO series *From Earth to the Moon*, and a variety of other TV special productions.

The visitors' centers at the Kennedy and Johnson Space Centers likewise worked with the media. Teague had pushed NASA to construct visitors' centers, providing money for them in the federal budget. He argued that public support was essential to sustaining NASA's appropriations, and he understood the tourist potential of space exploration. The centers quickly proved to be popular destinations, with the one at the Kennedy Center topping one million visitors in 1969.⁴⁰ The centers also hosted many foreign visitors and dignitaries, thereby serving the Cold War purpose of exemplifying the United States as a country of great prosperity, amazing technological achievement, and unparalleled power over heavens and Earth. In 1966, Congress authorized construction of the National Air and Space Museum, which became one of the most popular destinations on the National Mall and sponsored programs that attracted media attention.

38. House Committee on Science and Technology, *Toward the Endless Frontier*, p. 173; Mark E. Byrnes, *Politics and Space: Image Making by NASA* (Westport, CT: Praeger, 1994), p. 101.

39. NASA History of Space Flight Motion Pictures, <http://video.google.com/nara.html> (accessed September 15, 2007).

40. House Committee on Science and Technology, *Toward the Endless Frontier*, pp. 177–178.



A clear synergy developed between the space program and the highly competitive world of image-based media. NASA projected itself to be an Agency involved in science and technology, but it proved also to be skilled at image-making and public relations. Sensational stories generated by human-piloted flights meant publicity for NASA, larger audiences for the media networks, and positive projections of America's power in the Cold War world. Many of the themes that had structured both popular science fiction and popular western tales echoed in the Media Age's presentation of the space race: danger, heroism, competition, suspense, and problems overcome through ingenuity. Yet the dramas that played out at Cape Canaveral and Houston, as exciting as fiction, had the added attraction of being "real." The spectacularity of the space race helped sustain the older print-pictorial media, pioneered a compelling early version of "reality TV," and proved attractive to filmmakers and space center visitors. And this fast-changing and competitive media environment, in turn, boosted the visual spectacularity of the Space Age.

3. THE TECHNETRONIC AGE: TECHNOCRACY AND SPACESHIP EARTH

The complexity of research and development in the Space Age raised moral and practical questions. How might new technologies change life and politics? How might people manage the interrelated systems that comprised the planet Earth within its solar system? Issues about technology and global management were not new to the Space Age, but the rapidity of scientific and technological change made them seem more urgent. Moreover, the penetration of space, by helping to focus attention on Earth's future, provided new terrain for reimagining age-old concerns about the ultimate fate of humans and their planet. "Technocracy" and "Spaceship Earth" became key words in Space Age-era discussions.

Although a Technocracy Movement, which envisioned greater prosperity and social progress through the systematic application of technical expertise, had flourished during the 1930s, the word "technocracy" became a much-discussed concept of the Space Age.⁴¹ Techno-scientific and governmental elites seemed fused together as never before, as NASA's budgets soared and

41. On the pre-World War II Technocracy movement, see Henry Elsner, Jr., *The Technocrats: Prophets of Automation* (Syracuse, NY: Syracuse University Press, 1967); William E. Akin, *Technocracy and the American Dream: The Technocrat Movement, 1900-1941* (Berkeley, CA: University of California Press, 1977); and Howard P. Segal, "The Technological Utopians," in *Imagining Tomorrow: History, Technology, and the American Future*, ed. Joseph J. Corn (Cambridge, MA: MIT Press, 1986), pp. 119-136.

government embraced the funding for research and development (R&D). Panels of experts, paid through government grants, became a regular feature of defense and space planning.⁴² Steering the enormous space bureaucracy and its complex contracting processes even spawned a new management style called “systems engineering.” Just after Sputnik’s launch, *Newsweek* pointed out a “central fact” that had to be faced: “As a scientific and engineering power, the Soviet Union has shown its mastery. The U.S. may have more cars and washing machines and toasters, but in terms of the stuff with which wars are won and ideologies imposed, the nation” now had a frightful opponent.⁴³ But what might be the impact of the fusion between government and technical/scientific expertise in creating this stuff? Could technocracy, which the Soviet system seemed able simply to impose, be reconciled with democracy?

In films, comics, and literature of the pre-Sputnik 1950s, space travel had provided an ideal venue for elaborating various utopian and dystopian visions of a technological future directed by techno-scientific and political elites. Films such as *Destination Moon* presented a positive view, but others, such as *Rocketship XM*, predicted that technology (and the life in space that it sustained) would ultimately fail, bringing death and destruction as the primary outcome.⁴⁴

The same year that Sputnik prompted calls for building new cadres of space scientists and technicians the film *The Incredible Shrinking Man* (1957) presented a dark fantasy about a man who, after exposure to radioactivity, became gradually smaller and more insignificant until he disappeared entirely. Drawing on fears of atomic power, the film advanced a thoroughly alarming vision of the inexorable prospects of man’s “shrinkage” in an expanding universe, a victim of his own technology. (A few years later the *Jetsons* brought this theme to TV in “The Little Man,” an episode in which a faulty compression technique reduces George Jetson to six inches tall.) The theme of human insignificance resulting from an almost God-like technology and an awareness of Earth’s smallness in a vast cosmos ran through Space Age culture.

It was within this broad debate over technocracy, of course, that NASA’s own public affairs offices weighed in. By emphasizing group competence and the good individual character of those in the space program, NASA depicted science and technology as being under control and debunked popular worries of shrinking men and overbearing machines. Moreover, NASA’s stress on the innovative products and better living arising from space research aimed to diffuse the darker fears of technology’s impact.

42. See, for example, Ann Finkbeiner, *The Jaxons: The Secret History of Science’s Postwar Elite* (New York, NY: Penguin Books, 2006).

43. Quoted in Lucena, *Defending the Nation*, p. 29.

44. Frederick I. Ordway, III, and Randy Leiber, eds., *Blueprint for Space: From Science Fiction to Science Fact* (Washington DC: Smithsonian Institution Press, 1992) deals with the popular culture of spaceflight.

Popular culture's consideration of technological themes had counterparts in political philosophy and religion, in literature and history. Major works contributed thoughtful, yet highly diverse, elaborations of the cautions and promises of the Space Age. Lewis Mumford's book *The Pentagon of Power*, for example, disparaged colonization of space as a waste of resources and, like the building atomic weapons, a pathological use of technology. Zbigniew Brzezinski's book *Between Two Ages* examined the dawn of the "technetronic age," a new era that would reorient the customary relationships of the industrial age and bring inevitable dislocations and challenges. One of the most popular science writers of the Space Age, Carl Sagan, extolled space exploration but at the same time warned that the siren song of "sweet" science and engineering projects could also turn sinister if pursued with single-mindedness. These works, and so many others, prompted broad consideration of the new role that science and technology assumed in the Space Age.⁴⁵

In religious thought, the "Is God Dead?" controversy contained subtexts about the spiritual meanings of the Space Age. Was the total secularization of the modern world bringing about the death of God "in our time, in our history, in our existence?" The exaltation of science and rationality, many theologians agreed, was helping to fuel a reexamination of the doctrine of God, which in such a secular world stood as an almost empty and irrelevant idol. Still, might the mysteries and infinity of the cosmos provide proof of a divine being with creative powers of unfathomable magnitude and splendor? Appearing in theological treatises, in pulpits of every faith, and even on a highly controversial cover of *Time*, the "death of God" controversy laced the Space Age with momentous philosophical questions about faith and its connection to social action.⁴⁶

Many of the most memorable portrayals of the Space Age similarly centered on the consequences of technology and technocracy. Stanley Kubrick's film *2001: A Space Odyssey* (1968)—developed along with a novel by Arthur C. Clarke that was based on some of Clarke's earlier stories—presented the wonders of space, the potential hazards of technology, and the inevitability of humans' pursuit of new techniques and new modes of being. Norman Mailer in *Of a Fire on the Moon* (1970), an account of the Apollo 11 flight, stated "that he hardly knew whether the Space Program was the noblest expression of the Twentieth Century or the quintessential statement of our fundamental insanity."⁴⁷ In 1985,

45. Kilgore, *Astrofuturism*, pp. 54–56; Lewis Mumford, *The Myth of the Machine: The Pentagon of Power* (New York, NY: Harcourt, Brace, Jovanovich, 1964); Zbigniew Brzezinski, *Between Two Ages: America's Role in the Technetronic Era* (New York, NY: Viking Press, 1970); Carl Sagan, *The Cosmic Connection: An Extraterrestrial Perspective* (Garden City, NY: Anchor Press, 1973), and Ray Bradbury, Arthur C. Clarke, Bruce C. Murray, and Carl Sagan, *Mars and the Mind of Man* (New York, NY: Harper and Row, 1973).

46. "The 'God Is Dead' Movement," *Time*, (October 22, 1965); cover photo, *Time*, (April 8, 1966).

47. Norman Mailer, *Of a Fire on the Moon* (New York, NY: Little Brown, 1969), p. 15.

Walter A. McDougall's prize-winning history of the Space Age examined the dilemmas raised by the nation's expensive and expansive networks of scientific and technological expertise. The space program, he argued, led Americans to accept a greater concentration of governmental power and the enlistment of technological change for state purposes. McDougall ended with a plea to neither worship nor hate technology; to neither expect utopia nor fear distopia.⁴⁸ In Kubrik's, Mailer's, and McDougall's very different kinds of representations that occurred years apart, humans had no choice but to continue to embrace technology and confront its challenges.

Like "technocracy," the phrase "Spaceship Earth" echoed in a broad range of cultural products during the Space Age. In 1963, Buckminster Fuller published *Operating Manual for Spaceship Earth*; in 1966 Kenneth Boulding wrote *Human Values on the Spaceship Earth*. Both aimed to map a new consciousness for a sustainable environment that would abandon reliance on fossil fuels and develop sources of renewable energy. Along with so many other works of the era, they sought to unite science, engineering, humanities, and art in an integrated effort to focus upon ameliorating human problems. Some connected the current fears of overpopulation and the "population bomb" with the prospects of space colonization.⁴⁹

The Apollo crews in 1968 and 1969 captured from outer space the now famous images of a Spaceship Earth. Perhaps the best known photo, called "Earthrise," showed Earth ascending over the Moon. Such visions of a whole Earth, drifting in space, became among the age's most meaningful icons. On the front page of the *New York Times*, poet Archibald MacLeish wrote that these images might transform human consciousness. "To see the Earth as it truly is, small and blue and beautiful in that eternal silence where it floats, is to see ourselves as riders on the Earth together."⁵⁰ To many people, especially the young who were beginning to call for a counterculture—a new way of living and relating—such images signified a global consciousness that might spur transnational and global networks of non-governmental organizations (NGO) to work beyond

48. Walter A. McDougall, . . . *the Heavens and the Earth*, and Joseph N. Tatarewicz, *Space Technology and Planetary Astronomy* (Bloomington, IN: Indiana University Press, 1990) examine the interaction between government and "big science."

49. R. Buckminster Fuller, *Operating Manual for Spaceship Earth* (New York, NY: Simon and Schuster, 1969); Kenneth Boulding, *Human Values on the Spaceship Earth* (New York, NY: National Council of Churches, 1966). The idea that technocratic skills needed to be wedded to more humanist values was a common theme of Space Age writers. See, for example, R. Buckminster Fuller, Eric A. Walker, and James R. Killian, Jr., *Approaching the Benign Environment* (Auburn, AL: University of Alabama Press, 1970). Norman Mailer, *Of a Fire on the Moon* explored the tension between NASA's appeal to nationalism and the countercultural humanism of the 1960s.

50. Archibald MacLeish, "A Reflection: Riders on Earth Together, Brothers in Eternal Cold," *New York Times*, (December 25, 1968); discussed in Finis Dunaway, *Natural Visions: The Power of Images in American Environmental Reform* (Chicago, IL: University of Chicago Press, 2005), pp. 207–208.

nation-states. They also, to some, signified a new ecological awareness about the interrelatedness of planetary systems and called for greater stewardship of the Spaceship Earth on which humans live. Steward Brand's *Whole Earth Catalog* and its famous cover, which came out in 1968, powerfully expressed the goal of linking the stewardship of Earth to individual empowerment. It opened with the words "We are as gods and might as well get good at it." The catalog, a kind of Bible for the counterculture including many of those innovators who would later magnify Brand's ideas in creating the Internet, promised a broad access to whatever tools might save Earth and foster self-improvement. If technology was to be the future, it should be a technology that empowered everyone, not just technological elites and their political masters.⁵¹

In the early 1980s, the Disney Corporation opened an exhibit called "Spaceship Earth" as the center of its new Epcot exhibit in Florida. Advised by Ray Bradbury and presumably inspired by Fuller's ideas about the advantages of geodesic dome architecture, the Disney Spaceship reached 18 stories tall. Its intricate system of some 11,000 triangles formed cladding that absorbed rainwater and channeled it into a lagoon. Upon its opening, "Spaceship Earth" presented a story of human enlightenment beginning with early cave dwellers and ending with a spacecraft launch. Disney's rendition of civilization as a linear arc of progress flattened the complexities of many of the era's other representations of Earth as a spaceship, but it surely attracted the largest crowds.

Images of Earth in space raised complex questions about the future role of nations and nationalism on a Spaceship Earth. Such tensions between nation and planet, of course, preceded Sputnik and recalled the astrofuturist visions of the pre-Sputnik years. In the 1951 movie *The Day the Earth Stood Still*, for example, the dangerous combination of atomic power, rocketry, and nationalistic competition prompted a visit from a superior civilization from outer space. The emissary, Klaatu, issued a warning that unless nations of Earth began to live peacefully, superior beings would blow up their planet. Nationalism and international conflict, this early Space Age movie suggested, were obsolete and threatened the extraterrestrial order.

Other science fiction scenarios, especially those from *Star Trek*, which debuted in 1966, played imaginatively with the idea that space exploration might provide new configurations of power and authority. The 23rd century "starship," the *Enterprise*, cruised space to explore rather than to dominate other worlds through violence. The creation of Gene Roddenberry, *Star Trek* aired for three years, after which it went into syndication, developed a global following of loyal fans, and ultimately spun off five television series and nearly a dozen movies. In its much-quoted introduction, Captain James T. Kirk (William Shatner) presented the *Enterprise's* purpose in traditional astrofuturist and Kennedyesque terms: "to

51. Andrew G. Kirk, *Counterculture Green: The Whole Earth Catalog and American Environmentalism* (Lawrence, KS: University Press of Kansas, 2007).

explore strange new worlds, to seek out new life and new civilizations, to boldly go where no man has gone before.” The show revolved around thinly veiled Cold War themes, as the Federation’s *Enterprise* dealt with rivalries with the Klingon and Romulan civilizations. Would new kinds of policing be able to enforce rules within a new kind of intergalactic, or internationalist, order?

The more practical minded turned to forging international space law in the real world. Development of international norms might create precedents for turning space-race competition into Spaceship Earth cooperation and reconfigure the landscape of the Cold War. The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) worked to develop international space law, and the U.S. Congress undertook various cooperative initiatives.⁵² The Outer Space Treaty of 1967, for example, banned weapons of mass destruction from space, demilitarized the Moon and other non-terrestrial bodies, and promised peaceful international cooperation in space. In 1975, Apollo astronauts and Soyuz cosmonauts orchestrated a symbolic handshake in space.⁵³

In 1969, U.S. astronauts posed for a much-debated iconic image in which they planted an American flag on the Moon. They also left behind a gold olive leaf and a plaque that stated “We came in peace for all mankind.” Throughout the Space Age, a multitude of such representations persistently and unproblematically mixed rhetoric of a national “conquest” of space with invocations of peace and cooperation; they embedded calls for national greatness within universalistic justifications. The tensions between serving the nation and humanity as a whole may have seemed insignificant, indeed even invisible, to most Americans because such juxtapositions sounded so familiar. A long rhetorical tradition avowing America’s unique national mission to and for the world, after all, stretched from the Puritans through America’s long experience of frontier expansionism to Woodrow Wilson and Franklin Roosevelt and into Kennedy’s New Frontier. In classic American tradition, Space Age representations both raised and quieted or masked the tensions between serving the nation and representing all of humanity.

Another question implied in the concept of Spaceship Earth concerned the social make-up of its denizens. How, for example, might Earth-bound racial and gender differences appear when rendered in outer space? Some historians have seen science fiction (like early space travel itself) as a rather exclusionary

52. Eilene Galloway, “Organizing the United States Government for Outer Space, 1957–1958,” in *Reconsidering Sputnik*, ed. Launius, et al., pp. 309–325; Joan Johnson-Freese, *Changing Patterns of International Cooperation in Space* (Malabar, FL: Orbit Books, 1990) examines cooperation in space. House Committee on Science and Technology, *Toward the Endless Frontier*, pp. 367–450 details congressional efforts.

53. The text of the Outer Space Treaty of 1967 may be found at the NASA History Division, <http://history.nasa.gov/1967treaty.html> (accessed September 15, 2007).

preserve of white males, but imagined forays into space often provided a forum for envisioning and confronting assorted futures.

Stories about interplanetary space travel often featured encounters with alien “others.” As U.S. leaders and experts projected their nation’s power into areas of the world that required dealing with the dilemmas of cultural and racial differences, imagined encounters with aliens living outside of the planet Earth could mirror the complexities of addressing the problem of “otherness.” *The Thing*, *The Blob*, *Invaders from Mars*, and *War of the Worlds*, among many others, presented aliens as monsters. But *Forbidden Planet*, one of the most acclaimed films in the space genre, went beyond the simplistic formula, probing the monstrous ineffectiveness of good intentions and of presumably benevolent interventions. The film features a protagonist (Walter Pidgeon) who tries to understand the alien Krell but, despite his high-minded motives, ultimately fails.

Moreover, the interrelationships within groups of people on small crafts hurtling through space raised issues of gender, race, and class, allowing discussions related to the contemporaneous civil rights and feminist movements. In the much analyzed *Star Trek*, for example, the *Enterprise* has a multiracial crew of women and men and aliens (the half-human First Officer Mr. Spock, Leonard Nimoy) who live and work in a spirit of (mostly) cooperation. The program literally took its crew into new territory when it offered audiences a highly controversial, if compelled, interracial kiss. *Star Trek*, of course, has attracted an enormous amount of analysis and commentary, and some commentators have seen the centrality of white men and the marginality of others as a reinforcement of existing hierarchies. DeWitt Douglas Kilgore, however, makes a compelling argument that *Star Trek*, like other astrofuturist imaginings of life in space, invites “speculation about alternatives” and can operate as a “liberatory resource” for those who wish to stake a claim in a more egalitarian future. Astrofuturist narratives, he argues, are multivalent and “unusually porous, with consumers regularly seizing the reigns of production.” *Star Trek* both reflected and also scrutinized contemporary issues of gender, race, and class by safely projecting them into an imagined future.⁵⁴

In America’s Space Age imaginings, the present seemed poised to make an unprecedented leap, and the future came in many styles. The terms *Technocracy* and *Spaceship Earth*, appearing and reappearing in diverse contexts, raised seemingly urgent moral and practical questions that revolved around three interrelated concerns: the political and moral impact of technocracy; the

54. Kilgore, *Astrofuturism*, pp. 28–29. In making this argument he draws effectively on the racial politics that surrounded George Takei’s and Nichelle Nichols’s participation in the show and an analysis of class in Homer H. Hickam, Jr.’s *Rocket Boys* and the film *October Sky*.

problems of managing the health of the planet; and the national or international (or intergalactic?) government of and social relationships in space. Would extraterrestrial travel become a terrain for renewal and betterment, or for hubris and subsequent failure? Would spacecrafts and space colonies transcend or simply transplant the divisions that beset humans on Earth? Space exploration brought no answers to dilemmas over technology, planetary consciousness, and nationalism—versions of which had long preceded spaceflight—but it did refresh imaginations and reignite philosophical, religious, and practical controversies.

4. MID-CENTURY MODERNISM: GOOGIE DESIGNS AND “FAR OUT” ART

The term Space Age, in addition to signifying a Cold War competition, a media sensation, and a debate over future political and social structures, signified the look called Mid-Century Modernism. Space Age design—in architecture, signage, decorative arts, and painting—elaborated an aesthetic of risk, individualism, and confidence. It emphasized eclecticism, mixing retro primitivism with futuristic styles. It juxtaposed calm, planet-shaped curvatures with abrupt, spaceship-style thrust. If the science of space penetration suggested sleek exactitude, the wonder of the cosmos encouraged unpredictable pastiche.⁵⁵

Space Age modernism brought spherical and angular motifs into a cacophony of the unexpected. American automobiles sprouted their storied tailfins, suggesting rocket propulsion. Manufacturers redesigned children’s playground equipment: Space Age kids ascended ladders into rockets, played house in spaceships, and scrambled around on faux Moon surfaces. Toys, coloring books, wallpaper, and storybooks adapted space themes. Space mania revolutionized the design of household items. Chandeliers resembled space platforms; dinnerware assumed the elliptical shape of a satellite orbit; vases, ashtrays, and appliances disguised their functions within new forms and facades.

French designer André Courreges launched his Moon Girl Collection in 1964. It featured angular, geometric shapes; space-style hats; short skirts in white and silver; and high, shiny-white plastic “go-go” boots. His 1968 Space Age Collection continued to display simple, stark lines with metallic silver as the design color of the age. The look of these “moon fashions” swept through the worlds of famous designers and of street faddists. They adorned covers of *Vogue* and percolated into the sew-it-yourself pattern catalogues that set the styles on Main Street.

55. Thomas Hine, *Populuxe* (New York, NY: Alfred A. Knopf, 1986); George H. Marcus, *Design In The Fifties: When Everyone Went Modern*, (New York, NY: Prestel, 1998). For background, see John H. Lienhard, *Inventing Modern: Growing Up with X-rays, Skyscrapers, and Tailfins* (New York, NY: Oxford University Press, 2003).

New theme parks, especially Disneyland, popularized the look of Space Age modernism as belonging to the future. Popular entertainment (and education) in America had long been structured around a trajectory from past to future: the Buffalo Bill Wild West Shows replayed the popular clichés about the transition from barbarism to civilization; the 20th century World's Fairs displayed visions of progress extending from the drudgery of the unenlightened past into the pleasures of the technologically driven future. Reprising, but always improving upon, these culturally embedded narratives, Disneyland offered two of its Kingdoms as "Frontierland" and "Tomorrowland." True to cultural archetypes, an imagined future derived definition from an imaged past: Tomorrowland enacted the new comforts and ease offered in the Space Age, yet it also extended the individual heroism of the legendary frontiersman into the new era. At Disneyland, as in so much of the era's political rhetoric, the "new frontier" of space and the "endless frontier" of science could confirm the national and personal virtues that popular culture of the 1950s and early 1960s still associated with the winning of the West.

The two international exhibitions held in America during the Space Age—in Seattle and New York—also emphasized space themes expressed in the look of Mid-century Modernism. The Seattle Century 21 Exposition's Space Needle set the tone for an exhibition that claimed to represent the summit of human (well, really *American*) accomplishment. The Seattle World's Fair Commission sought some kind of restaurant in space as a central symbol and engaged an architect, John Graham, Jr., who had created a revolving restaurant in Honolulu. Graham joined with other partners to design a slim steel tower anchored to Earth by 74 32-foot-long bolts topped by a large rounded structure containing a revolving restaurant, which stood eight hundred thirty-two steps away from the base. Built in a year and opening slightly before the Fair began in April of 1962, the Space Needle's color scheme included "Orbital Olive," "Reentry Red," and "Galaxy Gold." NASA had its own exhibit at the exposition, including John Glenn's space capsule that was then touring the world rather than soaring above it.⁵⁶

The 1964 New York World's Fair centered around a Unisphere, a large sculpture of Earth circled by orbiting bands. The Space Park displayed America's aerospace superiority, and corporate pavilions had futuristic themes. General Motors's "Futurama" featured an extraterrestrial-looking building holding models of futuristic cities built on land, under the sea, and in space. Monsanto showcased a Space Age home. At the end of the World's Fair, some of the exhibits migrated to become features at Disney's Tomorrowland.

These international exhibitions helped promote an architectural style that has become popularly known as "Googie." Space evocations predominated in

56. "History of the Space Needle," <http://www.spaceneedle.com/about/history.asp> (accessed September 15, 2007); McCurdy, *Space*, p. 93.

Googie styles, which reached their apogee in the slice of southern California that stretched between Hollywood and Disneyland. In 1949, the architect John Lautner had designed a building for Googie's Coffee Shop on Sunset Boulevard in Los Angeles. Architecture critic Douglas Haskell wrote an article in *House and Home Magazine* in 1952 in the form of a playful interview with a fictitious expert on "Googie" architecture. "It seems to symbolize life today," his imaginary expert explained, "skyward aspiration blocked by Schwab's Pharmacy." The article closed with the rumination that seemed to be at the heart of Cold War Googie: "It's too bad our taste is so horrible; but it's pretty good to have men free."⁵⁷

Googie quickly moved beyond coffee shops. Architect John Lautner's own 1960 home, the Cemosphere (recently saved and rehabilitated by the German book publisher Benedikt Taschen) shimmered above the horizon like some extraterrestrial hovercraft. Built in the Hollywood Hills off Mulholland Drive, Lautner's design responded to the challenge of building on a 45-degree slope. Erected on top of a 30-foot concrete pole, it appeared to defy not just conventional forms but gravity itself.⁵⁸ Googie, Douglas Haskell wrote, "was an architecture up in the air."

Googie's influence flowed out into highways and towns throughout the nation. "Serious" architects picked up the Googie designation as a slur, but it became the roadside look of a Space Age nation-on-the-go. Just as the space race defied gravitational laws, so representations of space offered suggestive mixtures of lines and curves that flaunted the conventions of Earthbound realities. Travelers in the late 1960s could stay in the Space Age Inn or the Cosmic Age Lodge. After taking in Disneyland (a Googie paradise), they might shop in Satellite Shopland and cruise by the fabulous Anaheim Convention Center. Gas stations might rest in the shade of characteristically upswept roofs and aerospace-inspired flying buttresses. In Googie, domes hugged Earth as spires and starbursts (see Las Vegas and Holiday Inn) transcended terra firma. The original McDonald's golden arches projected a Space Age ellipse. If Googie had any rules of form, they were the embrace of abstraction and surprise.⁵⁹

As in other Space Age representations of the future, Googie's futuristic elements often mixed anachronistically with primitivist motifs: tiki-hut roofs, South sea island-style lava rock walls, frontier themes. Long before the postmodern architecture of the end of the twentieth century self-consciously (and

57. Douglas Haskell, *House and Home Magazine*, (February 1952) <http://www.spaceagecity.com/googie/index.htm> (accessed September 15, 2007).

58. Alan Hess, *The Architecture of John Lautner* (New York, NY: Rizzoli International Publications, 1999).

59. Alan Hess, *Googie: Fifties Coffeehouse Architecture*, (San Francisco, CA: Chronicle Books, 1985), and Philip Langdon, *Orange Roofs, Golden Arches: The Architecture of American Chain Restaurants* (New York, NY: Alfred A. Knopf, 1986).

controversially) conglomerated elements of style, Space Age avatars were already jumbling together time and geographic space. They were stage-setting the future within the past and, with a wink, presenting fantasies of both to the present.⁶⁰

Googie not only brought the excitement of a jet-propelled look into the everyday activities of American life, but it also colonized the new “fast” medium of television. True to the age’s most popular entertainment formula—the toying with both past and future—the creators of *The Flintstones*, Hanna-Barbara Productions, introduced *The Jetsons*. This animated series of 24 episodes played in the prime Sunday night spot from September 1962 to March 1963. After that, it became a staple of Saturday morning cartoon reruns for decades. (Additional episodes were made between 1985 and 1987, followed by movies and television specials.) Over the years, merchandise spinoffs from *The Jetsons* continued to attract a market.

The life of the Jetsons fairly bristled with Googie style. Their neighborhood boasted houses raised high above the ground on poles—suggesting the Cemosphere and anticipating the Seattle Space Needle. The family flew around the air in its private rocket-ship and traversed the ground in individual people movers that look just like today’s Segways. Sets were spare, brightly colored, modernistic.

The Jetson’s Googie world of spheres and angles and turquoise and pink projected an automated future. George Jetson worked three hours a day, three days a week for Mr. Spacely of Spacely Space Sprockets. He mostly pressed buttons. Although the Jetsons enjoyed the standard fare of family sitcom mixups, frustrations, and travails, labor-saving devices of all kinds provided abundant leisure. Space references abounded in this future: a Moon Side Country Club, a space-club trip to the Moon, an auto shop called Molecular Motors. Football was played by robots. The family dog, Astro, was acquired after a comparison with an electronic, nuclear-powered dog. A used robot maid, Rosie, made a couple of appearances, but the future, after all, was fairly work-free.

Googie was one highly popular part of a broader aesthetic that had emerged along with abstract expressionism in high art. The abstract expressionists during the 1940s and 1950s, too, explored the modern as a statement of freedom, an acceptance of risk, and a willingness to shock. The connections between the mid-century visions of space and postwar art seem almost too obvious, as so many artists of the age employed lines, spheres, and vast canvasses to project enigmatic representations of unknowability. Both artists and astronauts drifted beyond the rules that governed their atmospheres; both projected a kind of outlaw masculinity that combined an extraordinary endurance for the regularity of hard work with a confident ability to improvise and transcend boundaries.

60. Stephen Lynch, “Excursion Roadside Retro Be It Space Age, Cocktail or Tiki: Orange County Has Gobs of Googie,” *Orange County Register*, (June 27, 1998) ID# 1998178044, <http://www.ocregister.com/ocregister/archives/> (accessed September 15, 2007).

In some cases the trajectory of vision for abstract expressionist painters seemed quite directly in synch with space exploration, even if the connections often stood largely unnoticed or unarticulated at the time. Richard Pousette-Dart, for example, brought to canvass Space Age motifs in *Night Landscape* (1969–71), a blue, black, white, and yellow sky dense with layered planets and rotations; *Starry Space* (1961); and *Earth Shadow in Time* (1969). Other artists also explored Space Age concerns. Robert Rauschenberg, for example, produced his “Stoned Moon” cycle of paintings after being invited by NASA to witness the launch of Apollo 11.⁶¹ There were many, many more artists who drew from new understandings in physics and astronomy to fashion commentaries on perspective, on the fungibility of matter and energy, and on the universe’s enigmatic proportions. Fascination with the “far out” provided the ethos of the era, in art as well as in science and politics.

For a couple of decades, Googie design and its many offshoots shined as brightly as the Moon and stars. Googie was a style of optimism, an exemplar of free and unregimented spirits who broke the rules, an effervescence of populist self-confidence. If the Space Age coincided with an increasingly powerful American imperium, then Googie represented the imperial signature of what one historian has termed America’s “empire of fun.” Its bold and shiny surfaces revealed few dark sides.

5. CONCLUSION

From the 1950s to the 1970s, space held many meanings: it was a symbol-laden arena in which people and nations staged Cold War competitions, a “star” in the media firmament, an ultimate challenge for scientists and engineers, and an inspiration for artists and designers.

In 1966, Wernher von Braun ended his book on the history of space travel with a vision of what steps would follow after the projected Apollo Moon landing. He asserted that there would soon be semi-permanent bases on the Moon, growing vegetables and chickens. He then predicted a flyby to Mars or Venus by the late 1970s, landings on Mars in the 1980s, and the exploration of other planets and moons until the process of discovery became routine.⁶²

61. Robert Rauschenberg; *Stoned Moon*, <http://www.orbit.zkm.de/?q=node/277> (accessed September 15, 2007).

62. Von Braun and Ordway, *History of Rocketry*, p. 222. For a well-illustrated, recent attempt to reimagine the past and future of space exploration, see Roger D. Launius and Howard E. McCurdy, *Imagining Space: Achievements, Predictions, Possibilities, 1950-2050* (San Francisco, CA: Chronicle Books, 2001).

Even by the time of these breathless predictions, however, the most storied days of the Space Age were already coming to a close. An image-saturated public seemed to be tiring of spectacles in space. Only a major triumph, such as the walk on the Moon in 1969, or a major disaster—such as the death of three Apollo astronauts in January 1967, the Apollo 13 travails in April 1970, or the *Challenger* explosion in January 1986—could reclaim a large viewing public. Between 1969 and 1972, the United States landed six sets of astronauts on the Moon. The successes of the Moon program, first amazing and then routine, became its greatest burden. Media attention ebbed along with the public's investment of emotional and monetary assets. In 1979, Tom Wolfe's *The Right Stuff* seemed the stuff of nostalgia. Wolfe recalled the early 1960s fascination with the buccaneer days of space and concluded with the epitaph "the era of America's first single-combat warriors had come, and it had gone, perhaps never to be relived."⁶³

Even as the exuberant high of the Space Age slipped away, it nonetheless left an enduring array of creative and rhetorical resources in American culture. Like any star celebrity, the legacy of meanings for national identities and global futures were complex and multiple. Space exploration in this era—entangled in Cold War rivalries, magnified by the explosion of new image-based media, intertwined with discussions over the role of technology and planetary stewardship, and expressed through innovative artistic products and designs—anchored diverse images and representations.

The Space Age boosted national pride—and placed it under threat. It forged pipelines to pump money into fantastic new projects—and prompted warnings about the size of a "Moon-doggle" and an enervating dependence on government largesse. It promoted techno-science—and stimulated new fears about "technocracy." It encouraged the triumph of rational endeavor—and a mystical faith about the meanings of the heavens. It promised peace and social justice—and more frightening forms of hierarchy and war. It offered the excitement of new modes of living—and apprehensions about the unknown. It inspired creativity—and created bureaucracies that could stifle it.

In its intersections with the Cold War, the Media Age, the Technetronic Age, and Mid-century Modernism, the Space Age provided a canvas for many visions, a setting for multiple narratives about who "we" were and could be. Loaded with so many meanings, space indeed seemed infinite. And in its undefinability and semiotic expansiveness, space was—and still is—*far out*.

63. Tom Wolfe, *The Right Stuff* (New York, NY: Farrar, Straus, Giroux, 1979), p. 436.

CHAPTER 11

A SECOND NATURE RISING: SPACEFLIGHT IN AN ERA OF REPRESENTATION

Martin Collins

INTRODUCTION

Recently novelist and essayist Barbara Kingsolver began a reflection on the virtues of the local food movement with the following sentence: “In my neighborhood of Southwest Virginia, backyard gardens are as common as satellite dishes.”¹ She casually invokes then subverts the cultural notion—vestigial and romantic—that the garden, backyard or otherwise, stands as the “natural” against which ubiquitous communications and its machines might be defined and measured. She makes clear our contemporary tendency to grant priority to the human made in creating our sense of what the world is.² Even in rural southwest Virginia, it is the garden that is the surprising presence, one that needs to be placed in relation to an alternate ontology represented by the satellite dish. Media and machines, she implies, have become the embodiment of a *new* natural, the tip of a vast, globe-connecting system of technology, of capital, of first world and other world cultural transactions, of a condition of semiotic super-abundance as “in your face” and compelling existentially as beans, corn, and garden dirt. Indeed, the new natural is more so. In this cultural condition, the semiotic realm enabled by globally connected satellite dishes frames the very way in which we think about intimate rituals of local food cultivation and consumption.

Her matter-of-factness in this regard offers incidental proof of a thesis initiated in the humanities in the late 1960s and regnant in sociology, anthropology, geography, and literary theory since the late 1970s: That representation—the signs of things, rather than things themselves—had over-spilled its pre-World War II channels of circulation, spread luxuriantly, and established a new order of experience. To put this in the passive voice, of course, is deceptive. Kingsolver’s satellite dish, as thing, media conduit, and symbol situated in one locale and

1. Barbara Kingsolver, “The Blessings of Dirty Work,” *Washington Post*, September 30, 2007.

2. Of course, to be accurate the “backyard garden” also is human made, a particular construct of what counts as nature, a symbol of a romantic notion of nature that is apart from the human.

standing in relation to other very different locales elsewhere in the world, arrived through a specific process of historical agency. Distilled, this humanities literature makes two deep claims. First, that our regime of representation is ontological, that semiotics perform and act—as discourse and signs, especially as instantiated in commodities and the ever expanding presence of electronic media. They touch nearly all geographic nooks of the globe and order our experience: There is, if you will, a there there. Second, this literature claims that this semiotic-ness coincides with a historic transformation of capitalism in the post-World War II period.³

Thus, it is an argument about historical basics: about the way the world is structured, operates, and feels. It is, too, if semiotics may be taken to perform and act, about fundamental sociological categories: of how individuals constitute themselves and are constituted by ambient cultures, about identity and politics. And it presents a rousing challenge: it places at the center of the historical playing field two conjoined and reinforcing vectors of agency—representation and capitalism—that many historians of the Cold War and spaceflight sort might see as inferior or ancillary to two other organizing concepts, state action and elite politics. The title of this paper comes from this literature—Frederic Jameson, preeminent literary theorist and exponent of historicizing the relations between capital and culture coined the phrase “second nature” to describe this remapping of the human experience in the postwar years.⁴

3. A range of authors have advanced these points, in varying combination and degree of emphasis. Most important are the works of Jean Baudrillard, Francois Lyotard, and Frederic Jameson, referenced in succeeding notes. Also crucial is David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Oxford, UK: Blackwell, 1989), as well as various works by Zygmunt Baumann, e.g., *Culture As Praxis* (London: Sage Publications, 1999). A sampling of additional works includes Arjun Appadurai, *Modernity at Large: Cultural Dimensions of Globalization* (Minneapolis, MN: University of Minnesota Press, 1996); Marc Augé, *Non-Places: Introduction to an Anthropology of Supermodernity* (London: Verso, 1995); Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage Publications, 1992); Pierre Bourdieu, *The Logic of Practice* (Stanford, CA: Stanford University Press, 1990); Judith Butler, Ernesto Laclau, and Slavoj Žižek, *Contingency, Hegemony, Universality: Contemporary Dialogues on the Left* (London: Verso, 2000); Frederick Cooper, *Colonialism in Question: Theory, Knowledge, History* (Berkeley, CA: University of California Press, 2005); Guy Debord, *Society of the Spectacle* (Detroit, MI: Black & Red, 1983); Michael Denning, *Culture in the Age of Three Worlds* (London: Verso, 2004); Terry Eagleton, *The Idea of Culture* (Oxford, UK: Blackwell, 2000); Paul N. Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: MIT Press, 1996); Mike Featherstone, *Consumer Culture and Postmodernism* (London: Sage, 1990); Scott Lash, *The End of Organized Capitalism* (Cambridge, UK: Polity, 1987); Edward W. Said, *Culture and Imperialism* (New York, NY: Vintage Books, 1994); Graham Thompson, *The Business of America: The Cultural Production of a Post-War Nation* (London: Pluto Press, 2004); Anna Lowenhaupt Tsing, *Friction: An Ethnography of Global Connection* (Princeton, NJ: Princeton University Press, 2005); and Reinhold Wagnleitner and Elaine Tyler May, eds., *Here, There, and Everywhere: The Foreign Politics of American Popular Culture* (Hanover, NH: University Press of New England, 2000).

4. Jameson is the focal point for the literature (loosely grouped under the rubric of critical theory) making this claim. See variously: Fredric Jameson, *Postmodernism, Or, the Cultural Logic of Late*

The subtitle raises a question: What are the implications of this literature and its associated historical claims for our understanding of the development of spaceflight, its cultural meanings, and its integration into the broader field of history? Even so, why should this question merit our curiosity? Because the changes mapped and claimed by this swath of literature are coeval *and* intimately bound to the development of spaceflight in its many dimensions—as significant genre of postwar technology; as site of knowledge creation; as state activity, business undertaking, military venture, and global utility; as a cultural zone for contesting the era's values and beliefs; and as national and international trope extraordinaire.

First, an admission: What I am offering is an analytic sketch—of period history, of a diverse group of theoretical literatures and positions—and proceeds primarily by feeding off of theory rather than empirical data. Despite such simplifications, I think one can argue for an alternative perspective on the field's historiography and research problematic. Let me first historically situate the question of representation in slightly more detail, and then offer a couple of thumbnail case studies to suggest the historical stakes when we juxtapose capitalism, semiotics, and spaceflight.⁵

THE CHALLENGE OF REPRESENTATION

Based on the theoretical literature already cited, almost all a product of the 1970s and after, one might offer a periodization of the postwar years that traces the trajectory of representation and its cultural importance. In the 1950s and 1960s, the image and semiotics take on a stronger, more pervasive cultural function, with emphasis on their phenomenological everywhere-ness and density—especially in the media-rich West—resulting in an incipient problem on a transnational scale. Think of McLuhan's global village and his Western-centered geopolitical perspective reflected in his 1964 thought

Capitalism (Durham, NC: Duke University Press, 1991); *The Geopolitical Aesthetic: Cinema and Space in the World System* (Bloomington, IN: Indiana University Press, 1992); *The Cultural Turn: Selected Writings on the Postmodern, 1983-1998* (London: Verso, 1998); *A Singular Modernity: Essay on the Ontology of the Present* (London: Verso, 2002); and Jameson and Masao Miyoshi, eds., *The Cultures of Globalization* (Durham, NC: Duke University Press, 1998). For a discussion of Jameson's importance to this discussion and his centrality to the related issue of postmodernity as a descriptor of the postwar condition see Perry Anderson, *The Origins of Postmodernity* (London: Verso, 1998); as regards the argument for a "second nature," see especially p. 53.

5. This essay is a companion to two earlier explorations by the author on space history and its historiography, see: Martin Collins, "Community and Explanation in Space History (?)," in *Critical Issues in the History of Spaceflight*, edited by Steven J. Dick and Roger Launius (Washington, DC: NASA, 2006); and "Production and Culture Together: Or, Space History and the Problem of Periodization in the Postwar Era," in *Societal Impact of Spaceflight*, by Steven J. Dick and Roger Launius (Washington, DC: NASA, 2007).

that “in the electric age, we wear all mankind as our skin.”⁶ By the 1970s, changes in capitalism and technology intensified these developments and made representation a (perhaps *the*) central problem of the human condition—an analytic perspective one might trace through seminal authors Jean Baudrillard, Francois Lyotard, and Jameson.⁷

Let’s venture into this postwar circumstance, though, by considering a scholar firmly in the center of the historical profession, Daniel Boorstin.⁸ In 1961, Boorstin published *The Image, or What Happened to the American Dream*, a book-length disquisition on the ascendance of the image and its consequences for the American experience. After presenting the reader with a broad inventory of the image’s ubiquity and modes of use in contemporary life, he offered a first-pass assessment:

In nineteenth-century America the most extreme modernism held that man was made by his environment. In twentieth-century America, without abandoning the belief that we are made by our environment, we also believe our environment be made almost wholly by us. This is the appealing contradiction at the heart of our passion for pseudo events: for made news, synthetic heroes, prefabricated tourist attractions, homogenized forms of art and literature (there are no “originals,” but only the shadows we make of other shadows). We believe we can fill our experience with new-fangled content. Everything we see and hear and do persuades us that this power is ours.⁹

6. Marshall McLuhan, *Understanding Media; the Extensions of Man* (New York, NY: McGraw-Hill, 1964), p. 56.

7. On Jameson’s work, see prior note. On Baudrillard, see Jean Baudrillard, *Selected Writings* (Stanford, CA: Stanford University Press, 2001). The introduction by Mark Poster provides useful insight on the arc of Baudrillard’s thinking. He began publishing on these issues in 1968 and continued through his death in 2007. Lyotard’s writings have been equally seminal; see, as his best known example, Jean François Lyotard, *The Postmodern Condition: A Report on Knowledge* (Minneapolis, MN: University of Minnesota Press, 1984).

8. On Boorstin and the U.S. historical profession in the first decades after World War II, see Peter Novick, *That Noble Dream: The “Objectivity Question” and the American Historical Profession* (Cambridge, UK: Cambridge University Press, 1988).

9. Daniel J Boorstin, *The Image: A Guide to Pseudo-events in America* (New York, NY: Atheneum, 1971), pp. 182–183. It must be noted that Boorstin changed the subtitle of the book within the first years after publication. Originally published in Great Britain as *The Image, or, What Happened to the American Dream* (London: Weidenfeld and Nicolson, 1961), the book was reissued with the revised title *The Image: A Guide to Pseudo-Events in America*, Harper Colophon Books (New York, NY: Harper & Row, 1964). The change is indicative of the tensions in Boorstin’s thought on how to integrate the problem of the image into his notions of political economy. Also, note that Boorstin’s analysis was roughly contemporaneous with Marshall McLuhan’s first articulations of the notions of the global village and the medium as message in the late 1950s and early 1960s.

The cultural condition that Boorstin described as different-than-modern quickly became identified with a name—postmodernity—that grew in usage and application in the years to follow. In writing this passage he carefully sidestepped a narrative common in American history, the people versus the interests. This decades-old motif dominated immediate postwar critiques of advertising and consumer culture, and included prominent instances such as Theodor Adorno's "The Culture Industry" and defined the early work of McLuhan.¹⁰ Yet Boorstin made clear that the condition he found so unsettling was a consensual creation: of the masses and elites, of consumers and producers, a field of experience that all inhabited and in which all participated, a basic reorganization of the perceptual and social order.

The stakes were high. The image or pseudo-event gave a new cast to a problem as old as philosophy: How do we know what we know? The social practices Boorstin detailed through rich example had a powerful consequence: they undermined the idea of the real as an independent referent for human thought and action *and* as a fundamental motivation for human engagement with the world.¹¹ The former had a long contested history in epistemology; in the context of post-Enlightenment thought, the latter seemed a newly emerged view and the heart of Boorstin's concern: it was not merely the coexistence of the real and pseudo, it was our avid preference for the pseudo. The image was a challenge in collective ethics. He did not belabor these implications in his main text, tucking his strongest concern in a concluding bibliographic note. Here he neatly combined the ethical and ontological implications: "The trivia of our daily experience are evidence of the most important question in our lives: namely, what we believe to be real."¹² The rise of the image was not just a lament but a foundational shock.

Why did Boorstin put the most concise, potent statement of his thesis in the back-matter of his book? The simplest answer is that he was uncomfortable with two broad issues raised by the real-to-image turn. One concerned politics. For him, the question of the real was not a mere philosophical problem à la

10. Adorno's seminal essay "The Culture Industry" was published in 1947; around the same time, McLuhan began a long run of media and advertising critiques. See: Theodor W. Adorno, *The Culture Industry: Selected Essays on Mass Culture* (New York, NY: Routledge, 2001) and, as one example, Marshall McLuhan, *The Mechanical Bride: Folklore of Industrial Man* (New York, NY: Vanguard Press, 1951).

11. The absence of any foundation (e.g., "reality") or of access to a priori truths became a leitmotif of the postmodern. The nearly contemporaneous work of Thomas Kuhn on the role of non-science in establishing scientific knowledge became an intellectual touchstone of this position. See Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago, IL: University of Chicago Press, 1962). The most relevant discussion of issues of epistemology in relation to the literatures covered here is Bruno Latour, *We Have Never Modern* (Cambridge, MA: Harvard University Press, 1993).

12. Boorstin, *The Image*, p. 265.

Plato's allegory of the cave (an allusion he invokes with his "shadows of other shadows"). It was a genuine problem of the everyday, a particular historical condition of American life. If the real and unreal, the actual and simulations, coursed through the polity without distinction and with equal status, then how could citizens be rational actors, sorters, and evaluators of the world around them and serve as the bedrock of political life? But Boorstin's use of the word "trivia" signaled the problem was not about politics in isolation but in its American-style bred-in-the-bone connection with market capitalism. Image-ness posed a conundrum for the culture in full. His American "dream" assumed individual rational actors as an essential foundation, yet the robust pursuit of this ideal over the 20th century created a condition—the turn to the pseudo-event—that threatened the possibility of making and nurturing such actors, and thus the dream itself. The ethics of the image mirrored the ethics of the system of which it was a part. Still, Boorstin could not bring himself to a vigorous analysis of a main engine of this change—market capitalism—and made the emergence of image-ness seem only a causeless development or a collective shift in taste.¹³

This set of issues led to a second—the intellectual basis of history and the organization of knowledge in the academy. Boorstin held to a view of history compatible with his notion of the ideal citizen—an instrumental view in which nations, institutions, and individuals acting as purposive, rational agents provided the best means for describing and accounting for historical change. But the image and its semiotic kin, Boorstin concluded, stood as a new form of agency, structural and diffuse rather than localized, a tide of the trivial and the serious that only loosely and imperfectly fit with an instrumental view of the world. Among his reflections in the book's back matter, Boorstin confided it had been his personal, in-the-moment experience with everywhere-ness that stimulated this insight. He sketched a day-in-the-life, from waking to sleep, in which he found the semiotic ever-present—billboards, radio and television programs, newspapers, magazines, movies, advertisements, commodities in stores, sales pitches, street conversation and the "desires I sense all around me"—and entering into the very constitution of the world. He saw the limitations of his intellectual framework *and* the disciplinary organization of the academy, which, he averred, when confronted with new phenomena "continues to pour almost exclusively into old molds." His epiphany-stimulated study, he concluded, "might offer a rough map of some too little known territories in the

13. This concern received fuller expression just over a decade later in Daniel Bell, *The Cultural Contradictions of Capitalism*, 20th anniversary ed./with a new afterword by the author (New York, NY: Basic Books, 1996) [originally published 1976]. Boorstin's notion of rationality should be situated in the postwar environment; see S. M. Amadae, *Rationalizing Capitalist Democracy: The Cold War Origins of Rational Choice Liberalism* (Chicago, IL: University of Chicago Press, 2003).

new American wilderness. It might suggest how little we still know, and how slowly we are learning of the inward cataclysms of our age.”¹⁴

Yet Boorstin’s reflections on the “inward cataclysms of our age” were not original, and perhaps provided an unwitting commentary on the limitations of the consensus school of history then dominant in the academy. The “too little known territories” long had been part of Marxist critique (centered on Marx’s notion of the fetish of the commodity). Boorstin’s emphasis on the everyday phenomenology of the semiotic was a decades-later echo of German critical theorist Walter Benjamin’s Arcades Project, begun in the 1920s, which examined the effects of early 20th century urban commercial-media environments on the Western experience.¹⁵ Benjamin argued that this new condition, distinguished by a kinetic and overlapping environment of signs, reoriented vision and perception, diminishing the ability of individuals to separate out and contemplate the constituents of experience—whether, to use Boorstin’s terminology, such constituents were real or pseudo events or objects.¹⁶ Benjamin’s analytic made clearer the intellectual task of analyzing underlying cultural structures as embodied in and expressed through day-to-day immersion in things and images associated with industrialization, new forms of consumption, and modernity.¹⁷ Benjamin and later critical theorists argued that these fields of experience, new and fundamental, shaped the behavior of individuals and groups in ways that were bound yet distinct from the purposive ideologies and actions connected to elite politics or the institutions of capitalism.

Boorstin’s hybrid fascination-worry about an image-culture was a descriptive statement overlaid with misgivings—not a theory. The Marxist tradition, which Benjamin exemplified, advanced in the 1960s new ways of looking at this post-World War II phenomenon—by linking it to (not surprisingly) a transformation in the basis of capitalism. Daniel Bell’s 1973 *The Coming of Post-Industrial Society: A Venture in Social Forecasting* helped make the case that, as Cold War modes of

14. *Ibid.*, p. 264.

15. On the history of the semiotic and the importance of Benjamin, see two valuable works by Jonathan Crary: Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, Mass: MIT Press, 1990) and Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture* (Cambridge, MA: MIT Press, 1999).

16. See Crary, *Techniques of the Observer*, pp. 19–20.

17. This analytic line became an academic growth industry in the 1960s, leading to new fields of study such as material culture. As a partial measure of these developments, see Pierre Bourdieu, *The Logic of Practice* (Stanford, CA: Stanford University Press, 1990); Daniel Miller, ed., *Materiality* (Durham, NC: Duke University Press, 2005); and Mark Poster, *Information Please: Culture and Politics in the Age of Digital Machines* (Durham, NC: Duke University Press, 2006), especially chapter 10. For the post-World War II period, a particularly useful treatment of the theoretical issues is Patricia Ticineto Clough, *Autoaffection: Unconscious Thought in the Age of Teletechnology* (Minneapolis, MN: University of Minnesota Press, 2000).

knowledge production moved from the state to the market and became more closely connected to the world of commodities, representation and practices of representation became a more integral part of capitalism.¹⁸ By the early 1980s, a range of authors came to see this complex of changes as the seedbed of globalism (conceived as the relative enhancement of the power of markets in relation to states across the transnational landscape) and postmodernism (conceived as a new cultural condition associated with this mode of production).¹⁹ With this turn, Boorstin's argument was reframed: Yes, images and semiotics broadly conceived existed as a quasi-ontological fixture of life, but they operated in and through the power-relations of this emerging thing called globalization.²⁰

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18. To be clear: Bell did not advance this argument himself; others, such as the authors cited here, did. The best delineation of the shift from "organized" to "disorganized" capitalism (and in the Marxian tradition correlating this change to distinctive cultural orders) is Scott Lash, *The End of Organized Capitalism*; also see Nick Heffernan, *Capital, Class and Technology in Contemporary American Culture: Projecting Post-Fordism* (London; Sterling, VA: Pluto Press, 2000). For a dense, contemporaneous account, less attuned to the enhanced status of knowledge seen by Galbraith and Bell, see Ernest Mandel, *Late Capitalism* (London: NLB, 1975) [First published as *Der Spätkapitalismus*, Suhrkamp Verlag, 1972]. For an overview of changes from the 1960s in corporate structure and strategy as firms moved from primarily national to broadly transnational modes of operation, see Naomi R. Lamoreaux, Daniel M. G. Raff, and Peter Temin, "Beyond Markets and Hierarchies: Towards a New Synthesis of American Business History," *American Historical Review*, 108 (April 2003): 404–433. On the rise of private market ideology and accompanying policy reorientation in this period see Daniel Yergin and Joseph Stanislaw, *The Commanding Heights: The Battle Between Government and the Marketplace That Is Remaking the Modern World* (New York, NY: Simon & Schuster: 1998). On changes in modes of production from the perspective of history of science and technology, see Paul Forman, "The Primacy of Science in Modernity, of Technology in Postmodernity, and of Ideology in the History of Technology," *History and Technology* 23 (2007): 1–152; and Philip Mirowski, *The Effortless Economy of Science?* (Durham, NC: Duke University Press, 2004).
19. See, as a range of examples: Arjun Appadurai, ed., *Globalization* (Durham, NC: Duke University Press, 2001); Francis Fukuyama, *The End of History and the Last Man* (New York, NY: Perennial, 2002); Anthony Giddens, *The Consequences of Modernity* (Stanford, CA: Stanford University Press, 1990); Harvey, *The Condition of Postmodernity*; Jameson, *Postmodernism*; Jonathan Xavier Inda and Renato Rosaldo, eds., *The Anthropology of Globalization: A Reader* (Malden, MA: Blackwell Publishers, 2002); and Frank Webster, *Theories of the Information Society* (London: Routledge, 2002). Several case studies in space history engage these changes. See Martin Collins, "One World One Telephone: Iridium, One Look at the Making of a Global Age," *History and Technology* 21(2005): 301–324; Lisa Parks, *Cultures in Orbit: Satellites and the Televisual* (Durham, NC: Duke University Press, 2005); and Peter Redfield, "The Half Life of Empire in Outer Space," *Social Studies of Science* 32 (2002): 791–825. More broadly, in the historical profession these changes have given new life to the transnational (in contrast to the long-standing preference for the "national") as a key unit of analysis. See Thomas Bender, ed., *Rethinking American History in a Global Age* (Berkeley, CA: University of California Press, 2002).
20. In this analytic sketch one needs to be careful not to assume a unitary global capitalism. For deeper discussion of this point see *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, eds. Peter A. Hall and David W. Soskice (Oxford, UK: Oxford University Press, 2001), and *Varieties of Capitalism, Varieties of Approaches*, ed. David Coates (New York, NY: Palgrave Macmillan, 2005).

Spaceflight mapped onto this tangle of production and culture in particular and seemingly contradictory ways. Earth-serving satellites (communications, meteorological, remote sensing, science—civilian, commercial, military) served as a prominent institutional and material element of this regime of production and consumption, exemplifying in the postwar period the robust capabilities of state-market collaborations. These arrangements enlarged and amplified the very condition of image-ness examined by Boorstin. Benjamin's work focused on the early 20th century urban experience; Boorstin's on the U.S.; and subsequent critical theory (using, say, Baudrillard's 1968 *The System of Objects* as a starting point) began to see semiotic immersion as a transnational condition.²¹ As such, spaceflight, mostly in tacit and un-remarked ways, became bound to the politics of globalization and the myriad points of contestation that gave new weight to terms such as local and identity. However, in U.S. culture in particular, spaceflight also operated as an explicit, widely circulating symbol bearing important, transcendent connotations. As exploration, as frontier, as a place apart from the corruptions of Earth, spaceflight suggested the possibility of individuals and humanity collectively achieving Enlightenment ideals of universal values fulfilled, either via travel beyond Earth or drawing space experience and knowledge back into worldly experience.

As a window onto this set of issues, consider any of the late 1960s or early 1970s Earth-as-seen-from-space images, such as Apollo 8's Earthrise or selected covers from the Stewart Brand-created Whole Earth catalog. Such images invigorated a romantic discourse in which humanity via spaceflight perspectives and machines might find harmonious balance with nature. This discourse served as a powerful counter narrative to a century-plus series of writings in European and American critical thought about the machine in the garden—a critique that reached a crescendo in 1950s and 1960s in the work of authors such as Hannah Arendt, Herbert Marcuse, and Lewis Mumford.²²

But such space-based Earth images, too, in other contexts, could be consistent with notions of the machine run rampant, of bureaucratic or corporate control on a planetary scale—a level of technological hubris that Lewis Mumford railed against in his nearly contemporaneous *The Myth of the Machine*. And such iconography helped make concrete a uniquely important practical Cold War ambition: that the totality of Earth could and should serve as a stage of action. This ambition, made possible by numerous, discrete civilian

21. Jean Baudrillard, *Le Système Des Objets* (Paris: Gallimard, 1968).

22. See, for example, Hannah Arendt, *The Human Condition*, 2nd ed. (Chicago, IL: University of Chicago Press, 1998) [originally published 1958]; Herbert Marcuse, *One-dimensional Man: Studies in the Ideology of Advanced Industrial Society* (Boston, MA: Beacon Press, 1964); and Lewis Mumford, *The Myth of the Machine*, 1st ed. (New York, NY: Harcourt, Brace & World, 1967) and *The Pentagon of Power* (New York, NY: Harcourt Brace Jovanovich, 1974) [Volume 2 of *Myth of the Machine*].

and military accomplishments over the 1960s, followed the main lines of force in the Cold War assemblage of politics, knowledge, and institutions. Total war, in its U.S. Cold War incarnation, assumed the notion of complete action across the globe, even if it had not yet been realized. With the shift to market-driven economic policies in the 1980s, multinational corporations stood ready if the military (as a source of scientific and technical tools and as a guarantor of security) and international regulatory regimes made planetary-scale markets possible. While one might squirm at a hackneyed invoking of classic explanatory “go-to” guys, the story of the last 30 years—the drama of globalization—is intimately bound to the elaboration and working out of national, military, and business interests in making the planet an honest-to-God, no-messing-around stage of action. And a new tighter integration between military and business was a significant part of that undertaking.²³ As a matter of historical framing, the emphasis is properly U.S.-centric—for it is U.S. actors who are most motivated and most able to effect this planetary ambition, to pursue, as a growing body of literature argues, a distinctly U.S. form of empire, hegemony, dominance—choose your word.²⁴

But let us return to those Apollo-era Earth-from-space images and their connotations of universal ideals and an abstract, collective humanity. In a recent study, historian Frederic Turner argues that Whole Earth creator Stewart

23. This was an unstated thesis of Bell's, *The Post-Industrial Society*; it was the institutional basis for observations on the emergence of scientific and technical knowledge communities as a distinct and important sociological formation. A number of works in 1950s and 1960s pointed to the close collaboration between the military and business; the most sustained argument regarding this collaboration as an economic system is John Kenneth Galbraith, *The New Industrial State* (Boston, MA: Houghton Mifflin, 1967).

24. The argument for U.S. centrism as a valid historiographic angle is present in several literatures—and, of course, not without contestation. It is a prominent thread in the critical theory literature, reflecting Jameson's influence. On this, see Anderson, *Origins of Postmodernity*, chapter 3. From the perspective of “empire,” see Charles S Maier, *Among Empires: American Ascendancy and Its Predecessors* (Cambridge, MA: Harvard University Press, 2006). In the globalization literature, the assumption is rife, but with attention to the countervailing or resistive effects of the local. A sample of this literature is in note 3. As an indicator, consider how Reinhold Wagnleitner and Elaine Tyler May, eds., *Here, There, and Everywhere*, frame their study of the global reach of U.S. popular culture: “It could easily be argued that the products, icons, and myths of American popular culture represent the single most unifying and centripetal cultural force for the global triumph of the American century. On the other hand, in many areas of the world, American cultural products are potentially among the most disruptive and centrifugal cultural forces of the twentieth century.” (p. 1) Either way it is the “American” that is at the center of their analytic. To apply this argument to the 1970s and 1980s seems more problematic given the antagonistic positioning of the U.S. and U.S.S.R. But several authors point to relevant similarities between the two as inheritors of a modernist ideology that linked politics, technology, and notions of global control. See, for example, David C. Engerman, et al., ed., *Staging Growth: Modernization, Development, and the Global Cold War* (Amherst, MA: University of Massachusetts Press, 2003); and Odd Arne Westad, *The Global Cold War: Third World Interventions and the Making of Our Times* (Cambridge, UK: Cambridge University Press, 2005).

Brand saw post-industrial capitalism, rooted in Cold War knowledge and technological practices, as the means to transport counterculture values into the large society and to invigorate Enlightenment beliefs in the individual as the measure of all things—one instance of how the global construct emerging in the 1970s provided a home for seemingly contrary belief systems, for the megamachine, *and* for its fundamental transformation.²⁵ The distinctive feature of the U.S. style of empire was to perform that very conflation—to conjoin the Enlightenment heritage of abstract universals with an actual, rubber-meets-the-road total global everywhere-ness of state and market actors. Courtesy of space-based capabilities, idealism and practice now confronted each other literally everywhere. This twist on old colonial and imperial modalities gave rise to different and nuanced intersections of the local and global—as suggested by Kingsolver’s view from southwestern Virginia—whether as sites of contrast and difference, of acceptance or rejection, or of absorption and transformation—whether of music, film, television, hamburgers, or IMAX space adventures.

IN THE ERA OF REPRESENTATION, TWO EXAMPLES: GPS AND IRIDIUM

Let’s shake this mix of semiotics, capitalism, spaceflight, the global and the local, and consider a couple of examples. In public discourse on globalization, capitalism—restless, U.S. and European-centric, with Asia on the rise—has drawn the most attention. But the U.S. military, as already inferred, has played an essential part, creating seemingly strange linkages between national security and a rampant transnational consumer culture. Consider the example of the Global Positioning System (GPS), a network of satellites designed and operated by the U.S. Air Force (USAF). Conceived in the early 1970s and only becoming fully operational in 1995, GPS’s history straddled the Cold War and its market-oriented aftermath. The system provided a soldier, ship, airplane, or missile with information on their exact position anyplace on the planet via signals encoded with highly accurate time data, its profound effects symbolized by its use in guiding “smart” bombs and missiles with deadly, precise accuracy in the post-September 11 conflicts in Afghanistan and Iraq.²⁶ In recent years, satellite photographic images of these “smart” actions have been a staple of television news and are widely available on the Internet.²⁷

25. Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago, IL: University of Chicago Press, 2006).

26. A useful account of GPS to 1995 is Scott Pace, et al., *The Global Positioning System: Assessing National Policies*, MR-614-OSTP (Santa Monica, CA: RAND Corporation, 1995).

27. As one example, see this “before and after” account of a strike in Afghanistan from the Aerospace Corporation: <http://www.aero.org/publications/crosslink/summer2002/05.html> (accessed on February 10, 2008).

In the 1990s, though, GPS became not just a tool for the U.S. military, but for anyone, anywhere in the world—for a hiker in the Rocky Mountains, for mom and dad driving the family car, as well as for past and present adversaries such as a Chinese soldier or a terrorist. In its posture toward users, the system became egalitarian in the extreme. Not surprisingly, in the go-go market-driven post-Cold War world, business and consumer use of GPS vastly outstripped that of the military. Imagine a use for location, tracking, or accurate time information and one found GPS there, often in the intimate contours of daily life—say, tracking a spouse suspected of having an affair. Indeed, one can “google” a phrase such as “cheater tracker” and find GPS products marketed for that purpose. Combined with a geographic information system (such as satellite-based Google maps), one can track and visualize the itinerary of an errant mate.²⁸ Such uses are not just confined to the U.S.: as the *New York Times* observed, “the world has incorporated our GPS into its daily life as rapidly as Americans took up the ATM banking network.”²⁹ Nothing, perhaps, speaks more to the distinctive conjunction between production and semiotics in the global era, to the total, actual, not merely metaphorical, planetary scale of this conjunction, than GPS, its radio signals equally available to friends and foes, to weapons in flight, and to off-the-shelf products offering to meet every consumer need.

The GPS story is not the same as that by-gosh, by-golly story of the origins of the Internet—of “isn’t it strange that a research project into maintaining command and control during a nuclear holocaust gave us this wildly diverse, unpredictable, electronic social universe.” It is different and more revealing of the transformation in the world order since the early 1970s. It still is, in essence, controlled by the U.S. military, and in a way unprecedented in U.S. history unites a classic function of empire—controlling and maintaining its perimeters—with the churning demands of capital and consumer appetites. And not just those based in United States, but everywhere. GPS has become a military-consumerist hybrid, in which each political-cultural domain has continually redefined the other. We—a transnational we—know the precision bomb blast from Afghanistan or Iraq and the “cheater tracker” originate in and depend on the same system of production, yet in our everyday cultural frame of semiotics, we allow them to maintain their separateness. It is tensions such as these that continually redefine the global and the local, geographically and in time, and keep the United States—and its preeminence and exploitation of spaceflight—in the center of this dialectic.

Consider another example, drawn from my current research that tracks Boorstin’s concern about semiotics and the structuring of our sense of the real. Like GPS, Iridium was and is a satellite constellation that completely embraces

28. A fun example may be seen here: <http://www.brickhousesecurity.com/catch-a-cheater.html> (accessed on February 10, 2008).

29. James Hitt, “Battlefield: Space,” *New York Times Sunday Magazine*, (August 5, 2001): 63.

the planet—but with a different purpose, to provide telephony and data services, and with a different institutional actor in the lead, a multinational corporation. Conceived in 1987 at Motorola, a Fortune 500 company and a leading firm in cellular phone equipment and systems business and in semiconductors, the Iridium satellite project seemed to epitomize the historical moment: as the Cold War waned and collapsed, markets rather than government would lead into a techno-democratic future, and corporations rather than nations would articulate the pathways through which the local and the global took shape. The largest privately-financed technology project ever undertaken, and with an array of international investors, including the newly constituted Russian Federation and the People's Republic of China, Iridium stood as symbol of this fusion of technology, corporations, markets, and international politics. In 1998, as the system neared completion, *Wired* magazine proclaimed, "It's a bird, it's a phone, it's the world's first pan-national corporation able to leap geo-political barriers in a single bound."³⁰

Part of my challenge in untangling this story has been to understand the varied ways in which semiotics functioned in a multinational corporation (MNC). You might expect that a MNC, deep-pocketed, well-connected politically, at home and internationally, with tens of factory and sales sites around the world would be an instrumental historical actor extraordinaire, a big "them" guy able to exert power in ways unavailable to all the little "us" guys. And, of course, that crude truth is there. But so is another one, one in which Motorola regarded the semiotic realm as real, a reality that required substantive corporate responses that intermingled culture, politics, and identity. As a literally planetary project, incorporating flesh-and-blood actors from around the world, Iridium dramatically highlighted the problem of semiotics—local, global, multiple, contesting, and not readily controlled—and the need for solutions.

The Motorola's response to this condition can be glimpsed in a 1998 book entitled *Uncompromising Integrity: Motorola's Global Challenge*.³¹ The concept of culture stood as organizing precept. The narrative provided definitions of culture and related concepts that showed it as a structure, but varied in place and time, and as a process—national culture, subculture, host culture, enculturation, and transcultural. Two key additional notions situated the discussion in the corporate context: "Motorola culture" and "home culture." The first made clear that the organization had a semiotic sphere, derived from its own history and as a U.S.-

30. Keith Bradsher, "Science Fiction Nears Reality: Pocket Phone for Global Calls," *New York Times*, (June 26, 1990): pp. A1 and D7; David S. Bennahum, "The United Nations of Iridium," *Wired* 6.10 (October 1998): pp. 134-138, 194-201.

31. R. S. Moorthy and Robert Galvin, *Uncompromising Integrity: Motorola's Global Challenge* (Schaumburg IL: Motorola University Press, 1998). As a measure of the importance Motorola attached to this issue, note that Robert Galvin was the son of Motorola founder Paul Galvin and CEO of the company at the time Iridium was initiated.

centered capitalist institution. The second that that sphere was permeable and in flux because employees hailed from many localities around the world and because, as a multinational, the corporation always was operating in someone else's backyard. Culture was something around which a company had to define itself (Motorola culture). Yet, in the global age, "home" was complex and mobile, reflective of the world's many diasporas—of people, individually and en masse, following the flow lines of capital. Home inhered in individuals even as they moved (with Motorola employees themselves an example) and in those places from which they came. Motorola and home cultures were oppositional and profoundly interpenetrating.³²

Uncompromising Integrity's preoccupation with culture—perceived as variegated and everywhere, in specific geographical places, in institutions (including Motorola), in individuals, and pulsing through the many channels of the media—had a corporate history. It encapsulated more than 15 years of high-level managerial attention to the global. It led executives in the late 1980s to create a hybrid academic-corporate institution—Motorola University—to engage and comprehend the fauna and flora of culture-world. This book was a product of that—a Motorola University Press publication! Lest this example seem quirky and isolated, note that it exemplified a larger trend: Over a decade, from the mid 1980s to mid 1990s, more than a thousand corporate universities were created in the United States—all of which were a response, in one fashion or another, to the perceived challenge of culture and semiotics to transnational business practice.³³

The biography of the lead author—R. S. Moorthy—makes concrete some of the issues of identity and politics embedded in these developments. Born into an Indian family and raised in poverty in Malay, as a young man he found work in a Motorola facility in that country. His professional life at Motorola became one of reconciling his origins in a place with a specific history, one tied to colonialism and the new globalism, with the purposes and outlooks of a multinational firm. He found a way to marry his interests with Motorola's culture preoccupation and he came to play a major role in establishing Motorola University, creating a subunit of that enterprise, the Center for Culture and Technology.

This vignette only is meant to suggest the complicated and non-obvious ways in which social boundaries got created and negotiated and how semiotics constrained and enabled this process at different levels of corporate activity. As one instance, consider this graphic (see figure) outlining the manufacturing flow for the Iridium project, one that required a transnational "virtual factory"—

32. A particularly cogent analysis of culture in its post-1970 global dimensions is Zygmunt Baumann, *Culture As Praxis*, pp. vii-lv.

33. For an overview of this trend from a policy perspective, see Stuart, Cunningham, et al., *The Business of Borderless Education* (Canberra: Commonwealth of Australia, Department of Education, Youth, and Training, 2000).

Virtual Factory

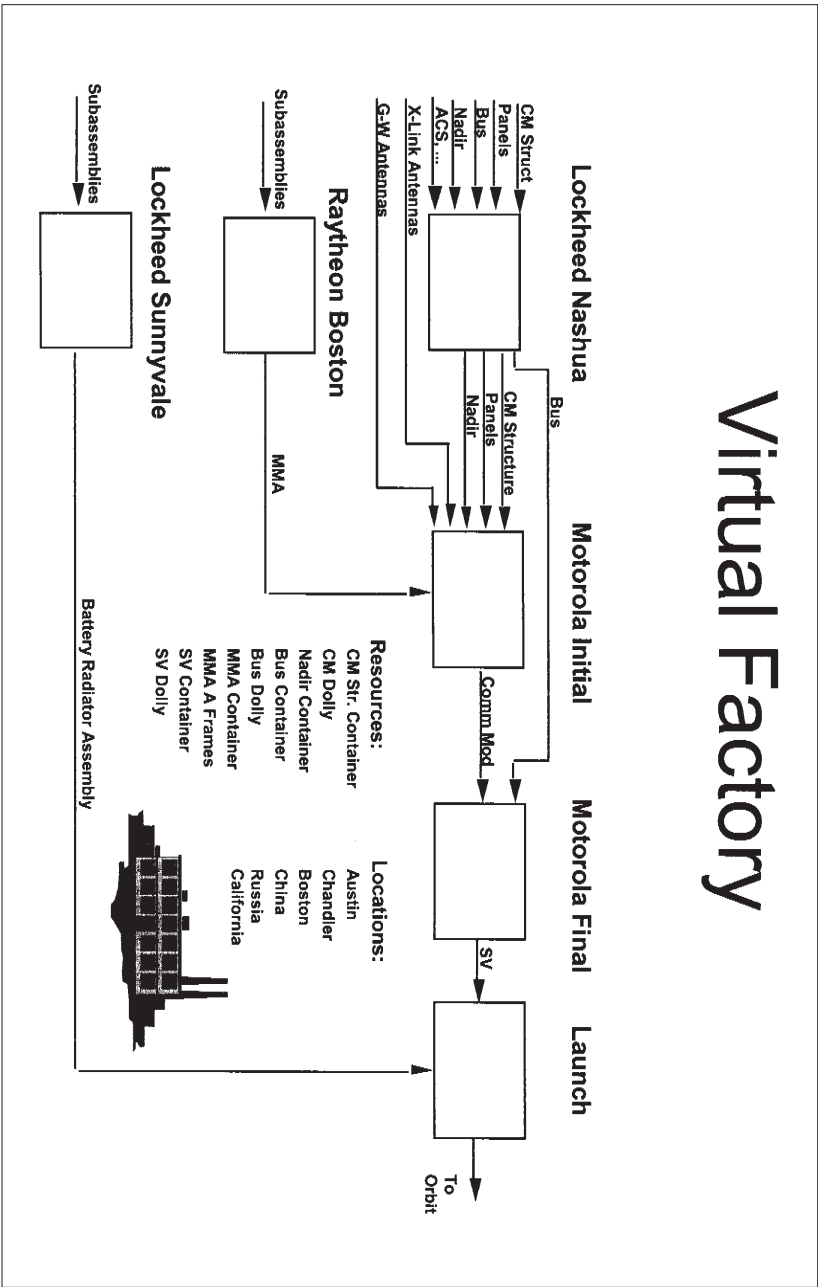


Diagram prepared by Motorola engineers in the mid 1990s that shows how the varied institutional actors and geographic sites involved in the Iridium project were envisioned as an unified construct—a factory (Courtesy of Andrew Feller)

Motorola's own phrase. In the lower right corner, we find included in the virtual factory Baikonaaur, Kazakhstan and Taiyuan, China. That Kazakhstan and China could be integral, functioning elements of a U.S.-based business project made sense only in the context of this belief in the everywhere-ness of culture and the reality of semiotic structures—whether in dealing with transnational elites or with questions of politics and identity in specific geographic locales. But as the project moved from planning and manufacturing execution to marketing, the instrumental view—think the way I, Iridium, want you to think, buy my phone—comes to the fore and you find a different way of presenting geographical specificity and cultural accommodation, bleached and abstracted back to the aims of the corporation and neo-liberal capitalism, and using Enlightenment universals to facilitate those aims.³⁴

CONCLUSION

Where do these examples leave us? What might we draw from this mix of state action and capitalism, of semiotics and on-the-ground practice, of geographical specificity, local meanings, and the meta-narratives of the West? And where does spaceflight fit into this contested field of action? I would point to two things.

First, my recitation here advances a particularly modest claim: Deep and important issues become visible when we recalibrate our interpretive lens and see spaceflight *in* history, rather than expecting it to be *sui generis*. Spaceflight—especially those near-Earth applications cited here—has been a major element in creating the incarnation of the global we have experienced over the last 40 years. It has provided images and practices that have made the category of the global, natural and insistent, even when different actors give it different meanings. It has been a primary site in which prior categories of the modern—the nation state, the military, civil society, capitalism—have been refashioned and given new meanings. And in helping to elevate the importance of the global—to distribute its effects across regions and places, to recalibrate our sense of distance and time, of identity as a creation of community or the flows of transnational semiotics—it has helped to invigorate the meaning of the local. This has led to an intensified scrutiny of globalism's origins in the West—emanating from its military, economic, political and cultural institutions—and in its ideological underpinnings, the legacy of the Enlightenment, of universal values inhering in universal humans. Spaceflight thus has enabled the dominant vectors of the global and its critique.³⁵

34. Advertising images and language conveyed corporate aims through use of universals. Language, in particular, served this function. Two of the most widely used taglines, at different times, were "One world, one telephone" and "Freedom to communicate."

35. I don't think it is a coincidence that in the post-1970s literatures of critical theory, post-colonialism, and globalization some of the most influential work is coming from scholars in India

Second, this essay grapples with the problem of the image and semiotics identified by Boorstin. Is the question “what is real” as transformative as he suggests? Does it stand as a fundamental change in the relation of citizens to politics? Of what politics means and makes possible when interest-driven actors *and* cultural structures are taken as historical agents? These musings are not mere abstractions; they filter down to the everyday—in what we take to be credible, in what we trust, and in what we question rather than give assent. If they have historical weight, they represent a reorientation of existential and value structures in the postwar period. Is that not a historical problem of the first rank, a deep argument for placing spaceflight in the broadest frames of analysis?

For spaceflight itself, there is a perhaps surprising blowback in this cultural condition. In exposing the contingency of the global, as a product with a geography and history in the West, of universal values as a specific cultural creation not as given absolutes, one can find some empirical oomph behind two of those tenets of the postmodern that some love to hate. One is Lyotard’s claim about the “death of meta-narratives,” principally those Enlightenment universals. What Lyotard meant is not the *disappearance* of such narratives but skepticism as to their truth and general applicability. They still run wild in the semiotic transnational landscape. And with this skepticism, comes the second tenet, the one from which Boorstin recoiled: the end of that abstract Enlightenment individual enacting Enlightenment values.

And the blowback is this: spaceflight as *application* helped make this world. But spaceflight as *exploration*, particularly human exploration, encountered and encounters this condition somewhat differently. Granting human spaceflight’s grounding in Cold War real politik, that experience gained credibility because exploration as a culture trope drew strength from Western meta-narratives and explorers as universal human subjects. If human exploration is only a narrative and not a meta-narrative in competition with other narratives, then space exploration as an exemplification of Enlightenment values fades. The exploration narrative still resonates, but in a much diminished way. And this ties back to Boorstin’s concern that image-ness threatened to change the very nature of politics—from a field of experience built on elite actions, meta-narratives, and Enlightenment rationality to one in which these elements are transformed and conjoined with the ontology of everywhere semiotics. This insight offers an analytic hint: traditional explanatory modes that rely on interest groups and elite power to account for the history of human spaceflight in the last 40 years miss the changed foundations (as presented in critical theory and other literatures) of politics and culture. The Moon journeys, it may be argued, exemplify the modern temperament; the subsequent years of human spaceflight illustrates the intrusion of the postmodern into the modern, a marker

or the Indian diaspora. See as one important example Dipesh Chakrabarty, *Provincializing Europe: Postcolonial Thought and Historical Difference* (Princeton, NJ: Princeton University Press, 2000).

of “second nature,” of the complex ways in which spaceflight and culture have been mutually reconfigured.

At the beginning of the Space Age, applications stood as the stepchild of the more glamorous meta-narrative of human exploration. Over the 1970s and 1980s she came to supplant her parent and helped make a new realm of meaning and experience—her own world, a second nature, a new chapter in the saga of the machine and the garden.

CHAPTER 12

CREATING MEMORIES: MYTH, IDENTITY, AND CULTURE IN THE RUSSIAN SPACE AGE¹

Slava Gerovitch

The Nobel Prize laureate Orhan Pamuk's novel, *The White Castle*, is a subtle reflection on the power of memory. Living in 17th-century Istanbul, two main protagonists, an Italian scholar and a Turkish noble, share their most intimate memories and gradually adopt each other's memories as their own. Their distinct identities begin to blur until they (and the reader) can no longer recognize who is who. Eventually they switch their original identities as the power of memory overwhelms them. The Turk becomes a scholar and leaves for Italy, while the Italian abandons science to enjoy luxurious life at the sultan's court.² Our memories determine who we are, and manipulating these memories affects the very core of our identity.

Key events in the Space Age are especially memorable—this is why it is called “the Space Age” in the first place. The triumphs of Gagarin's first flight and Armstrong's first step, and the tragedies of Apollo 1, Gagarin's death, *Challenger*, and *Columbia* are among recent generations' most vivid and emotional memories. But what do we really remember when we remember the Space Age? In 1986–1988, the cognitive psychologist Ulric Neisser conducted a study of 44 student subjects, who were asked how they first heard the news of the *Challenger* disaster. The first round of questioning took place the next morning after the event, the second round—with the same participants—two and a half years later. It turned out none of the later accounts fully coincided with the original report, and over a third were, as Neisser put it, “wildly inaccurate.” Moreover, even when confronted with their own earlier written reports, the subjects were convinced that the later memory was true. The original memories quite simply disappeared from their minds.³

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1. The author wishes to thank Asif Siddiqi for his insightful comments on an early draft of this article. Research for this article has been supported by Fellowship in Aerospace History from the American Historical Association.
 2. Orhan Pamuk, *The White Castle*, trans. Victoria Holbrook (New York, NY: Braziller, 1991).
 3. Ulric Neisser and Nicole Harsh, “Phantom Flashbulbs: False Recollections of Hearing the News about *Challenger*,” in *Affect and Accuracy in Recall: Studies of “Flashbulb” Memories*, ed. Eugene Winograd and Ulric Neisser (New York, NY: Cambridge University Press, 1992), pp. 9–31.

Recent research in cognitive, social, and clinical psychology and in cognitive neuroscience indicates that our memory is a much more dynamic and malleable process than previously thought. Our memories are not stored in a fixed form; we do not pull them out of a permanent storage and then put them back intact. According to the constructivist approach to memory, every act of recollection is re-creation, reconstruction of a memory.⁴ Every time we “recall” a memory, we relive the event that caused it, we emotionally relate to it, we remake that memory, and we store a new version, totally overwriting the old one. At the moment of recollection, memory becomes unstable, and it can be modified and even “erased,” or a false memory can be planted.⁵ Recalling something is essentially similar to making a new, original memory. In the language of neuroscience, “reconsolidation . . . is qualitatively strikingly similar to consolidation”;⁶ in the psychology parlance, “recollection is a kind of perception, . . . and every context will alter the nature of what is recalled.”⁷ As a result, we do not really remember the original event; we remember only our last recollection of that event. The more we remember and the more often we recall something, the more we rebuild and change that memory and the farther we get from the original event.

According to the school of “narrative psychology,” linking individual memories into a coherent narrative, which supplies meaning to past events, plays an essential role in the formation of one’s self.⁸ As the neurologist Oliver Sacks has put it, “We have, each of us, a life story, an inner narrative—whose continuity, whose sense, *is* our lives. It might be said that each of us constructs and lives a ‘narrative,’ and that this narrative *is* us, our identities.”⁹ When our

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4. The idea of memory as a dynamic and constructive process goes back to Frederic C. Bartlett’s book *Remembering* (Cambridge, UK: Cambridge University Press, 1932). For overviews of recent studies, see Daniel L. Schacter et al., “The Cognitive Neuroscience of Constructive Memory,” *Annual Review of Psychology* 49 (1998): 289–318; Daniel L. Schacter, “Memory Distortion: History and Current Status,” in *Memory Distortion: How Minds, Brains, and Societies Reconstruct the Past*, ed. Daniel L. Schacter (Cambridge, MA: Harvard University Press, 1995), pp. 1–43; and Daniel Schacter, *Searching for Memory: The Brain, the Mind, and the Past* (New York, NY: Basic Books, 1996).
 5. On experiments with “erasing” fear conditioning in rats, see Karim Nader, Glenn E. Schafe, and Joseph E. Le Doux, “Fear memories require protein synthesis in the amygdala for reconsolidation after retrieval,” *Nature* 406 (August 17, 2000): 722–726. On experiments showing the possibility of implanting false memories in humans, see Elizabeth F. Loftus and Katherine Ketcham, *The Myth of Repressed Memory* (New York, NY: St. Martin’s Press, 1994).
 6. Karim Nader, “Memory Traces Unbound,” *Trends in Neurosciences* 26:2 (February 2003): 70.
 7. Israel Rosenfeld, *The Invention of Memory: A New View of the Brain* (New York, NY: Basic Books, 1988), p. 89 (emphasis added).
 8. See Jerome S. Bruner, *Acts of Meaning* (Cambridge, MA: Harvard University Press, 1990), chap. 4, “Autobiography and Self”; and Ulric Neisser and Robyn Fivush, eds., *The Remembering Self: Construction and Accuracy in the Self-Narrative* (Cambridge, UK: Cambridge University Press, 1994).
 9. Oliver Sacks, *The Man Who Mistook His Wife for a Hat and Other Clinical Tales* (New York, NY: Summit Books, 1985), p. 110.

present self constructs and distorts our memories of the past, the very fallibility of these memories serves a purpose—to establish a continuity between our present and past selves. The literary scholar Paul Eakin has argued that memory is “not only literally essential to the constitution of identity, but also crucial in the sense that it is constantly revising and editing the remembered past to square with the needs and requirements of the self we have become in any present.”¹⁰

We are what we remember, and this is equally true for individuals and societies.¹¹ By focusing on the notions of “collective memory” and “social memory,” cultural history draws on the metaphor of society as a remembering subject, which constructs its identity based on collective remembrance and can go through a psychological “trauma” profoundly distorting collective memories.¹² Collective memory—culturally sanctioned and publicly shared representations of the past—shapes social identities and provides narratives through which individuals publicly describe their selves, remember the past, and interpret the present.¹³

10. Paul John Eakin, “Autobiography, Identity, and the Fictions of Memory,” in *Memory, Brain, and Belief*, ed. Daniel L. Schacter and Elaine Scarry (Cambridge, MA: Harvard University Press, 2000), pp. 293–294. On the “false memory syndrome” as an adaptive mechanism, see Daniel L. Schacter, *The Seven Sins of Memory: How the Mind Forgets and Remembers* (New York, NY: Houghton Mifflin, 2001).
11. For recent attempts to bring together specialists from cognitive psychology, psychopathology, psychiatry, neurobiology, social psychology, sociology, and history to discuss the phenomenon of memory from different disciplinary perspectives, see Thomas Butler, ed., *Memory: History, Culture and the Mind* (Oxford, UK: Blackwell, 1989); Schacter, ed., *Memory Distortion*; Schacter and Scarry, eds., *Memory, Brain, and Belief*; and the newly established academic journal *Memory Studies*.
12. For recent general works on collective memory in social and cultural history, see Alon Confino and Peter Fritzsche, eds., *The Work of Memory: New Directions in the Study of German Society and Culture* (Urbana, IL: University of Illinois Press, 2002); Paul Connerton, *How Societies Remember* (Cambridge, UK: Cambridge University Press, 1989); John R. Gillis, ed., *Commemorations: The Politics of National Identity* (Princeton, NJ: Princeton University Press, 1994); Pierre Nora, ed., *Realms of Memory: Rethinking the French Past*, trans. from the French, gen. ed. Lawrence D. Kritzman, 3 vols. (New York, NY: Columbia University Press, 1996–1998); Pierre Nora, ed., *Rethinking France: Les Lieux de mémoire*, trans. from the French, gen. ed. David P. Jordan, 2 vols. (Chicago, IL: University of Chicago Press, 2001–2006); Jeffrey Olick, *The Politics of Regret: On Collective Memory and Historical Responsibility* (New York, NY: Routledge, 2007); Jeffrey Olick, ed., *States of Memory: Continuities, Conflicts, and Transformations in National Retrospection* (Durham, NC: Duke University Press, 2003); and Eviatar Zerubavel, *Time Maps: Collective Memory and the Social Shape of the Past* (Chicago, IL: University of Chicago Press, 2003). Among the recent works that examine “traumatic” events in American historical memory are Edward Tabor Linenthal and Tom Engelhardt, eds., *History Wars: The Enola Gay and Other Battles for the American Past* (New York, NY: Metropolitan Books, 1996); Edward Tabor Linenthal, *The Unfinished Bombing: Oklahoma City in American Memory* (Oxford, UK: Oxford University Press, 2001); and Emily S. Rosenberg, *A Date Which Will Live: Pearl Harbor in American Memory* (Durham, NC: Duke University Press, 2003).
13. More precisely, “collective memory” in this article is understood as both a set of cultural norms that regulates practices of remembrance and a body of texts and other types of symbolic

When the constructivist model of individual memory is applied to cultural history, the implications are profound. Like individual memory, collective memory is continuously recreated, supplanting original memories with later versions. Cultural memory thus becomes self-referential: it feeds on itself and recollects its own recollections. The more a particular society or group remembers an event, the more intensely collective memory is at work, the more we mythologize and the more we forget. Remembering and mythologizing are the same thing. Just like false private memories reinforce the continuity of the individual self, cultural myths shore up national or group identity.

Taking seriously the view that culture is the myths we live by, historians have focused on the cultural functions of collective myths—to structure and pass on historical memory, to create the basis for a dominant “master narrative,” and to shape social identities. In this context, whether the myth is literally true or not is not particularly significant. What is important is the political and cultural force of collective myths—ethnic, religious, ideological—their ability to act, to create a public appeal, to tell a story to identify with and an ideal to imitate. Most recent studies have shifted the focus toward the historical origins—the genealogy—of myths, their deliberate construction by political elites, and their repressive power to marginalize alternative stories and identities.¹⁴

The institutionalization of memory by nation states—the establishment of national archives, the public celebrations of various anniversaries, the dissemination of favorable historical narratives—often serves the political purpose of reinforcing national identity and marginalizes individual memories and other social identities. Private memories become “contaminated by national projects of remembrance,” writes the historian Peter Fritzsche.¹⁵ The French cultural historian Pierre Nora even argues that the old age of memory and tradition gave way to the new age of history and conscious narrative-construction. “Memory is constantly on our lips,” he writes, “because it no longer exists.”¹⁶

Space history has its own recurrent myths. The historian Asif Siddiqi has identified four cultural archetypes, or “tropes,” structuring master narratives of space exploration in different countries: the myth of the founding father,

representations that a particular culture produces based on these norms. The most authoritative texts function as instantiations of the “master narrative,” setting an effective norm for a wider discourse of remembrance. The term “collective” here does not imply uniformity of individual memories or a monolithic character of culture. Different groups within a larger society may have distinct collective memories that reinforce their group identities; narratives produced by these groups may come into conflict with the “master narrative” prevalent in larger culture.

14. Peter Fritzsche, “The Case of Modern Memory,” *The Journal of Modern History* 73 (March 2001): 87–117.

15. *Ibid.*, 107.

16. Pierre Nora, “General Introduction: Between Memory and History,” in *Realms of Memory*, vol. 1, p. 1.

the myth of exclusively domestic space technology, the myth of spaceflight as expression of national identity, and various stereotypical justifications for spaceflight—the destiny of humanity, the glory for the nation, national security, economic development, scientific exploration, and benefits to the ordinary people.¹⁷ Every nation develops its own variations, such as the “myth of presidential leadership”¹⁸ and the “astronaut myth” in the United States. The historian Roger Launius has identified several key elements of the popular image of Apollo astronauts as a “cultural icon”: the astronaut represented “everyman” and yet personified the American ideal, embodying the image of a masculine hero, a young, fun-loving, vigorous warrior, guided by an older, wiser leader, and showing the nation the path of progress toward utopian future.¹⁹

Like the Turk and the Italian in Pamuk’s novel, who change their identities by listening to each other’s stories, the astronauts could hardly remain unaffected by their image in popular culture. A recent documentary, *In the Shadow of the Moon*, is made entirely of interviews with Apollo astronauts illustrated with fragments of archival footage.²⁰ The film is not organized as a collection of separate stories of individual missions; instead, it weaves together bits and pieces of astronauts’ stories to create a meta-story that blurs distinctions among different missions and even among different astronauts. It is as if a composite image of the astronauts is telling a composite story of lunar landings. Another recent documentary, *The Wonder of It All*, uses a similar technique, interleaving commentaries from seven astronauts who walked on the Moon.²¹ As one reviewer has noted, “the editing has been done so skillfully that instead of seven individuals talking, it seems more like one—each of them often continues a sentence that the other started.”²² Individual stories—and individual astronauts’ identities—blend together seamlessly. How did this blending occur? Is this a trick of the filmmakers or a fundamental cultural mechanism at work in real life, squeezing individual identities to conform to the dominant cultural stereotype of an astronaut? What happens to alternative memories? What are the mechanisms by which a culture decides which memories to erase and which to write over them?

17. See Siddiqi’s article in this volume.

18. See Roger D. Launius and Howard E. McCurdy, eds., *Spaceflight and the Myth of Presidential Leadership* (Urbana, IL: University of Illinois Press, 1997).

19. See Roger D. Launius, “Heroes in a Vacuum: The Apollo Astronaut as a Cultural Icon,” 43rd AIAA Aerospace Sciences Meeting and Exhibit, January 10–13, 2005, Reno, Nevada. AIAA Paper No. 2005–702 (available at http://klabs.org/history/roger/launius_2005.pdf).

20. *In the Shadow of the Moon*, directed by David Sington (Discovery Films, 2007).

21. *The Wonder of It All*, directed by Jeffrey Roth (Jeffrey Roth Productions, 2007).

22. Ronald A. Wells, “Review: *The Wonder of It All*,” *The Space Review*, (accessed November 12, 2007). (available at <http://www.thespacereview.com/article/996/1>).

THE SPACE AGE IN AMERICAN CULTURE

The cultural historian Emily Rosenberg has set up an appropriate system of coordinates to analyze the role of the Space Age in American culture: a four-dimensional space of politics, the media, philosophy, and the arts. The Sputnik shock and the perceived “missile gap” boosted Cold War anxieties, and these anxieties, in turn, gave a spur to the space race. The media were enrolled in the ideological “battle of appearances,” turning astronauts into international celebrities and making space-craft launches and television broadcasts from space into spectacular public events. The idea of technocracy gained support, and technological elites gained economic and political power, while “counterculture” chose the Spaceship Earth image to promote environmental consciousness and a new global identity, which transcended the political boundaries of a nation state. In architecture, product design, and abstract expressionist painting, new space-inspired shapes and color palettes captured the spirit of a “new frontier” of space in the aesthetic of self-confident progress, futuristic automation, and individual adventure.²³

The dynamics of the relationship between spaceflight and the media, outlined by Rosenberg, stresses the active, instrumental role of culture in shaping the Space Age. NASA skillfully used the media to create and disseminate a favorable public image of the U.S. space program, and at the same time space technologies engendered a technological revolution in visual media, making electronic communications truly real time and global. Emerged what Rosenberg has called a “synergy” between the Space Age and the Media Age: spaceflight acquired its spectacular character while the media thrived on new popular subjects of interest and on the advanced technologies. Wider culture did not simply reflect developments in the space program; it became a vehicle for specific agendas within the space program.

Rosenberg’s analysis highlights tensions and contradictory trends in different aspects of the Space Age culture. The Space Age both threatened the sense of national pride and was enrolled to boost it. It gave birth to mammoth technological projects and raised concerns about uncontrollable government spending. It created a cult of technology and awoke suspicions about the attempts to find technological solutions to political problems. It trumpeted rationality and gave rise to various forms of spirituality. It was wrapped in the rhetoric of global unity and peaceful cooperation, and it led to the militarization of the heavens. It unleashed fantasy in the arts and regularized engineering creativity with systems engineering management techniques. It gave rise to both exciting and frightening visions of the future.

What are the cultural mechanisms that select specific iconic images, prominent figures, and big ideas that end up occupying a central place in the public

23. See Rosenberg’s article in this volume.

memory of the Space Age? Recent literature begins to tackle the question of how, of all the variety of different visions of the Space Age, only a few survive as the dominant symbols of the era, while others are marginalized and forgotten.²⁴ As Roger Launius has argued, the American “master narrative” of spaceflight incorporates the mythology of “limitless frontier,” the popular image of the “heroic explorer,” and futurist visions to tell the story of American triumph in the space race, exceptionalism, and success. Three counter narratives have also emerged: the left-wing criticism of spending funds on space instead of social programs, the right-wing criticism of the space program as an excessive government expense, and various conspiracy theories of secretive space militarization schemes, alien abductions, and alike.²⁵ The competition among the master narrative and the three counter narratives might provide a template for analyzing the clash of diverse cultural representations of the Space Age outlined by Rosenberg. Each narrative plays out in public discourse through literature, imagery, film, and other media. The competition among Space Age symbols serves as a proxy for the battle of the narratives.

A number of seminal works have explored the relationship between NASA and popular culture. The political scientist Howard McCurdy has examined the links between popular conceptions of space exploration and national space policy, focusing on NASA’s deliberate exploitation of the frontier myth and the utopian visions of social progress through technological means, and its encouragement of the Cold War fears of Soviet domination. As the space program after Apollo changed its character, it no longer matched the popular expectations inherited from the previous era. The gradual disillusionment with the NASA space program since the 1970s could be traced to a widening gap between popular sentiment and the reality of spaceflight.²⁶ The cultural theorists Marina Benjamin, Constance Penley, and others have studied how popular culture responded to the Space Age by reinterpreting NASA’s symbolic imagery and generating competing discourses.²⁷ Broader culture turns space images, artifacts, names, events into

24. See, for example, Roger D. Launius, “Perceptions of Apollo: Myth, Nostalgia, Memory, or All of the Above?” *Space Policy* 21 (May 2005): 129–139; William D. Atwill, *Fire and Power: The American Space Program as Postmodern Narrative* (Athens, GA: University of Georgia Press, 1994); Andrew Smith, *Moondust: In Search of the Men Who Fell to Earth* (New York, NY: Fourth Estate, 2005). For a historiographic review of the cultural history of the Space Age, see Asif A. Siddiqi, “American Space History: Legacies, Questions, and Opportunities for Future Research,” in *Critical Issues in the History of Spaceflight*, eds. Steven J. Dick and Roger D. Launius (Washington, DC: NASA SP-4702, 2006), esp. pp. 472–477.

25. See Launius’s article in this volume.

26. Howard E. McCurdy, *Space and the American Imagination* (Washington, DC: Smithsonian Institution Press, 1997).

27. See Marina Benjamin, *Rocket Dreams: How the Space Age Shaped Our Vision of a World Beyond* (New York, NY: Free Press, 2003), Constance Penley, *NASA/Trek: Popular Science and Sex in America* (New York, NY: Verso, 1997), and Debra Benita Shaw, “Bodies Out of this World: The Space Suit as Cultural Icon,” *Science as Culture* 13 (March 2004): 123–144.

“floating signifiers”—symbols without fixed meaning—that are reinterpreted again and again as they pass through different contexts. No single group or agency—even a government agency—can fully control them.

From a cultural anthropologist’s perspective, the interaction between NASA and broader culture could be recast as a dialogue of different cultures: NASA’s own culture(s) and the diverse subcultures of space fans, activists, educators, and artists. A study of this interaction might finally bring together two disparate research areas—the analyses of the Space Age in popular culture and the studies of NASA’s own institutional culture(s).²⁸ The anthropological models of cultural contact, conflict, translation, mediation, and the “trading zone” may prove useful here.²⁹

Combining the notion of historical memory with the model of cultural exchange leads to an investigation of the dynamics of memory in different cultures. Within larger American culture, every distinct group—space engineers, astronauts, and space fans, for example—nurtures its own memories, its own folklore, and its own historical visions of the Space Age. What happens when different groups interact and exchange their memories? What new mythologies and hybrid identities emerge?

Although different groups and different nations may have different memories of the Space Age, the cultural mechanisms by which these memories are exchanged and altered over time prove remarkably similar. If we look beyond American culture and examine the convolutions of the historical memory of the Space Age in Russian and Soviet culture, we will find a similar struggle between a master narrative and an array of counter-stories, even though the dynamics of this struggle will follow a specific Russian political and cultural trajectory.³⁰

28. On NASA culture(s), see Alexander Brown, “Accidents, Engineering, and History at NASA, 1967–2003,” in *Critical Issues in the History of Spaceflight*, pp. 377–402; Yasushi Sato, “Local Engineering and Systems Engineering: Cultural Conflict at NASA’s Marshall Space Flight Center, 1960–1966,” *Technology and Culture* 46:3 (July 2005): 561–583; Diane Vaughan, *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA* (Chicago: University of Chicago Press, 1996); Vaughan, “Changing NASA: The Challenges of Organizational System Failures,” in *Critical Issues in the History of Spaceflight*, pp. 349–376.

29. See Peter Galison, “Trading Zone: Coordinating Action and Belief,” in *The Science Studies Reader*, ed. Mario Biagioli (New York, NY: Routledge, 1999), pp. 137–160.

30. On memorialization practices in Soviet and post-Soviet contexts, see Svetlana Boym, *The Future of Nostalgia* (New York, NY: Basic Books, 2001); Frederick C. Corney, “Rethinking a Great Event: The October Revolution as Memory Project,” *Social Science History* 22:4 (Winter 1998): 389–414; Geoffrey A. Hosking, “Memory in a Totalitarian Society: The Case of the Soviet Union,” in *Memory*, ed. Butler, pp. 97–114; and James V. Wertsch, *Voices of Collective Remembering* (Cambridge, UK: Cambridge University Press, 2002).

RUSSIAN SPACE MEMORIALIZATION

Memories of the Space Age occupy a prominent place in contemporary Russian culture. This year alone, the Russians have celebrated the centennial of the legendary Chief Designer Sergei Korolev, the 150th anniversary of the space visionary Konstantin Tsiolkovskii, the 120th anniversary of the Soviet rocketry pioneer Fridrikh Tsander, the 50th anniversary of the R-7 intercontinental ballistic missile designed by Korolev, and, finally, the 50th anniversary of Sputnik and of Laika's flight on Sputnik II. One anniversary, however, was barely noticed: the ill-fated Soyuz 1 mission, which ended 40 years ago in a crash and the tragic death of the Soviet cosmonaut Vladimir Komarov. That year, 1967, was a significant turning point in Soviet cultural attitudes toward spaceflight: from admiration and pride to grief, cynicism, and, ultimately, indifference. Yet this memory is overwritten by a different, pride-boosting version of history.

The cultural trope of the founding father, as Asif Siddiqi has pointed out, still dominates the Russian cultural perceptions of the Space Age. In January–February 2007, a large conference was held in Moscow to commemorate Korolev's centennial. The conference had 1,650 participants; over 1,000 papers were submitted, and 420 were selected for oral presentation at the conference in 20 sections running in parallel over four days.³¹ Although not all the papers were historical (many were devoted to current issues in astronautics), several sections were devoted to history. Such Korolev conferences are organized every year; this year's was the 31st. Also, every April, Gagarin conferences are held at his birthplace, the town of Gagarin (this year, it was the 33rd conference), and every September the town of Kaluga organizes Tsiolkovskii conferences (this year's was the 42nd). The general mood at such conferences is celebratory: veteran cosmonauts wear their ceremonial uniform, dancers in ethnic Russian costumes provide a suitable patriotic background, and Korolev's (or Gagarin's, or Tsiolkovskii's) portrait dominates the stage. During the Korolev conference, a new monument to Korolev was dedicated at the conference site, the Bauman State Engineering University in Moscow. Giant portraits and dominating, larger-than-life monuments serve as symbolic beacons for historical discourse. These conferences provide a suitable setting for hero-worshipping, rather than critical analysis. A chosen set of historical figures—Korolev, Tsiolkovskii, and Gagarin—serve as sources of light rather than objects of study at which light should be directed.

31. Analytical report on the XXXI Academic Conference on Cosmonautics, dedicated to the 100th anniversary of academician Sergei Korolev. Moscow, Russia, January 30–February 1, 2007 (available at <http://www.ihst.ru/~akm/ao31.htm>). See also Asif Siddiqi, "From Russia with History," *NASA History Division News and Notes* 24:2 (May 2007): 1–2, 4–5 (available at <http://history.nasa.gov/nltr24-2.pdf>).

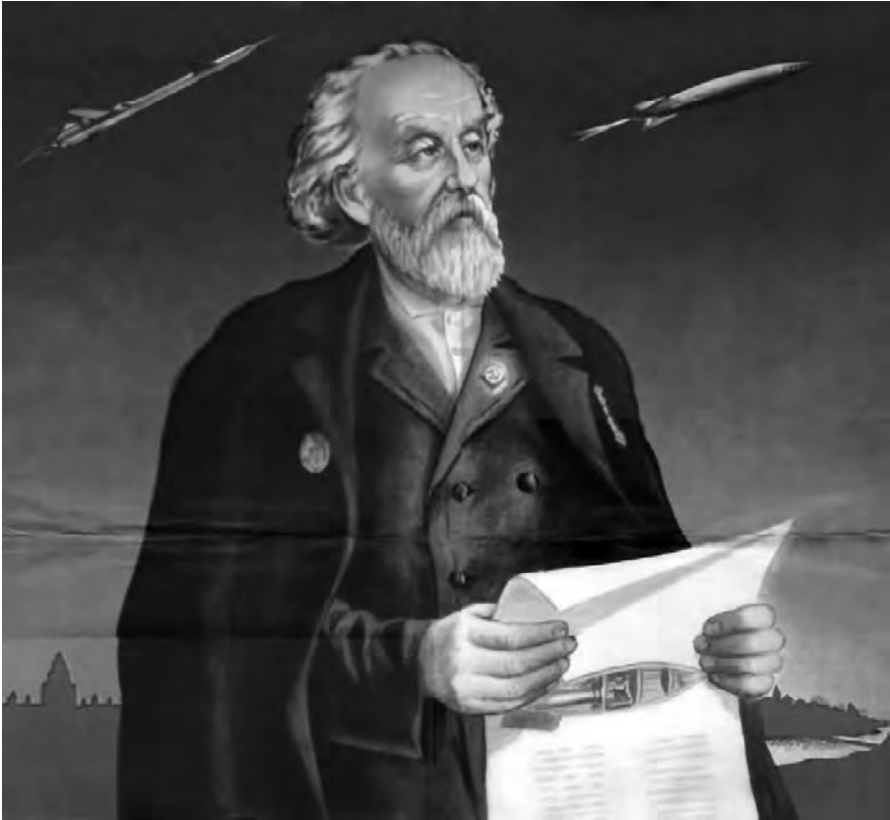
This weaving of space history around a handful of key personalities was characteristic of Soviet space history from its early days. If Korolev has traditionally been portrayed as the “founding father” of Soviet cosmonautics, Tsiolkovskii might be christened its “founding grandfather.” A deaf schoolteacher in the provincial town of Kaluga, Tsiolkovskii was a self-taught theorist and visionary of space travel. In the 1910s–30s, his writings widely circulated in the growing Russian community of space travel enthusiasts. In the 1930s, the Stalin propaganda machine made him into a national hero, a “poster grandpa” for national technological superiority. This ascribed identity was quite different from his own cultivated image of a humble provincial inventor, science popularizer, and public educator who built rocket models in his home workshop.³²

In the postwar period, Soviet rocket engineers and the space enthusiasts’ community put the government-constructed myth to their own use. In the late 1940s, the name of late Tsiolkovskii was regularly evoked amidst a Party-sponsored nationalist campaign asserting the priority of Russian-born scientists and engineers. Journalists claimed that Tsiolkovskii had invented the airplane and the dirigible.³³ On September 17, 1947, on the 90th anniversary of Tsiolkovskii’s birth, Sergei Korolev gave a speech at the commemoration meeting at the Central Hall of the Soviet Army. As Asif Siddiqi has noted, “significantly, Korolev drew attention to Tsiolkovskii’s ideas about space travel rather than rocketry or airships, thus beginning the process of relocating Tsiolkovskii within space research rather than aeronautics.”³⁴ Suddenly, Korolev and other rocket engineers interested in space exploration began to recall their prewar meetings with Tsiolkovskii and to present their space projects as “inspired” by Tsiolkovskii. Pilgrimages to Tsiolkovskii’s home in Kaluga to meet with the great man came to be seen retrospectively as a “rite of passage” for any major figure among the rocket engineers. A symbolic link with Tsiolkovskii, canonized by the Soviet state, played an important role in legitimizing their proposals in the eyes of government officials. In 1952–1953, in autobiographical materials, accompanying his applications for membership in the Communist Party and in the Academy of Sciences, Korolev wrote about his personal meeting with the late visionary as a starting point for his interest in rocketry. Even though he had met Tsiolkovskii only once in 1932, during

32. See James T. Andrews, “K. E. Tsiolkovskii, Ascribed Identity, and the Politics of Constructing Soviet Space Mythology, 1917–1957,” paper presented at the 2006 annual conference of the American Association for the Advancement of Slavic Studies in Washington, DC; Andrews, “In Search of a Red Cosmos: Space Exploration, Public Culture, and Soviet Society,” *Societal Impact of Spaceflight*, eds. Stephen Dick and Roger Launius (NASA, forthcoming); and Andrews, *Visions of Space Flight: K. E. Tsiolkovskii, Russian Popular Culture, and the Birth of Soviet Cosmonautics, 1857–1957* (Texas A&M University Press, forthcoming).

33. “My – nasledniki Tsiolkovskogo,” *Komsomol’skaia pravda* (September 17, 1947).

34. Asif A. Siddiqi, “The Rockets’ Red Glare: Spaceflight and the Russian Imagination, 1857–1957,” Ph.D. dissertation, Carnegie Mellon University, 2004, p. 293.



Soviet poster commemorating the centennial of Tsiolkovskii's birth, 1957. (Courtesy of the Russian Academy of Sciences Archives)

Tsiolkovskii's visit to Moscow, the story later became embellished to the point of Korolev's vivid recollection of a visit to Tsiolkovskii's house in Kaluga—a visit that evidently never happened.³⁵ Privately, Korolev admitted that he barely remembered Tsiolkovskii and that the main source of his recollections was his own “fantasy.”³⁶ Yet the official canonization of Tsiolkovskii and the resurrection of his legacy played a crucial role in legitimizing the idea of space exploration in the postwar Soviet Union. By turning a government-sponsored myth into a personal memory, Korolev managed to present his space projects

35. See Iaroslav Golovanov, “Korolev i Tsiolkovskii,” unpublished manuscript; RGANTD, f. 211, op. 4, d. 150 (available at http://rgantd.ru/vzal/korolev/pics/006_008.pdf); Georgii Vetrov, *S.P. Korolev i kosmonavtika: Pervye shagi* (Moscow: Nauka, 1994), chaps. 20, 21.

36. Iaroslav Golovanov, *Korolev: Fakty i mify* (Moscow: Nauka, 1994), p. 110.

as a matter of national prestige and eventually to secure permission to launch Sputnik shortly after the centennial of Tsiolkovskii's birth.³⁷

THE MYTH OF THE COSMONAUT

As the Soviet government kept the identity of the true leaders of the space program secret (Sergei Korolev remained an anonymous "chief designer" until his death in 1966), a handful of flown cosmonauts literally had to stand on top of Lenin's mausoleum next to Nikita Khrushchev for the entire space program. State-sponsored memorialization of Soviet space achievements turned such staged events as mausoleum appearances into iconic images of the space era widely disseminated through television, newspapers, posters, and postcards.

The space historian Cathleen Lewis has examined the Soviet "myth of the cosmonaut," which in some aspects mirrors the astronaut myth even though the two were supposed to stand for two ideologically opposite political regimes and systems of values. During the Soviet era, ghost writers produced numerous cosmonauts' biographies that followed a familiar pattern of heroic narrative: humble beginnings, childhood burdened by wartime hardship, encouragement by the family and teachers, good education paid for by the Soviet state, a wise mentor who teaches the core communist values, loyal military service, building up character and physical strength through a "trial of fire," achieving the lifetime dream by carrying out an important mission trusted to the cosmonaut by the Communist Party, and finally coming back with an important message reaffirming the communist values.³⁸ As the cultural historian Svetlana Boym has noted, "Soviet space exploration inherited the rhetoric of war; it was about the 'storming of space,' and the cosmonaut was the peacetime hero who was ready to dedicate himself to the motherland and, if necessary, sacrifice his life for her sake."³⁹

The cosmonaut myth played a major role in Khrushchev's attempts to de-Stalinize Soviet society—to break with the Stalinist past and to reconnect with the original revolutionary aspirations for a communist utopia.⁴⁰ In 1961, soon after Gagarin's flight, Khrushchev ordered to remove Stalin's remains

37. Siddiqi, "The Rockets' Red Glare." See also Asif A. Siddiqi, *The Red Rockets' Glare: Soviet Imaginations and the Birth of Sputnik* (Cambridge University Press, forthcoming).

38. Cathleen Lewis, Curator of Russian spacecraft at the Smithsonian National Air and Space Museum, has been working on a book on the social and cultural history of "hero-cosmonauts" in the Soviet Union. She has presented various aspects of her research at numerous scholarly conferences.

39. Svetlana Boym, "Kosmos: Remembrances of the Future," in *Kosmos: A Portrait of the Russian Space Age*, photographs by A. Bartos, text by S. Boym (Princeton, NJ: Princeton Architectural Press, 2001), p. 91.

40. On the Khrushchev period, see Polly Jones, ed., *The Dilemmas of De-Stalinization: Negotiating Cultural and Social Change in the Khrushchev Era* (London and New York: Routledge, 2006), and William Taubman, *Khrushchev: The Man and His Era* (New York, NY: W.W. Norton, 2003).

from Lenin's mausoleum in Red Square and to change the name of the city of Stalingrad, the site of a major battle that turned the tide of World War II and a potent symbol of the Soviet victory over Nazism. As monuments of the Stalin era were being dismantled, new memorials to the Space Age were erected, supplanting the collective memory of Stalinist terror and devastating war with futurist visions of space conquests.

The cosmonaut myth was mostly about the future, not the past. In 1961, on the heels of Gagarin's triumph, Khrushchev proclaimed a new Communist Party Program to build a communist society in the Soviet Union within the lifetime of the current generation. The creation of the New Soviet Man—an honest, sincere, modest, morally pure person and a conscientious worker—was an essential part of the program, and the cosmonauts were hailed as a living embodiment of this human ideal. Cosmonauts themselves often felt uncomfortable playing a public role that had little to do with their own professional identity.⁴¹

In the Brezhnev period, as conservative ideologues attempted to whitewash the image of Stalin as a political and military leader, memories of World War II again took up a prominent place in public discourse. The conquest of space became symbolically associated with the Soviet victory over Nazi Germany. A typical Brezhnev-era biography pictured Gagarin in his capsule, preparing for his flight and listening to music, which evoked memories of his childhood: life under Nazi occupation, war privations, and the joy of liberation by Soviet soldiers.⁴² This ideological appropriation of private memories quite creatively reinterpreted Gagarin's actual experiences. As a boy, Gagarin indeed survived the occupation, but he reportedly had to hide this fact while applying to a flight school; this "dark spot" in his biography could have prevented his admission.⁴³ He later wondered how the authorities still allowed him to become a cosmonaut after learning about the fact.⁴⁴ And the music he listened to during the preparations for his flight could hardly evoke elevated patriotic feelings: he actually listened to *Lilies of the Valley*, a popular love song whose lyrics cosmonauts parodied, turning it into a drinking song.⁴⁵

41. See Slava Gerovitch, "'New Soviet Man' Inside Machine: Human Engineering, Spacecraft Design, and the Construction of Communism," *OSIRIS* 22 (2007): 135-157.

42. *Yuri Gagarin: The First Cosmonaut* (Moscow: Novosti Press Agency Publishing House, 1977).

43. Interview with Marina Popovich, *Iakutsk vechernii* (March 18, 2005) (available at <http://epizodsspace.testpilot.ru/bibl/intervy/popovich-m1.html>).

44. Interview with Pavel Popovich, *Fakty* (Kiev) (July 18, 2003) (available at <http://epizodsspace.testpilot.ru/bibl/intervy/popovich.html>).

45. Interview with Pavel Popovich, *Meditsinskaia gazeta* (April 13, 2007) (available at <http://www.mgzt.ru/article/310>). For a transcript of Gagarin's onboard communications, see "Zvezdnyi reis Iuriia Gagarina," *Izvestiia TsK KPSS*, no. 5 (1991): 101-129.



Gagarin monument in Moscow, dedicated in 1980. (Courtesy of Wikipedia)

Like any irrational construction that was to be believed rather than critically examined, the myth of the cosmonaut was full of internal contradictions. The cosmonauts were portrayed as both ordinary people and exceptional heroes. All the first cosmonauts had military ranks but their missions were presented as entirely peaceful. Their flights were praised as daring feats, while official reports of perfectly functioning onboard automatics did not seem to leave much room for human action.⁴⁶

In July 1980, shortly before the opening of the Moscow Olympics, a monument to Gagarin was dedicated in Moscow. Gagarin's giant statue soars 40 meters above the crowd on top of a colossal pillar, evoking the image of a rocket plume. The cosmonaut and his rocket are symbolically fused, presenting Gagarin as a superhuman blend of man and machine. The insurmountable distance between the statue and the viewer emphasizes the mythological proportions of Gagarin's figure, which rises in its futuristic perfection far above today's all-too-human world.

CONSTRUCTING THE MASTER NARRATIVE

Just like the cosmonaut myth in many respects resembled the astronaut myth, the Soviet master narrative of space exploration mirrored essential features of the American story of national exceptionalism, technological progress, and continuous success. Pervasive secrecy and centralized control over the media further streamlined public discourse about space. Bound by secrecy on one side and by propaganda demands on the other, Soviet-era space history was reduced to a set of clichés: flawless cosmonauts flew perfect missions, supported by unfailing technology. All contingencies, failures, and alternative paths were thoroughly purged from history books. Entire programs, such as the manned lunar program, were passed over in silence. The space industry itself, namely its leading think tank, the Scientific Research Institute No. 88 (since 1966, the Central Scientific Research Institute of Machine Building), was charged with the task of clearing all space-related materials for publication in the open press.⁴⁷ While Soviet propaganda cultivated an idealized image of the Soviet space program for ideological purposes, space industry officials had their own reasons for deemphasizing failures and contingencies before decision-makers in the high echelons of Soviet power.

The cosmonauts resented the restrictions on information about their flights, having to repeat the same platitudes if not outright lies over and over again. In his private diary, Lieutenant General Nikolai Kamanin, the Deputy

46. See Slava Gerovitch, "Human-Machine Issues in the Soviet Space Program," in *Critical Issues in the History of Spaceflight*, pp. 107–140.

47. See Yurii A. Mozzhorin, *Tak eto bylo: Memuary Iu.A. Mozzhorina. Mozzhorin v vospominaniakh sovremennikov* (Moscow: Mezhdunarodnaia programma obrazovaniia, 2000), p. 298.



The Chief Designer Sergei Korolev reenacting his actions during Yuri Gagarin's flight on April 12, 1961. (Photo from the author's collection)

Chief of the Air Force's General Staff in charge of cosmonaut selection and training, complained about the official ban on reports about equipment failures and cosmonaut errors: "Because of these restrictions, we are actually robbing ourselves by creating an impression of 'extraordinary ease' and almost complete safety of prolonged space flights. In fact, such flights are very difficult and dangerous for the cosmonauts, not only physically, but also psychologically."⁴⁸ "The most interesting things in our cosmonautics are classified," he lamented.⁴⁹ These sentiments, however, did not translate into an active opposition to the master narrative. When asked to serve as a consultant for Andrei Tarkovsky's feature movie based on Stanislaw Lem's novel *Solaris*, in which space travel turned into an exploration of the human soul, Kamanin blatantly refused.

48. Nikolai Kamanin, *Skrytyi kosmos*, vol. 4, 1969-1978 (Moscow: Novosti kosmonavtiki, 2001), p. 182 (diary entry of June 6, 1970).

49. Nikolai Kamanin, *Skrytyi kosmos*, vol. 1, 1960-1963 (Moscow: Infortekst, 1995), p. 176 (diary entry of October 31, 1962).

Such science fiction “degrades human dignity and denigrates the prospects of humanity,” he wrote in the same diary.⁵⁰

An “inner censor” reinforced the master narrative more efficiently than any outside censoring agency. Early Soviet discourse constantly oscillated between “what is” and “what ought to be”—the quality literary scholar Katerina Clark has labeled a “modal schizophrenia.”⁵¹ The blurring of this boundary and the desire to replace “what is” with “what ought to be” was characteristic of the later space-related discourse as well. Sergei Korolev was acutely aware of the historical significance of his space projects, but his vision of history reflected a desire to improve on reality to meet an ideal. “What is” was just a messy, error-prone draft, while the history’s hall of fame deserved a clean, showcase version of “what ought to be.” Korolev did not admit any journalists to the launch site on the day of Yuri Gagarin’s pioneering flight, April 12, 1961.⁵² Later, however, he sat down for a photo session, pretending to communicate with the cosmonaut in orbit. As Korolev’s identity was still a state secret, the photo was not, of course, publicly released at the time. This fake was made for internal consumption—for those who knew about Korolev and his role in the space program—and for future generations as a “clean” version of historical events.

For Korolev, space artifacts were first and foremost symbols, not merely technological objects. Before the launch of Sputnik, two copies of the satellite were made: one for the flight and one for ground tests and simulations. Korolev ordered the satellite surface to be polished in order to maximize reflection of solar light to avoid possible overheating. He was outraged, however, when he learned that his subordinates neglected to polish the test copy: “It will be displayed in museums!” He stressed the aesthetic appeal of the ball-shaped Sputnik, arguing that, as a symbol of human entry into space, it must look “properly.”⁵³

Korolev’s notion of looking “properly” apparently did not include looking authentic. Soon after Gagarin’s flight, Korolev suggested to display a make-up of Gagarin’s space capsule at an aviation show at the Tushino airfield in Moscow. Since Gagarin’s Vostok spacecraft was still classified, Korolev let his subordinates “unleash their fantasy.”⁵⁴ The result looked impressive but had nothing to do with the actual spacecraft.⁵⁵

50. Kamanin, *Skrytyi kosmos*, vol. 4, p. 152 (diary entry of April 18, 1970).

51. Katerina Clark, *The Soviet Novel: History as Ritual*, 3rd ed. (Chicago, IL: The University of Chicago Press, 2000) pp. 36–38.

52. Iaroslav Golovanov, *Zametki vashogo sovremennika*, vol. 1, 1953–1970 (Moscow: Dobroe slovo, 2001), p. 399 (diary entries of January–March 1970).

53. Memoirs by Mark Gallai, in *Akademik S.P. Korolev: uchenyi, inzhener, chelovek. Tvorcheskii portret po vospominaniiam sovremennikov*, ed. Aleksandr Ishlinskii (Moscow: Nauka, 1986), p. 63.

54. Memoirs by Stal’ Denisov, in *ibid.*, p. 218.

55. Anton Pervushin, “Glavnaia taina ‘Vostoka,’” *Sekretnye materialy XX veka*, no. 8 (April 2004) (available at <http://epizodsspace.testpilot.ru/bibl/pervushin/vostok.html>).

Soviet media skillfully “enhanced” iconic images to stress their ideological message and to eliminate any undesired connotations. For example, the May 1961 issue of the Soviet illustrated magazine *Science and Life* featured a drawing of Gagarin’s launch on its cover. The drawing faithfully depicted the actual scene of Gagarin’s bidding farewell to a group of administrators, officers, engineers, and technicians, with one exception: all the military personnel at the launch pad were magically transformed into civilians, their military uniforms replaced with colorful cloaks. Recent research has uncovered many instances of retouching or cropping cosmonaut photos to erase “undesirable” individuals (who died in an accident or left the cosmonaut corps) from group shots—a venerable Soviet tradition going back to the Stalin-era iconographic erasure of high-placed “enemies of the people.”⁵⁶

To create a “clean” version of space history, both visuals and audio records were edited. On August 8, 1962, at a meeting of the State Commission that confirmed crew selections for the Vostok 3 and Vostok 4 flight, Deputy Chief of the Air Force Marshal Sergei Rudenko mistakenly pronounced the cosmonaut Pavel Popovich’s last name as Popov. “This gross error created discomfort for everybody present,” wrote Kamanin in his diary. “Too bad, but we’ll have to cut ‘Popov’ out of Marshal’s speech.”⁵⁷ Again, the editing was made not for an immediate public release (the State Commission meeting, attended by Korolev and other “secret” designers, went on behind closed doors), but for a “clean” historical record.

Artifacts and records deposited in museums and state archives were carefully selected to reinforce the master narrative. For example, when a document outlining the instructions for a cosmonaut who accidentally landed on foreign soil came up for declassification, this sparked a internal debate. The instructions explained in detail that the cosmonaut should not disclose any information about the launch site, the booster, the spacecraft, and the leadership of the Soviet space program, and only the last—seventh—item on the list permitted the cosmonaut to ask for contact with a Soviet consul. “How can we give this document to a museum? How will we look like after that?” asked the person responsible for declassification and ordered the document to be destroyed. Valentina Ponomareva, a former cosmonaut candidate and a space

56. See James Oberg, “Cosmonauts and Cosmo-NOTS: Image Falsification in the Soviet Manned Space Program,” Remembering the Space Age: 50th Anniversary Conference, NASA History Division and National Air and Space Museum Division of Space History, October 22–23, 2008, Washington, DC. On the Stalin-era political manipulation of iconography, see David King, *The Commissar Vanishes: The Falsification of Photographs and Art in Stalin’s Russia* (New York, NY: Metropolitan Books, 1997).

57. Kamanin, *Skrytyi kosmos*, vol. 1, p. 137 (diary entry of August 8, 1962).

historian, salvaged the document from destruction, but it still was not made available to the public.⁵⁸

The master narrative was literally written in stone—in massive monuments that placed the cosmonauts, the leading engineers, and Soviet political leaders on a pedestal of historical myth. In a revealing symbolic gesture, space industry leadership actually placed space documents and artifacts in the foundation of one such monument in Moscow. A recently declassified petition from a group of industry leaders to the Soviet political leadership read:

For the memorialization of the outstanding historical achievements of the Soviet people in the conquest of space and for the eternal preservation of documentation and other materials about the flights of Soviet spacecraft, it would be advisable to place in special sealed containers documents, films, and make-ups of Soviet artificial satellites of Earth, of space stations, of space ships, and of the most important research equipment used in flight, and to brick up these containers into the foundation of a monument commemorating the outstanding achievement of the Soviet people in the conquest of space to be erected in Moscow.⁵⁹

An identical set of carefully selected documents and artifacts was put on display at a museum open under the monument. Space history was written once and for all. The master narrative was literally protected from challenge by a stone wall.

SOVIET COUNTER-NARRATIVES

Individual memories that could not fit into the master narrative did not disappear. Beneath the glossy surface of official history, a myriad of private stories circulated informally, and they formed an oral tradition totally separate from written accounts. Historians have traditionally associated such “counter memories in the very shadow of the official history” with groups which are “excluded or overlooked.”⁶⁰ In the Soviet space program, by contrast, the groups that secretly cultivated such “counter memories” were front and center in official history: the space engineers and the cosmonauts. They were privy to information carefully concealed from an average Soviet citizen, and they

58. Valentina Ponomareva, *Zhenskoe litso kosmosa* (Moscow: Gelios, 2002), pp. 118–119.

59. Leonid Smirnov et al. to the Party Central Committee, February 2, 1966; Russian State Archive of the Economy (RGAE), Moscow, f. 4372, op. 81, d. 1944, l. 50.

60. Catherine Merridale, “War, Death, and Remembrance in Soviet Russia,” in *War and Remembrance in the Twentieth Century*, eds. Jay Winter and Emmanuel Sivan (Cambridge, U.K.: Cambridge University Press, 1999), quoted in Fritzsche, “The Case of Modern Memory,” p. 107.

preserved and passed on their memories as part of professional folklore. Telling and listening to the “true stories” of events hashed up or distorted in official accounts became an essential part of their group culture, a part of being a space engineer or a cosmonaut. Counter memory defined their private identity as much as the master narrative shaped their public persona.⁶¹

The engineers and the cosmonauts resented the obvious gap between their private memories and the official story. Forced to toe the official line in public, they let off their frustration in diaries and private conversations. “Why are we telling lies?” Korolev’s deputy Boris Chertok jotted in his notebook, reflecting on multiple launch failures concealed from the public.⁶² “All our reports are half-truths, which is worse than a lie,” Iaroslav Golovanov, a leading space journalist, wrote in his notes.⁶³ While the rest of the world was watching a live report of the Apollo 8 mission, Soviet television broadcasted a children’s movie. Golovanov remarked on that occasion, “Are Central Committee officials so thick that they don’t understand how foolish and shameful this is?”⁶⁴ When his newspaper put off the publication of his article on Apollo 11 indefinitely, he let off steam in his private notebook: “I am tormented with shame. Will they allow such a disgrace again?”⁶⁵

The same people—journalists, cosmonauts, and leading engineers—wrote both official accounts and private counter memories. A discursive split went right through their souls. Lieutenant General Nikolai Kamanin was one of the leading spokespersons for the Soviet space program. He appeared on the radio and television, published popular books and articles, arranged cosmonauts’ public appearances, and wrote and rehearsed their public speeches. In December 1968, he wrote an article for *The Red Star*, the Soviet Armed Forces newspaper, about the forthcoming launch of Apollo 8. He entitled his article “Unjustified Risk” and said all the right things that Soviet propaganda norms prescribed in that case. Naturally, he did not even mention that the Soviet Union had its own secret human lunar program. But in his private diary, he frankly admitted that the Americans were getting ahead in the lunar race and railed against those whom he saw as the true culprits: party leadership, military brass, and top administrators of the space program who neglected or misdirected the program

61. On the tension between the professional identity and the public image of Soviet cosmonauts, see Gerovitch, “‘New Soviet Man’ Inside Machine,” pp. 149–152. On how secrecy shaped the identity of space engineers, see Gerovitch, “Stalin’s Rocket Designers’ Leap into Space: The Technical Intelligentsia Faces the Thaw,” *OSIRIS* 23 (2008): 189–209.

62. Boris Chertok, Notebook #16, September–November 1964; Chertok papers, Smithsonian National Air and Space Museum, Washington, DC.

63. Golovanov, *Zametki vashego sovremennika*, vol. 1, p. 383 (diary entries of September 1969–January 1970).

64. *Ibid.*, p. 343 (diary entries of September–December 1968).

65. *Ibid.*, p. 372 (diary entries of June–September 1969).

for far too long. “We have fallen behind the United States by two or three years,” he wrote in the diary. “We could have been first on the Moon.”⁶⁶

The master narrative dominated Soviet media, but during the relatively liberal “thaw” of the Khrushchev era, newspapers occasionally gave voice to ordinary citizens who did not join in the public expression of enthusiasm for space. For example, in June 1960, a youth newspaper published a letter from one Alexei N., who bluntly asked about the space program, “What’s in it for me?” “I, for example, on the eve of the launch of a rocket, received 300 rubles salary, and this is what I still receive, in spite of the successful launch. Doesn’t it seem to you that the enthusiasm for these sputniks and the cosmos in general is inopportune and, more precisely, premature?” he asked. “Rocket, rocket, rocket—what’s it needed for now? To hell with it now, and with the moon, but give me something better for my table. After that, then it will really be possible to flirt with the moon.”⁶⁷ Most likely, the newspaper published this critical letter not to generate a genuine debate but simply to provoke an indignant reaction from space enthusiasts and thus further shore up the master narrative. An occasional display of dissenting opinion only stressed the need for the further strengthening of the space propaganda effort. Even such carefully controlled expressions of criticism, however, totally disappeared from public discourse during the Brezhnev period.

The first visible cracks in the master narrative came from those inside the space program who wanted to reassign credit among the major protagonists, while preserving the overall structure of the narrative. In 1974, the chief designer of rocket engines Valentin Glushko, Korolev’s longtime opponent, was appointed head of Korolev’s former design bureau. For 15 years, as Glushko ruled this central asset of the Soviet space program, he made a determined effort to rewrite Soviet space history by emphasizing his own contributions and downplaying Korolev’s. He even ordered to remove spacecraft designed by Korolev from the bureau’s internal museum and to replace them with rocket engines of his own design.⁶⁸

The tensions that brewed under the lid of the master narrative over decades eventually came to surface as the policy of glasnost during Gorbachev’s perestroika gave voice to the suppressed counter memories.

66. Nikolai Kamanin, *Skrytyi kosmos*, vol. 3, 1967-1968 (Moscow: Novosti kosmonavtiki, 1999), p. 335 (diary entry of December 12, 1968).

67. Quoted in Paul Josephson, “Rockets, Reactors and Soviet Culture,” in *Science and the Soviet Social Order*, ed. Loren R. Graham (Cambridge, MA: Harvard University Press, 1990), p. 185.

68. Asif A. Siddiqi, “Privatising Memory: The Soviet Space Programme Through Museums and Memoirs,” in *Showcasing Space*, eds. Martin Collins and Douglas Millard (London: Science Museum, 2005), p. 107.

THE END OF THE SOVIET UNION AND THE COLLAPSE OF THE MASTER NARRATIVE

In the late 1980s, public revelations of the full scale of Stalin's crimes led to a swift deterioration of the official historical discourse. Space history was also profoundly affected. Some archival documents came to light, private diaries became available, participants began to speak out, and a totally new picture of the Soviet space program emerged like a giant iceberg suddenly lifted out of the water. As Asif Siddiqi has written, "the single narrative of Soviet space history—teleological and Whiggish—fractured into multiple and parallel narratives full of doubt (for the claimed successes of the program), drama (for the episodes we never knew about) and debate (over contesting narratives of history)."⁶⁹ Veteran engineers, cosmonauts, and politicians began to tell stories of multiple failures during Soviet space missions, fatal errors and true heroism, favoritism in project funding, and hidden pressures to launch by a politically motivated date.

The collapse of the Soviet Union, as the Russian state largely withdrew both its economic support for the space industry and its ideological oversight over historical discourse, became a truly traumatic event for historical memory of the Space Age. This trauma resulted in a systematic transformation of memory of all previous Soviet space history. Soviet-era political leadership, often depicted as inept and short-sighted in the perestroika-period memoirs, suddenly acquired a better image. Stalin, Khrushchev, and Brezhnev were now portrayed as wise leaders, who appreciated the importance of the rocket and space industry and lent it much-needed political and economic support.

The memory of the Space Age became atomized and decentralized, or, in Asif Siddiqi's expression, "privatized" along with Russian industry itself. Trying to attract Western investors and clients, Russian space companies began advertising their history, opened exhibit halls for the public, and put on display rare space artifacts, including many original spacecraft. Owned and operated by space companies themselves, these "corporate" museums produced versions of space history that placed these companies in the best possible light. A competition in today's marketplace naturally led to competing versions of history, each shored up with its own set of artifacts and corporate collections of memoirs. To this day design bureaus and other Russian space institutions often physically hold or control access to most historical documents related to the Soviet space program, and the insiders have complete control over which, when, and in what form documents are released.

The old mode of hero-worshipping history did not change; only now we witness clashes between followers of different space hero cults. Soviet space history itself is full of acrimonious disputes, including the famous fallout

69. *Ibid.*, p. 99.



The unveiling of a monument to the chief designer of rocket engines Valentin Glushko at the Alley of Space Heroes in Moscow, October 4, 2001. (Photo from the author's collection)

between Korolev and the chief rocket engine designer Valentin Glushko, or the equally famous and equally bitter rivalry between Korolev and his main domestic competitor in the space race, the chief designer of cruise missiles Vladimir Chelomei. A loyal team of followers gathers around each of these historical figures, and they construct their own versions of history, trying to invalidate their opponents' accounts. Korolev's defenders accuse Glushko of refusing to build rocket engines for Korolev's lunar rockets, and blame Chelomei for siphoning off a large part of resources of the lunar program, all this resulting in the Soviet loss in the lunar race. But the rivals have their own stories to tell. From their perspective, Korolev is often portrayed as a ruthless competitor and a clever political operator. For example, Khrushchev's son Sergei, who had worked for Chelomei, has suggested that Korolev had "focused his energy on what he did best—the elimination of his rivals."⁷⁰ A group of Russian space industry dignitaries are posing in front of Glushko's

70. Sergei Khrushchev, "How Rockets Learned to Fly: Foreword," in Von Hardesty and Gene Eisman, *Epic Rivalry: The Inside Story of the Soviet and American Space Race* (Washington, DC: National Geographic, 2007), p. xviii.

monument, using the monument as a backdrop for a photo opportunity. At the same time, symbolically, they are standing guard to this monument and to a specific version of history that sanctifies this particular hero.

Monuments are not just silent memorials commemorating the past. Monuments do speak. Valentin Glushko reportedly bequeathed to inter his remains on the surface of the Moon. This bequest is cited nowadays as an inspiration for the Russians to go the Moon.⁷¹ An aura of national pride is projected from the glorious past into the promising future. A heroic image of the past is enrolled to promote a specific policy agenda today. "Memorialization has become an essential function of the *current* Russian space program," Asif Siddiqi has noted. For Russians, "truly, their future (e.g., bases on the Moon) exists in simultaneity with their past (e.g., Sputnik, Gagarin). It has become almost impossible to separate them."⁷²

The dominant medium for reassessing the past and translating this reassessment into lessons for today and tomorrow has been a steady stream of memoirs written by veterans of the Soviet space program: cosmonauts, engineers, physicians, military officers, and administrators. By revealing hitherto unknown historic details and placing space artifacts into context, these memoirs serve as a major vehicle for exploring Soviet space history. Since archival records are largely unavailable to researchers, new revelations come mostly through such memoirs. Nowhere is the "privatization" of memory as evident as in these highly personal, often emotional and partisan, accounts. Memoirists often try to write not merely an account of their own activities within the space program, but the whole history of specific periods or projects as seen from their partial perspective. In other words, they present coherent alternative versions of space history, not simply collections of bits and pieces of their individual experiences. Thus, even though these memoirs purport to articulate "counter-memory"—an alternative to the official story line—in fact they show a craving and a nostalgia for a Soviet-style single master narrative that would elevate their own patron—be it Korolev, Glushko, or Chelomei—above others.⁷³ "Counter-memory" ends up reproducing the same stereotypes of the master narrative, for it still serves a propaganda purpose—if not for the central government, then for a particular group within the space industry.

The changes in the way memoirs were written from the Soviet era to the perestroika to the post-Soviet period reflect an adaptation of individual memory to a specific historical context.⁷⁴ An oft-cited memoir by Oleg Ivanovskii went

71. Aleksandr Zhelezniakov, "V Moskve otkryt pamiatnik akademiku Glushko," *Poslednie kosmicheskie novosti*, no. 206 (October 4, 2001) (available at <http://www.cosmoworld.ru/spaceencyclopedia/hotnews/index.shtml?04.10.01.html>).

72. Siddiqi, "From Russia with History," p. 5.

73. Siddiqi, "Privatising Memory," p. 108.

74. On memoirs of the Soviet era, see *The Russian Memoir: History and Literature*, ed. Beth Holmgren (Evanston, IL: Northwestern University Press, 2003); Irina Paperno, "Personal Accounts of the

through multiple editions from 1970 to 2005.⁷⁵ Ivanovskii was the lead designer on the Vostok mission; he coordinated interaction among multiple participants in the production, testing, and launch of Gagarin's spacecraft. He later headed the space industry department of the Military Industrial Commission, the top government body overseeing the space program. The early editions of his memoirs were published under the pseudonym Ivanov; he wrote about many leading space engineers but could not reveal their names. In the 1980s, he added their real names but still followed the Korolev-centered master narrative. Even in the post-Soviet period, he was not ready to reveal anything about his activity inside the government bureaucracy. In the latest edition, a three-page section on this period of his life is filled entirely with quotations from other people's memoirs.⁷⁶ Without access to many original documents, the world of personal memory becomes self-referential. Ivanovskii did openly what others do implicitly or even unconsciously—he presented other people's memories as his own.

In the absence of crucial archival sources, memoirs are becoming a major source for historical scholarship. Among all the memoirs of the post-Soviet era, the most ambitious and the most influential has been the four-volume set of books by Korolev's deputy Boris Chertok, a sweeping and riveting account of the Soviet space program from its origins in the postwar years to the end of the Cold War. Well-informed and well-told, these memoirs, nonetheless, are written entirely from the perspective of Korolev's engineering team.⁷⁷ In Russia, the reverence for such patriarch figures and the trust in their personal accounts reach extremes. The recent fundamental, 750-page-long Russian *Encyclopedia of Human Spaceflight* often draws on memoirs as a major source for its articles. For example, the entry on the Soyuz 15 mission is based largely on an extended quote from Chertok's memoirs.⁷⁸ In 1974, Soyuz 15 failed to dock with the Salyut 3 space station, and an internal controversy erupted over equipment malfunctions

Soviet Experience," *Kritika: Explorations in Russian and Eurasian History* 3:4 (Fall 2002): 577–610; and Barbara Walker, "On Reading Soviet Memoirs: A History of the 'Contemporaries' Genre as an Institution of Russian Intelligentsia Culture from the 1790s to the 1970s," *Russian Review* 59:3 (2000): 327–352.

75. See Aleksei Ivanov (Oleg Ivanovskii), *Pervye stupeni: Zapiski inzhenera* (Moscow: Molodaia gvardiia, 1970); Ivanov (Ivanovskii), *Vpervye: zapiski vedushchego konstruktora* (Moscow: Moskovskii rabochii, 1982); Oleg Ivanovskii, *Naperekor zemnomu pritiiazhn'iu* (Moscow: Politizdat, 1988); and Ivanovskii, *Rakety i kosmos v SSSR: Zapiski sekretного konstruktora* (Moscow: Molodaia gvardiia, 2005).

76. Ivanovskii, *Rakety i kosmos*, pp. 164–166.

77. NASA History Division has sponsored the translation of these memoirs into English under Asif Siddiqi's editorship. Siddiqi has provided an excellent running commentary to the English edition, which places Chertok's story in a wider context. See Asif A. Siddiqi, "Series Introduction," in Boris Chertok, *Rockets and People* (Washington, DC: NASA SP-4110, 2005), pp. ix–xix.

78. See Iurii M. Baturin, ed., *Mirovaia pilotiruemaia kosmonavtika. Istoriia. Tekhnika. Liudi* (Moscow: RTSof, 2005), pp. 209–210.

and the actions of the crew in that incident. By letting an engineer tell his story unopposed, encyclopedia editors in effect presented a vary partial view of that controversy, placing the blame on the crew.⁷⁹ When a personal perspective is thus validated and becomes a major reference source, this “counter-memory” of a previously hushed-up episode literally turns into a new master narrative.

THE NOSTALGIC POETICS OF POST-SOVIET SPACE MEMORY

In today’s Russia, which has lost its former Communist ideals and is still searching for a unifying “national idea,” Gagarin’s pioneering flight—the pinnacle of the Soviet space program—often stands as a symbol of history that the Russians could really be proud of, despite the trauma of losing the superpower status. “If we did not have Gagarin, we would not be able to look into each other’s eyes. It seems, we blew everything that we could. But we still have Gagarin. We will never lose him,” writes one Russian journalist. “Gagarin is the symbol of a Russian victory over the entire world. A symbol for ages to come. We don’t have another one and perhaps never will. Gagarin is our national idea.”⁸⁰

Sociological studies confirm that the Russians today rank Gagarin’s flight as their second proudest historical achievement (91 percent), right after the victory in World War II (93 percent), and followed by Sputnik (84 percent).⁸¹ Other Soviet symbols of national pride are falling far behind: the Stalin-era creation of the atomic and hydrogen bombs, the Khrushchev-era Virgin Lands campaign, and the Brezhnev-era Baikal-Amur giant railroad construction are all tainted by various historic revelations that cast a dark shadow over the former showcase projects.

The Russian space program occupies such a prominent place in collective memory that any critique of its past or present is often viewed as unpatriotic. The deorbiting of the *Mir* space station in March 2001 caused a public outcry. The loss of *Mir* was portrayed in the media as a major blow to the national psyche. Radical Communist opposition viewed the destruction of *Mir* as part of a sinister Western plot to bring down Russia, and accused President Putin of bowing to Western demands. Street protests were held, with signs reading, “Send the government to the bottom!” and “If you drown *Mir*, we’ll drown you!”⁸²

79. For an alternative account by the Soyuz 15 crew see Mikhail Rebrov, “Gor’kii privkus slavy,” *Krasnaia zvezda* (September 9, 1994): 2; for an English translation, see “Cosmonauts Unfairly Blamed for Failure of Soyuz-15 Flight,” JPRS-USP-94-007 (October 5, 1994): 3.

80. Ivan Iudintsev, “Rossiia stremitsia v kosmos ... na skripuchei telege proshlykh uspekhev,” *HotCom.ru*, vol. 16 (April 12, 2001) (available at <http://www.hotcom.smi-nn.ru/main/art.phtml?id=5888>).

81. Russian Public Opinion Research Center, Press Release 612, January 18, 2007 (available at <http://wciom.ru/arkhiv/tematicheskii-arkhiv/item/single/3864.html>).

82. Vladimir Plotnikov, “Rubikon Prezidenta,” *Sovetskaia Rossiia* (March 22, 2001) (photo of street protests available at <http://sumpaket.webzone.ru/listvka.html>).



President Putin presents Gagarin's 1961 portrait by Nikolai But to the Cosmonaut Training Center head Petr Klimuk, Star City, April 12, 2001. (Photo from the author's collection)

Both critics of the government and government officials appealed to the public sentiment about space history, each side trying to claim historical memory in support of its legitimacy. The new, post-Soviet political leadership appropriated the image of Gagarin as its own ideological symbol, an emblem of national pride and technological prowess, and an inspiration for a superpower status. On April 12, 2001, on the 40th anniversary of Gagarin's flight and just three weeks after the de-orbiting of *Mir*, President Putin visited the Cosmonaut Training Center in Star City and gave a speech before the cosmonauts. The Center personnel prepared a special backdrop for Putin's speech—a giant, full-wall-size portrait of Gagarin in full regalia—a not-so-subtle message to the President, reminding him of the appreciation of cosmonauts' achievements by previous governments. For his part, Putin also showed historical sensitivity: he assured the cosmonauts that April 12—the Cosmonautics Day that was established to memorialize the date of Gagarin's flight—was celebrated not only by the cosmonauts, but by the entire country. To boost the cosmonauts' morale, which was at a historic low after the *Mir* demise, Putin brought them a gift. Apparently he concluded that nothing could be more valuable to the cosmonauts than reasserting the symbolic meaning of space memory, and he presented them with another portrait of Gagarin. The cosmonauts, in turn, handed the President their own gift: a watch with Gagarin's portrait on its face, and Putin immediately put it on.⁸³ By exchanging gifts, the President and the cosmonauts in effect exchanged their memories.⁸⁴ Both sides seemed keen to avoid confrontation over the present-day *Mir* controversy by reaffirming their connection with space history. This co-remembrance of the celebrated past of the Soviet space program reasserted their common identity as Russian heirs to the Soviet glory.

In post-Soviet culture, space history becomes part of what the cultural critic Natalia Ivanova has termed “no(w)stalgia”: neither condemnation nor idealization of the past, but its actualization as a symbolic language for discussing today's pressing issues. The “no(w)stalgic” audience turns into “a collective participant and a collective interpreter; a creator of a myth, a part of the myth, and a debunker of the myth; the living past and a trial of the past at the same time.”⁸⁵ The cultural anthropologist Serguei Oushakine has argued that the main task of “the postsocialist poetics of nostalgic clichés” is “to produce an already known and previously encountered effect of recognition, to evoke a shared experience, to point toward a common vocabulary of symbolic gestures”

83. V. Davydova et al., “40 let pervomu poletu cheloveka v kosmos!” *Novosti kosmonavtiki*, no. 6 (2001) (available at <http://www.novosti-kosmonavtiki.ru/content/numbers/221/01.shtml>).

84. On the Soviet tradition of gift-giving, particularly on gifts to political leaders, see *Dary vozhdiam / Gifts to Soviet Leaders*, edited by Nikolai Ssorin-Chaikov (Moscow: Pinakoteka, 2006).

85. Natalia Ivanova, *No\$tal'iashchee: Sbranie nabliudenii* (Moscow, 2002), p. 62. See also Natalia Ivanova, “No(w)stalgia: Retro on the (Post)-Soviet Television Screen,” *The Harriman Review* 12:2–3 (1999): 25–32.

and thus to overcome “a peculiar post-Soviet stylistic block, a particular expressive deficiency of postsocialism.”⁸⁶ Old symbols become frames for entirely new meanings. When President Putin and the cosmonauts have to find a common language, both sides resort to nostalgic images of the past—Gagarin’s portraits—to convey their messages.

The Gagarin iconography was no longer tied to the specific meanings attached to it in the Soviet era; it became a shared language that could express a wide range of new meanings. In the early 1990s, youth culture appropriated space iconography for the widely popular “Gagarin Parties,” rave dance extravaganzas held at the Cosmos Pavilion in the famed Soviet Exhibition of People’s Economic Achievements in Moscow. Giant make-ups of rockets and spacecraft hung from the ceiling, an enormous portrait of Gagarin was specially produced to adorn the festivities, and real cosmonauts were invited to have drinks at the bar and to mingle with the crowd. Placing old Soviet memorabilia into a youth party context had a strange liberating effect: space symbols were no longer perceived as ideologically loaded emblems of Soviet propaganda or perestroika revisionism. “The juxtaposition of Soviet symbols with rave symbols, which may seem ironic and absurd,” writes the cultural anthropologist Alexei Yurchak, “in fact freed the symbolic meanings attached to Gagarin and the space program from their Soviet pathos and reinvented them, making them accessible for the new cultural production.”⁸⁷ Yurchak has suggested the metaphor of “sampling” to express the (re)use of Soviet symbolism in the post-Soviet culture. “As with house music—which is continuously remixed, sampled, and quoted in new contexts—here, former official symbols were also *remixed* and presented in new contexts and in a fresh, nonlinear format,” he writes. “Thus, the new ‘symbolic samples,’ containing quotes from past and recent Soviet meanings, were placed into a dynamic new context.”⁸⁸

RUSSIAN CAPITALISM AND THE SEMIOTICS OF SPACE

In the post-Soviet era, discourses of the past and of the present interact in complex ways. As the historian Martin Collins points out, the Global Age that we live in has both changed the cultural perception of spaceflight and shifted priorities for the Space Age. The meta-narrative of exploration no longer dominates the public image of spaceflight, and new large-scale space projects tend to involve global satellite communication systems, rather than ambitious

86. Serguei Alex Oushakine, “‘We’re Nostalgic but We’re not Crazy’: Retrofitting the Past in Russia,” *The Russian Review* 66:3 (July 2007): 469, 481.

87. Alexei Yurchak, “Gagarin and the Rave Kids: Transforming Power, Identity, and Aesthetics in the Post-Soviet Night Life,” in *Consuming Russia: Popular Culture, Sex, and Society Since Gorbachev*, edited by A. Baker (Durham, NC: Duke University Press, 1999), p. 94.

88. *Ibid.*, p. 95.

human spaceflight endeavors. Instead of leading humanity away from Earth into the enchanting Unknown, space projects now connect disparate parts of Earth, changing the very terms in which we discuss culture in general and Space Age culture in particular.⁸⁹

Collins draws our attention to the semiotic nature of new discursive regimes: cultural symbols do not simply represent things, they act. They create a “second nature” environment in which new identities emerge and a new form of cultural power competes with and reshapes old political and institutional structures. Thus culture cannot be seen as a mere gloss on the rough surface of the crude machinery of technological innovation, economic pressures, and political decision-making. Culture is an actor in its own right—an instrument of innovation, a tool of profit-making, and the stuff politics is made of.

Both capitalism and communism manipulated with symbols: capitalism made semiotics an essential part of marketing, while communism incorporated it into daily ideological indoctrination. Both generated mass production and mass consumption of symbols; any public representation sold something, be it a product or an ideological dogma. Communist propaganda officials dealt with some of the same issues as corporate marketing executives.

In post-Soviet Russia, the cultural heritage of the decades of the communist rule clashes with the newly developing capitalist culture. Russian advertising campaigns today often skillfully combine old Soviet symbolism with “new Russian” capitalist values. To what Collins has called the “mix of semiotics, capitalism, spaceflight, and the global and the local” they add the spectacularity of space symbols of the Soviet superpower, which are fashionable among the young and nurture the nostalgic feelings of the old. In the summer of 2006, the cell phone provider MTS launched a billboard campaign in Moscow, promoting its new “Number One” calling plan. The billboard depicted a cosmonaut in a spacesuit happily using a cell phone in space. Accompanied by a television advertisement with the slogan “Be Number One!”, this blunt attempt to brand the company as the industry leader drew on the popular Russian association of the cosmonaut image with Gagarin, the “Number One” cosmonaut. In a truly postmodern fashion, the billboard message also had a self-mocking twist: the cosmonaut was wearing space gloves, which of course made it impossible to punch keys on the phone. Thus the advertisement pretended not to be an advertisement at all, but rather an invitation to the viewer to play a semiotic game, sorting out contradictory signifiers.

The mixed feelings of pride for the glorious space achievements of the past, shame for losing the superpower status, and the mockery of both pride and shame as ideological constructs provided a fertile ground for the semiotic interplay of past/present, reality/simulation, and truth/advertising. The

89. See Collins’s article in this volume.



A billboard advertisement of the “Number One” cell phone calling plan by the MTS company in the streets of Moscow, June 2006. (Photo from the author’s collection)

ostentatious self-awareness of the simulated reality of advertising was taken to a new level in a series of MTS television ads that followed the “Number One” billboard campaign. Those ads first depicted a cosmonaut talking on a cell phone during preparations for a takeoff, but then a wider camera shot gradually revealed that the action was actually happening at a movie set being prepared for shooting a takeoff scene.⁹⁰ In a sly reference to the popular conspiracy theories about entire space missions staged on a movie set, these ads again invited the viewer to blur the boundary between reality and simulation, between an advertisement and a game, and between space history and today’s marketplace.

Global satellite communication and positioning systems are increasingly integrated into the Russian economy, but their political and cultural ramifications remain peculiar to Russian society and are burdened with the remembrance of the Soviet past. As late as 1999, there still was no legal framework for using global positioning systems in Russia. In 1998, a batch of Volkswagen cars was reportedly not permitted for sale in Russia, because they were equipped with

90. See Dmitrii Kozlov, “MTS: O iaitsakh, tarifakh, sovetskoi simvolike i butaforskikh kosmonavtakh,” *Reklamnye idei*, no. 5 (2006) (available at <http://www.advi.ru/page.php3?id=287>, including one of the television ads).

GPS receivers.⁹¹ In 2001 the Russian authorities decided to build a Russian rival to GPS, and they revitalized the stalled military project called GLONASS (GLOBAL Navigation Satellite System), now broadening its use for civilian purposes. In May 2007, President Putin signed a decree authorizing free and open access to the civilian navigation signals of the GLONASS system to both Russian and foreign customers.⁹² After adding three satellites in December 2007, GLONASS would soon provide almost complete coverage of the Russian territory. According to the planners, GLONASS should reach global coverage by 2010. The Russian authorities counted that foreign consumers, especially in the Middle East and South East Asia, would be interested in having access to an alternative to the U.S.-controlled GPS.⁹³

Instead of fostering a sense of global unity, satellite navigation systems in the Russian context are becoming a subject of international technological competition, a tool of political influence, and a vehicle for boosting national pride. U.S.-Russian negotiations on achieving technical compatibility and interoperability between GPS and GLONASS progress very slowly. In the meantime, the Russian Ministry of Industry has proposed limiting the sales in Russia of GPS receivers that were not compatible with GLONASS.⁹⁴ Official policies toward global navigation systems in Russia seem to fall back on the old Soviet stereotype of national isolationism. In March 2007, Putin held a meeting of the State Council in Kaluga, the town nicknamed “the birthplace of cosmonautics” where Tsiolkovskii spent most of his life and produced his most important works. Having reestablished historical links with Tsiolkovskii’s visions of space exploration, Putin instructed the Council members that GLONASS “must work flawlessly, be less expensive, and provide better quality than GPS.” He expressed his confidence that Russian consumers would show “healthy economic patriotism” and prefer GLONASS over GPS.⁹⁵ In December 2007, the first batch of dual-signal GPS/GLONASS traffic navigators was quickly sold out in Moscow stores at \$570 a piece, several months before the customers could take full advantage of GLONASS capabilities.⁹⁶

91. V. Koliubakin, “‘Iridium’—presentatsiia v Sankt-Peterburge,” *Tele-Sputnik*, no. 3(41) (March 1999) (available at <http://www.telesputnik.ru/archive/41/article/40.html>).

92. Novosti Russian News and Information Agency report, May 18, 2007 (available at <http://rian.ru/technology/innovation/20070518/65722212.html>).

93. Novosti Russian News and Information Agency report, December 26, 2007 (available at <http://www.rian.ru/technology/connection/20071226/94147340.html>).

94. Anton Bursak, “Minprom zashchitit GLONASS, ogranichiv vvoz GPS-ustroistv,” *RBK Daily*, February 22, 2007 (available at <http://www.rbcdaily.ru/print.shtml?2007/02/22/media/266488>).

95. Viktor Litovkin, “GLONASS ishchet oporu na zemle,” FK Novosti Information Agency report, April 2, 2007 (available at <http://www.fcinfo.ru/themes/basic/materials-document.asp?folder=1446&matID=134457>).

96. PRIME-TASS Business News Agency report, December 27, 2007 (available at <http://www.prime-tass.ru/news/show.asp?id=746309>).

For individual Russian users, an “eye in the sky” often evoked Soviet-era cultural memories of total surveillance. In October 2007, General Nikolai Patrushev, the head of the FSB (the successor to the KGB), announced plans for a nationwide system of traffic control. Under the banner of fighting terrorism, the FSB intended to implement a system of monitoring individual motor vehicles on the Russian territory. Technical details of the new system were not revealed, but it was implied that it might involve the use of satellites for positioning and communication. Journalists quickly gathered initial negative reactions to the news: “it’s an invasion of privacy”; “this smells like a violation of constitutional rights of citizens”; and “any surveillance brings up bad memories of Stalin’s totalitarian system.”⁹⁷ At the same time, individual users seemed quite willing to use GPS devices to track the movements of their own children.⁹⁸

A shift in priorities from space exploration to satellite applications is clearly reflected in the Russian public opinion. In an April 2005 poll, the highest number of respondents (52 percent) said that scientific research and the development of advanced technologies should be a top priority of the Russian space program, and 44 percent supported defense applications. 17 percent mentioned the importance of space achievements for international prestige, and only 1–4 percent prioritized missions to the Moon and Mars, search for extraterrestrial civilizations, and space tourism.⁹⁹ Ambitious projects of space exploration serve as a token of memory, an emblem of the “no(w)stalgic” past, but they no longer dominate the cultural production of the present.

CONCLUSION

The Space Age both reinforced cultural boundaries—through the Cold War imagery and rhetoric—and blurred them through the emerging sense of the global. It produced vivid memories and engaging stories; individual retelling of these stories and collective propaganda projects of remembrance gradually turned historical events into mythological epics, shaping the identity of generations. The “Sputnik generation” of Russian citizens, who grew up in the 1950s, in recent interviews acknowledged the formative role of the key events of the Space Age, but had little personal recollection of their reaction

97. Andrei Kozlov, “Voditeli popali pod podozrenie,” *Vzgliad*, October 16, 2007 (available at <http://www.vz.ru/society/2007/10/16/117887.html>).

98. A. Kuznetsov, Report on testing the S-911 Personal Locator (available at http://gps-club.ru/gps_think/detail.php?ID=8057).

99. Russian Public Opinion Research Center, Press Release 187, April 11, 2005 (available at <http://wciom.ru/arkhiv/tematicheskii-arkhiv/item/single/1181.html>).

to Sputnik or Gagarin's flight.¹⁰⁰ In order to remember, we have to create our memories. And we create them out of the myths and symbols of our culture.

Cultural myths should not be seen merely as distorted memories. It is precisely these "distortions," cultural adaptations and appropriations of symbols, that give cultures their individuality, their unique character, and distinct perspective. Just as one's personal memories reveal more about one's current identity than about one's past, historical myths provide a valuable insight into the culture that produces them. At the intersection of space history and cultural history, the semiotics of Space Age remembrance ties together individual memory and collective myth, the materiality of objects and the pliability of symbols, the authenticity of fantasy and the deceptive nature of truth.

There can be no "true" memory, as any act of recollection reconstitutes our memories. As different cultures remember the Space Age, it keeps changing, revealing new symbolic meanings and providing an inexhaustible source of study for historians. By shifting the focus from debunking myths to examining their origins and their constructive role in culture, we can understand memory as a dynamic cultural force, not a static snapshot of the past.

100. Donald J. Raleigh, tran. and ed., *Russia's Sputnik Generation: Soviet Baby Boomers Talk about Their Lives* (Bloomington, IN: Indiana University Press, 2006).

CHAPTER 13

THE MUSIC OF MEMORY AND FORGETTING: GLOBAL ECHOES OF SPUTNIK II¹

Amy Nelson

In times when history still moved slowly, events were few and far between and easily committed to memory. They formed a commonly accepted *backdrop* for thrilling scenes of adventure in private life. Nowadays, history moves at a brisk clip. A historical event, though soon forgotten, sparkles the morning after with the dew of novelty.

— Milan Kundera²

It's been four long days since we first started experimenting on the dearly departed soon she won't communicate anymore.

— Amoree Lovell³

While Americans' memory of the "Evil Empire" might be fading,⁴ the Cold War continues to inform an increasingly diverse and interrelated global popular culture in often surprising ways. Among these, the enduring

1. The research for this essay was supported by a Summer Humanities Stipend from Virginia Tech, the Summer Research Laboratory on Russia, Eastern Europe, and Eurasia at the University of Illinois, and a Faculty Research Grant from Virginia Tech's College of Liberal Arts and Human Sciences. For assistance tracking down musical and poetic tributes to space dogs I am grateful to Karl Larson, Tom Ewing, Mark Barrow, Robert Stephens, Erik Heine, Andrew Jenks, and especially Evan Noble. I am indebted to Brian Britt and Greta Kroeker for their help translating lyrics in languages I wish I knew better. Some material from this essay also appears in Amy Nelson, "Der abwesende Freund: Laikas kulturelles Nachleben," in Jessica Ullrich, Friedrich Welzien, and Heike Fuhlbrügge, eds, *Ich, das Tier. Tiere als Persönlichkeiten in der Kulturgeschichte* (Berlin: Reimer Verlag, 2008), pp. 215-224.
2. Kundera, Milan. *The Book of Laughter and Forgetting*, trans. Michael Henry Heim (Middlesex, England: Penguin Books, Ltd, 1980 [1979]), pp. 7-8.
3. Lines from the song "Laika: an Allegory," *Six Sadistic Songs for Children* (2005).
4. In its annual assessment of the attitudes of today's youth, Beloit College's "Mindset List for the Class of 2010" notes that for today's college students "the Soviet Union has never existed and therefore is about as scary as the student union." "Beloit College Mindset List," <http://www.beloit.edu/~pubaff/mindset/2010.php> (accessed January 20, 2008).

celebrity and complex historical memory surrounding “Laika,” the mixed-breed dog that became the first living being to orbit Earth in November 1957, is certainly one of the most intriguing examples. Instantly famous as evidence that the Soviets led the race to conquer space, Laika joined a small group of animals who are celebrities in their own right. But while the fame of other creatures in this cohort often derives from humans’ shared assessment of their symbolic importance—as an emblem of grit and courage in the case of a depression-era racehorse such as Seabiscuit or as an exotic token of national rivalry in the case of P. T. Barnum’s giant pachyderm, Jumbo, (purchased in 1882 from the London zoo for a then-record sum of \$10,000),⁵ Laika’s celebrity was more controversial at the outset and remains more complicated 50 years after the flight of Sputnik II. By examining the ongoing resonance of the first space dog in global popular culture, this essay shows how a defining episode of the early Space Age has been remembered even as its specific historical circumstances have been effaced. This contradictory legacy has much to say about the shifting, mutable nature of social frames of memory (and, by extension, forgetting), and about the complex ways that humans engage, imagine, and remember the life and death of an individual dog.

Speculation about Laika’s fate and the significance of her voyage served as the crux of the initial controversy. As Susan Buck-Morss and David Caute have recently noted, the fierceness of the cultural Cold War derived, somewhat ironically, from the superpowers’ shared Enlightenment heritage and the fact that both sides largely agreed on cultural values, including a faith in progress, a veneration of science and technology, and a determination to harness nature to human ends. The space race, inaugurated a short month before Laika’s voyage with the launch of the first artificial satellite, tapped into all of these concerns while also serving as a proxy for armed conflict. Caute’s bemused assertion that “a Soviet dog orbiting in space caused all American dogs to howl” highlights the international drama precipitated by Laika’s flight. As ordinary citizens scanned the night sky and amateur radio operators tracked the satellite’s radio signal, world headlines confirmed the Soviets’ latest victory in the space race—a competition of scientific, engineering, and industrial might that was both more threatening and more fascinating than conventional warfare.⁶

Sending a dog into orbit further undermined Western confidence already shaken by the launch of Sputnik I. At the same time, this bizarre, public form of animal experimentation outraged animal welfare groups. For although Laika’s

5. Laura Hillenbrand, *Seabiscuit an American Legend* (New York, NY: Random House, 2001); Harriet Ritvo, *The Animal Estate. The English and Other Creatures in the Victorian Age* (Cambridge, MA: Harvard University Press, 1987), pp. 220, 232–233.

6. David Caute, *The Dancer Defects. The Struggle for Cultural Supremacy during the Cold War* (Oxford, UK: Oxford University Press, 2003), pp. 4, 38–39; Susan Buck-Morss, *Dreamworld and Catastrophe. The Passing of Mass Utopia in East and West* (Cambridge, MA: MIT Press, 2002).

space capsule had food, water, and a climate control system designed to support her for several days, it was not engineered to be retrievable, so the dog's death was a certainty from the outset. For 40 years the Soviets maintained that Laika had died painlessly after several days in orbit, revealing only in 2002 that she succumbed to overheating and panic a few hours after launch.⁷

Sacrificed in the quest to make spaceflight a reality for humans, Laika the dog provoked intense reactions from people who regarded her variously as an "experimental animal," a "brave scout," a "faithful servant," or an "innocent victim."⁸ At one level, these responses mirrored contradictory attitudes, common in their main contours across many cultural and national contexts, of people toward dogs. As such, conflicting human perspectives on the first space dog drew on and intensified more generalized tensions generated by the intertwined nature of domestic dog and human ecologies.⁹ They also tapped the excitement and apprehension occasioned by the advent of the nuclear era and the Space Age, which suggested the compelling attractions as well as the tremendously destructive potential of technological and scientific advances.

Over the last 20 years or so, the multivalent echoes of Laika's immediate celebrity have inspired an array of creative endeavors, including Lasse Halström's film, *My Life as a Dog* (1985) and extending to a number of recent literary undertakings, an array of Web sites, and, most remarkably, a diverse and expanding corpus of music emanating from various points around the Northern hemisphere and the transnational arena of cyberspace. Since the mid-eighties, music groups in Scandinavia, Spain, Germany, Japan, the United States, and the United Kingdom have dedicated songs to Laika, and three have adopted her name as their own. This represents considerable name recognition. Indeed, in the musical arena of commercial cyberspace, the first space dog seems to have more currency than the first space man or even the founder of the Soviet state.¹⁰ Nearly 50 short pieces are named after Laika or have lyrics referencing

7. David Whitehouse, "First Dog in Space Died within Hours," BBC News Online October 28, 2002, <http://news.bbc.co.uk/1/hi/sci/tech/2367681.stm> (accessed January 25, 2008).

8. These overlapping but often contradictory perspectives on Laika might be explained in terms of the sociological concept of the "boundary object." See Anita Guerrini, *Experimenting with Humans and Animals. From Galen to Animal Rights* (Baltimore, 2003), p. x; Susan Leigh Star and James R. Griesemer, "Institutional Ecology, 'Translations' and Boundary Object: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39," *Social Studies of Science* 19 (1989): 387-420.

9. On the extent to which the destinies of humans and domestic dogs are inextricably linked by forces of nature and culture, see Raymond Coppinger and Lorna Coppinger, *Dogs. A New Understanding of Canine Origin, Behavior, and Evolution* (Chicago, IL: The University of Chicago Press, 2001); Donna Haraway, *The Companion Species Manifesto. Dogs, People, and Significant Otherness* (Chicago, IL: Prickly Paradigm Press, 2003); and Susan McHugh, *Dog* (London, UK: Reaktion Books, 2004).

10. A search across all genres in the iTunes store in January 2008 yielded 23 pieces with Yuri Gagarin's name in the title, 27 pieces named after Lenin, and 43 referencing Laika.

her story. Nineteen of these are exclusively instrumental, and the majority of those are electronica in the tradition of the “space music” popularized for the last 20 years or so by Stephen Hill in his syndicated program “Hearts of Space.” Laika also has served as muse for classically trained musicians, including Max Richter (“Laika’s Journey,” 2002) and Ulrike Haage, whose “Requiem for Laika” (2005) interweaves vintage Soviet radio broadcasts and narration in German with sung portions of the Mass for the dead (with the sacrificial *agnus dei* recast as a wolf).

Given this prominence, one might expect Laika to provide an important bridge to the popular memory of the space race, the Cold War, and the Soviet past. But while Laika’s initial celebrity depended heavily on the politically charged and highly publicized circumstances under which she was sent into space, her ongoing resonance derives more from her appeal as a symbol of the timeless human concerns of sacrifice, experimentation, alienation, and loss. Indeed, an analysis of the recent musical tributes to her suggests that the contemporary popular memory of the first space dog has become somewhat uncoupled from the history of Sputnik II.

To explain this paradox, we must note that while the realms of “memory” and “history” partially overlap, they also differ in important ways. Historians use many different kinds of evidence—including qualitative sources such as memoirs, diaries, and oral histories—to gain insight on the events of the past. But like other scholars in the behavioral sciences and the humanities, they distinguish between the act of remembering and the historical events being remembered. Recent research in this area reminds us that for individuals and societies as a whole, memory is an active, iterative process. Our recollection of events is not a literal recall of a fixed or imprinted image or experience, but rather a construction or reconfiguration of what happened.¹¹ That the democratizing impulses fuelling the “unofficial knowledge” of popular memory often run counter to the empirical and sometimes arcane preoccupations of the professional historian has been well-documented, even as recent scholarship has focused on understanding the current obsession with “memory” among scholars and laypeople.¹²

Intended as a satirical observation on the perversity of Czech communism, Milan Kundera’s assertion that “nowadays, history moves at a brisk clip,” while events themselves are “soon forgotten,” offers a telling comment on how time

11. David Gross, *Lost Time: On Remembering and Forgetting in Late Modern Culture* (Amherst, MA: University of Massachusetts Press, 2000), p. 4.

12. On the significance of amateur collectors and preservationists to the construction and perpetuation of popular memory, see Raphael Samuel, *Theatres of Memory. Past and Present in Contemporary Culture* (London: Verso, 1994). For a recent attempt to historicize discourses of memory and modernity, see Alon Confino and Peter Fritzsche, *The Work of Memory. New Directions in the Study of German Society and Culture* (Chicago, IL: University of Illinois Press, 2002).

seems to have accelerated since the end of the last World War while at the same time historical memory has become less stable and, in many contexts, less valued. Where the cultural legacy of the first space dog is concerned, the inherent atemporality of the media-mediated images, sounds, and messages that have played an increasingly dominant role in framing social and cultural memory over the last 50 years seem to be critically important.¹³ So, too, are the converging influences of globalization and the digital technologies that have transformed the production, distribution, and consumption of music since the late nineties.¹⁴ With the rise of relatively small digital audio files, such as the MP3, the global internet became the ideal forum to facilitate the exchange and distribution of music, a creative medium uniquely suited to conveying the emotional charge of the Laika story. As the song cited for this essay's second epigraph suggests, by 2005 that story might sound more like a funeral for a friend than an early episode of the quest to send humans into space.

Laika's current visibility in various aesthetic and creative realms extends and expands on the celebrity status accorded her in the early years of the space race. Like several other dogs sent into space by the Soviets between Laika's voyage and Yuri Gagarin's manned flight in 1961, Laika became the subject of a sophisticated, anthropomorphized celebrity.¹⁵ Photographs of the canine cosmonauts were printed on front pages around the world. Reporters flocked to their "press conferences," and millions tuned in to hear their barks transmitted on radio "interviews." Fame was fleeting for most of these dogs as the world's attention quickly shifted from their exploits to the more compelling drama of human space travel and exploration. Laika, however, proved to be the exception. The significance of her voyage and the fact that she was deliberately sent to her death inspired a number of commemorative projects in the Soviet Union and other countries as well.

Soviet tributes to the canine pioneer began within a year of her journey. Soon after her flight, a brass tag was attached to her kennel with the inscription translated here from the Russian: "Here lived the dog Laika, the first to orbit our planet on an earth satellite, November 3, 1957."¹⁶ In keeping with the tradition of commemorating historic events and individuals, the Soviet mint issued an enamel pin of "The First Passenger in Space," showing the dog's head and a rocket hovering over Earth on a field of stars. Official commemorations in other countries soon followed as stamps bearing the dog's likeness were issued in

13. Gross, *Lost Time*, p. 123.

14. Timothy D. Taylor, *Strange Sounds. Music, Technology & Culture* (New York, NY: Routledge, 2001).

15. I examine the history of the space dog program and the dogs' celebrity in: Laikas Vermächtnis: Die sowjetischen Raumschiffhunde" in *Tierische Geschichte: Die Beziehung von Mensch und Tier in der Kultur der Moderne*, eds. Dorothee Brantz and Christof Mauch (Paderborn: Schöningh, in press).

16. A. Golikov and I. Smirnov, "Chetveronogie astronavy," *Ogonek* 49 (1960): 2.

Romania (1957), Albania (1962), Sharjah/Mongolia (1963), and Poland (1964).¹⁷ In the fall of 1958, the Soviet Union began to market its first filtered cigarette, using Laika's name and image on the wrapper, and initiating a now 50-year-old process of commodification and "branding" of the space dog.¹⁸ The high-relief at the base of the monument "To the Conquerors of Space" (dedicated in 1964) at the Exhibition of Achievements of the National Economy¹⁹ (VDNKh) includes an alert, larger-than-life Laika, whose capsule provides the foundation for a rocket guided by the muscular male arms of an anonymous socialist-realist human.

While the pins, stamps, and monuments of the 1950s and 1960s might be fairly straightforward commemorations of a significant event or individual, other tributes to Laika were more complex.²⁰ Outside the Soviet Union, at least two musical memorials addressed the main concerns raised by Sputnik II—American preoccupation with the specter of Soviet domination and widespread shock over sending a dog to its death in space.

"Sputniks and Mutniks," recorded by Ray Anderson and the Homefolks in 1958, playfully captured the sensationalism and insecurity Laika's flight generated in the United States.²¹ Jaunty and playful, the song's quick tempo and bluegrass style is at odds with the anxiety over the potential for weaponizing space expressed in the lyrics:

Sputniks and mutniks flying through the air
Sputniks and mutniks flying everywhere
They're so ironic, are they atomic?
Those funny missiles have got me scared.

While Anderson's song received relatively little distribution before Jayne Loader and Pierce and Kevin Rafferty identified it as a "must have" for the soundtrack of their satirical documentary *Atomic Café* (1982), the second song from this era, "Russian Satellite," enjoyed instant and enduring acclaim. As one of The Mighty Sparrow's three Carnival Road March Competition winners from 1958, the song helped catapult the "Sparrow" (born Slinger Francisco) to the forefront of the calypso world, where he has remained for nearly half a century. As in the case of "Sputniks and Mutniks," the lyrics and music of "Russian Satellite"

17. In the sixties, the Soviet Union and several other Eastern Bloc countries also issued stamps of other space dogs, especially Belka, Strelka, Chernushka, and Zvezdochka. Stamps of Laika were issued later in Hungary (1982) and North Korea (1987).

18. "Soviet Smokers Now Have Filters," *New York Times*, September 11, 1958.

19. In 1992, the title of this center was changed to the All-Russian Exhibition Centre, but it continues to be referred to by its previous acronym of VDNKh.

20. See for example, Leonid Vysheslavskii's poem, "Pamiati Laiki," *Zvezdnye sonety* (Moscow: Sovetskii pisatel', 1962), p. 71.

21. *Atomic Café Soundtrack* (Rounder Select, 1994).

work against each other for ironic effect. But whereas the appeal of “Mutniks and Sputniks” derives from its disarming simplicity, “Russian Satellite” exploits a hallmark of calypso style, setting deftly pointed social commentary against a bright, syncopated melody. “Murder, murder everywhere,” begins the song, which goes on to examine one of the many widespread myths about Laika’s demise: “Over a thousand miles in space . . . They poison the food for the poor puppy / Oh Lord, this is more than cruelty.” In 2002, The Mighty Sparrow reminded fans that he is a “multi-faceted” individual whose concerns about social justice still extended past the human community: “I can remember when the Russians sent a satellite in the sky, with a dog in it. I was the only one who came out and said that I was sorry for the dog.”²²

Given that rock and roll music developed in tandem with the space race and the heyday of science fiction, the pervasiveness of space themes throughout rock’s history is hardly surprising. Indeed, as Ken McLeod has recently noted, “the association of space and alien themes with rock’n’roll rebellion is found throughout rock’s history and has had an impact on nearly all its stylistic manifestations.”²³ But while any number of examples can be mustered to demonstrate the fertility of this connection from the 1960s on (i.e., David Bowie’s *Space Oddity* [1969] and his glam rock alter ego “Ziggy Stardust,” Pink Floyd’s *Dark Side of the Moon* [1973], George Clinton’s *Motherhip Connection* [1974], etc.), the flight and plight of the first space dog seems to have found minimal resonance between the late 1950s and the era of glasnost. Beginning in the mid-1980s, however, a diverse assortment of filmmakers, musicians, artists, and authors began turning to Laika for inspiration. Most of the resulting creative work has originated outside the former Soviet Union, although statistical evidence suggests that the memory of Laika thrives in her homeland as well. The majority of Russians surveyed in 1994 could identify Laika more accurately than they could other major events from the post-war period, including the Cuban missile crisis, the 20th Party Congress, or the publication of *One Day in the Life of Ivan Denisovich*.²⁴

The starting point for this renewed interest in the first space dog was the 1985 film *My Life as a Dog*. Set in Sweden in the late ‘50s, Lasse Halström’s drama charts the coming of age of a boy named Ingemar, who copes with his mother’s failing health and her inability to care for him by reminding himself of Laika’s plight. He worries that Laika starved to death, identifies with her helplessness, and laments her physical isolation in an effort to gain perspective

22. “Sparrow, the Concerned Caribbean Villager,” *The Jamaica Gleaner*, November 27, 2002, <http://www.jamaica-gleaner.com/gleaner/20021127/ent/ent1.html> (accessed January 25, 2008).

23. Ken McLeod, “Space Oddities: Aliens, Futurism, and Meaning in Popular Music,” *Popular Music* vol. 22, no. 3 (2003): 340.

24. Howard Schuman and Amy D. Corning, “Collective Knowledge of Public Events: The Soviet Era from the Great Purges to Glasnost,” *The American Journal of Sociology* 105, no. 4 (2000): 913–956.

on his own abandonment and loss, which culminates in the death of his mother and his own beloved dog, Sickan. As the film's title and these lines suggest, Ingemar reaches across the boundary of species to shore up his own identity and resolve:

I can't help thinking about Laika. She had to do it for human progress. She didn't ask to go . . . she really must have seen things in perspective. It's important to keep some distance . . .

Halström's film garnered critical acclaim at film festivals in Berlin and Toronto before making headlines in the United States, where box office sales ultimately topped eight million dollars. Nominated for a raft of awards and winner in the Best Foreign Film category for both the New York Film Critics Award (1987) and the Golden Globe Awards (1988), *My Life as a Dog* inspired a new wave of (mainly musical) tributes to the first dog in space.

The first of these came in 1987 from the Spanish punk rock group, Mecano. Part of "La Movida," the counter-cultural movement that mobilized Spanish youth in the 1980s, Mecano found commercial success in France, Italy, and Latin America, as well as in Spain. Still readily accessible on YouTube, Mecano's song, "Laika," tells the story of a "normal Russian dog" and speculates about her "thoughts" as she looked down on Earth through the window of her space capsule.²⁵ Like many bands to follow, Mecano laments sacrificing a dog to human ambition and curiosity, and in so doing elevates Laika to realms normally reserved for humans: "We have to think that on earth there is one little dog less / and in heaven there is one star more."

The most long-standing musical group to appropriate Laika's name was also founded in 1987. Ironically retro in conception, Laika and the Cosmonauts offered updated instrumental surf rock in the 1960s tradition of Dick Dale, complete with loud reverberating solo guitar and lots of fast double picking. The irony here derived from the former studio musicians' Finnish citizenship. Like their compatriots, The Leningrad Cowboys, Laika and the Cosmonauts parodied Finland's ambivalent stance toward the Cold War superpowers by choosing a Soviet-themed name and adopting a quintessentially American style. The group rode the wave of the instrumental surf rock revival set off by the release of the surf documentary, *Endless Summer II* and the inclusion of Dick Dale's "Miserlou" on the soundtrack of the film *Pulp Fiction* in 1994. Reviving the connection between rock music and space themes dating back to the early 1960s, Laika and the Cosmonauts paid explicit homage to the Space Age with their first album and title hit, *C'mon do the Laika* (1988) and their 1996 compilation, *Zero Gravity*. Besides offering covers of surf-rock classics and

25. "Mecano-Laika," <http://www.youtube.com/watch?v=AgHkv1XPPis> (accessed January 25, 2008).

themes from '60s movies and television shows (including *Psycho*, *Vertigo*, and *Mission Impossible*), the group composed its own music with a sound one critic described as bouncing "between endless summer, lurching polka, spy flick, and spaghetti western themes. Sometimes moody, sometimes trippy . . . Party music supreme."²⁶ The quartet has released six albums since its founding in 1987 and counts *Pulp Fiction* director, Quentin Tarantino, among its diehard fans.²⁷

With a career that spanned the transition from the end of Soviet communism to the age of the global electronic village, Laika and the Cosmonauts were among the first musical ensembles to tap the appeal of campy nostalgia for things (formerly) Soviet to a range of audiences. Others who mastered the appropriation of Soviet symbols and themes included Rasputin Stoy, whose German synth-pop band CCCP found an enthusiastic following in alternative dance clubs. Along with several homages to the Soviet space program, the band's 1996 album, *Cosmos*, includes a cut called "Laika, Laika" with the enthusiastic participation of the Russian Army chorus.

Over the last decade, however, explicit references to the Soviet past have become vaguer, focusing instead on a fairly generic nostalgia for the early space race or on the figure of the first space dog herself. For example, the American indie rock-power pop band Sputnik dedicated a smoky, strummed guitar ballad to Laika in 2004, but the other tracks on its debut album *Meet Sputnik* make little or no reference to the space race. Following the lead of the Leningrad Cowboys, the virtual band Gorillaz titled their hit remix album of 2002 *Laika Come Home*, combining the name of the Soviet space dog with the title commonly associated with the Anglo-American canine hero Lassie. While the album art evokes the glory days of dogs and chimps in space, the music consists of re-mixes of the group's first (eponymous) album in reggae and dub style.

Clearly for musicians, Laika's association with the creative possibilities and costs of innovation continues to serve as a compelling touchstone. The most explicit homage to the space dog and her legacy belongs to the eclectic British quartet, Laika, which uses sampling and electronics to achieve a celestial, innovative sound and features an image of the dog on all of its album covers. Founded in 1994, the group released five albums before "taking a break" in November 2007, the 50th anniversary of the launch of Sputnik II. While the group's "classic" sound is best exemplified in collections such as *Silver Apples of the Moon* (1995) and *Sounds of the Satellites* (1997), the incorporation of blues elements in *Good Looking Blues* (2000) followed from the group's determination to confound expectations. According to their Web site: "They're not a rock band, but they play guitars. They're not an 'electronic' group in the usual sense

26. Andy Ellis, "The Amazing Colossal Band," *Guitar Player* 29, no. 5 (May 1995): 129.

27. "Laika and the Cosmonauts," <http://www.laikaandthecosmonauts.com/news/index.php3> (accessed January 25, 2008).

of the term, yet they meld and twist samples with the best of them.”²⁸ As for the name, Margaret Fiedler and Guy Fixsen explain their choice as follows:

[W]e liked the sound of the word and we liked the association with being “out there” in terms of experimentation while at the same time being a warm furry organic thing . . . The other reason we like the name is that it was probably the most high profile animal experiment ever—Laika died up there in her capsule—and we are strong believers in animal rights and things that seem kind of obvious to us, like not eating them.²⁹

While innovation represents an essential component of artistic originality, concern about animal experimentation and sacrifice emerges as a recurring theme in Laika-themed songs across several genres. For example, American folk singer Kyler England uses phrases from the beloved nursery rhyme “Twinkle, Twinkle, Little Star” to frame an almost maudlin tribute to a brave dog sacrificed for human ends: “like a diamond in the sky / gave your life for humankind / what a view it must have been.”³⁰ In the hands of Amoree Lovell, the Portland-based rocker cited in this essay’s second epigraph, the same material gets an almost silly gothic twist, replete with rollicking arpeggios, cello counterpoint, and moaning bass chorus background. Others, such as the retro rock group Sputnik, Eurodance star Ice MC, and the grunge rock group Pond, denounce the human forces behind Sputnik II with little or no trace of irony. The lyrics of Pond’s “My Dog is an Astronaut,” for example, expresses this wish for Laika:

I hope she sails on and on across the universe
finds there some new world where she’ll be safe from man’s
experiments
that don’t have come home parts

In many of these songs, Laika is no longer a stray dog captured for laboratory research, but rather an abused or abandoned pet. Since most people more easily relate to dogs as pets or companions than as research subjects, this slippage facilitates an emotional connection with Laika’s experience even as it obscures the reality of her life. Other kinds of identity ambiguity in musical tributes to the space dog involve the performer appropriating a canine identity

28. “Laika,” http://www.laika.org/index_main.shtml (accessed January 25, 2008).

29. “Laika,” http://www.laika.org/index_main.shtml (accessed January 25, 2008).

30. Kyler, “Laika,” *A Flower Grows in Stone* (Deep South, 2004).

or blurring the human-dog boundary in the vein of George Clinton's "Atomic Dog" or the hip hop artist Snoop Dogg. The most explicit example of this is probably Ice MC's Eurodance hit from 1990 in which the rapper announces:

I'm a dog
my name is Laika
my ambition is to be like a f---in' astronaut
and see Mars³¹

In other cases, the boundary between human and animal and the ethical perspective of the artist are unclear, as in Moxxy Früvous's "Laika," which appeared on the Canadian group's 1994 smash hit album, *Bargainville*. The point of view shifts numerous times throughout this witty meditation on coming of age in the age of flying dogs. Like Ice MC and the death rock group Massacre (which speculates that Laika had a fear of heights),³² Moxxy Früvous projects human aspirations and feelings onto Laika with excellent ironic results ("Hey darling, throw this space pup a bone").

An even more arresting ambiguity surfaces when humans incorporate Laika into human pantheons. A physical example of this is the monument to fallen cosmonauts erected outside Moscow in 1997 that includes a likeness of Laika peering up at the faces of the humans who also died in the conquest of space. In the musical realm, we have a brilliant send up of real and artistic spectacular demises by British singer Neil Hannon. In the title cut of the 2004 album *Absent Friends*,³³ Hannon flanks a witty toast to Laika with tributes to the suicidal actress Jean Seberg, the World War I chaplain "Woodbine Willy" (who distributed cigarettes to doomed and dying soldiers), the persecuted Oscar Wilde, and the king of cool Steve McQueen (as "Hicks" in *The Great Escape*).

The flirtation with self-destruction in "Absent Friends" finds more direct expression in the song "Neighborhood #2 (Laika)," a ballad by the Montreal-based indie rock sensation Arcade Fire. While themes of death and loss run throughout the album (appropriately entitled *Funeral*), "Neighborhood #2" invokes Laika's name as the definitive marker of betrayal and rejection:

Alexander, our older brother,
set out for a great adventure.
He tore our images out of his pictures,

31. "Laika," *Cinema* (Xyx, 1991).

32. "Laika, se va," *Aerial* (1998?).

33. The Divine Comedy, *Absent Friends* (Parlophone, 2004).

he scratched our names out of all his letters.
Our mother shoulda just named you Laika!³⁴

The music video for this piece shows a book of “memories” being pulled from the family bookshelves during the singing of the third line. As the last line is sung, a shell labeled “Laika” blasts out of a cannon. In this song and in other examples, the elision of canine-human identity facilitates a reversal of the original inflection of Laika’s story. The historical Laika might still be a victim or a pioneer, but contemporary Laikas can also be agents of betrayal (as in the case of “Neighborhood #2) or emblems of lost causes.³⁵ When the specifics of Sputnik II are invoked, the ending of the story is subject to considerable revision: Laika might survive, return to Earth, or reappear in another realm. For example, in Niki McCretton’s recent theatrical production, “Mutttnik, the First Dog in Space,” the British solo stage performer portrays Laika as a “canine adventurer” whose “rags to riches story” appeals to audiences of “Children and Childish Adults.”³⁶

As the Soviet particulars of Laika’s story recede from the popular consciousness, musicians seem increasingly inclined to link her to more universal human concerns and struggles. The clearest example of using Laika’s name without any reference to the circumstances surrounding her story is a dreamy, half-intelligible song about lost love and self-effacement by Damon and Naomi, the folk-duo, peace activist sponsors of Exact Change publishers.³⁷ Other songs, such as Massacre’s “Laika, se va” or Blippi!’s “Laika,” use selected elements of the Sputnik II story to frame meditations on a (human) longing to return home or the isolation of an endless journey.

In addition to the musical compositions discussed here, a number of recent literary endeavors refer to or are inspired by Laika as well. Among these are children’s books and science fiction works, as well as more serious explorations of loneliness and alienation such as James Flint’s novel *Habitus* (2000) and *Sputnik Sweetheart* (1999) by Haruki Murakami. Nick Abadzis’s graphic novel *Laika* (2007) intertwines fact and fiction to examine the nature of trust and the implications of technological advances for what it means to be human. In Jeanette Winterson’s recently published, *Weight* (2005), the first space dog appears as a grateful companion to a world-weary Atlas in a witty retelling of a classic myth-cum-meditation on choice, freedom, and coercion. In

34. Arcade Fire, “Neighborhood #2 (Laika),” *Funeral* (Merge Records, 2004).

35. For a recent example of this usage, see the comic strip “Get Fuzzy” from November 7, 2006.

36. “Mutttnik the First Dog in Space,” <http://www.angelfire.com/stars4/nikimccretton/cgi-bin/MutttnikShowDetails2006.pdf> (accessed January 25, 2008).

37. “Laika,” *More Sad Hits* (Shimmy Disc, 1992); “Exact Change: Classics of Experimental Literature,” <http://www.exactchange.com/frame/frame.html> (accessed January 25, 2008); “Damon and Naomi,” <http://www.damonandnaomi.com/frameset/frame.html> (accessed January 25, 2008).

keeping with dogs' powerful role as mediators of realms in various mythic and legendary settings, Winterson's historical Laika helps the mythic hero negotiate his unbearable burden even as he saves her from the solitude of outer space.³⁸

Additional evidence of Laika's continued resonance is found in the astonishing number of Web sites devoted to the dog. These range from a "rainbow bridge" memorial that places Laika in the sentimentalized cosmology of grieving pet owners, to sites concerned primarily with space history, stamp collecting, or vending space dog memorabilia.³⁹ A rescue organization for homeless animals in Moscow chose Laika for its Web site logo because, "she represents for us the plight of homeless animals everywhere—abandoned or exploited, but rarely treated with the respect and compassion which all living creatures deserve."⁴⁰

And then there is Akino Arai's song "Sputnik," which appeared on her *Raining Platinum* album in 2000. In a manner perhaps befitting a famous anime singer, the real, the imaginary, and the fabricated are interwoven in this song of lost (human?) love. The lyrics refer to "the Laika dog on Sputnik II," but then conflate the historical Laika with "Kloka," a space dog fabricated by the Spanish artist Joan Fontcuberta for an installation called "Sputnik: The Odyssey of Soyuz 2." First exhibited in Madrid in 1997, "The Odyssey of Soyuz 2" used manipulated digital photos to present an elaborate, completely fabricated history of a fictional cosmonaut who allegedly vanished (along with his canine companion) in 1968.⁴¹

A song of human longing that invokes a fictitious dog to commemorate a real one might be the ultimate tribute to a global celebrity whose entire history is built on irony. For not only is Laika the dog a more meaningful figure—at least in the popular imagination—than the many human forces associated with her voyage, but, even more paradoxically, it seems that by perishing in space, she has become eternal. Laika endures as a symbol of futuristic adventure, sacrifice, and experimentation, as a foil for human anxieties about abused animals and pet dogs, and as a timeless echo of a unique historical moment. But in today's popular culture, the particulars of that moment seem to have been far easier to metabolize than the reality of sending "man's best friend" on a one way trip to

38. On dogs as negotiators of human identities and boundaries, see McHugh, *Dog*, pp. 47–48.

39. "Memorial to Laika," <http://www.novareinna.com/bridge/laika.html> (accessed January 25, 2008); Ted Strong, "Laika the Russian Space Dog!," <http://tedstrong.com/laika-trsd.shtml> (accessed January 25, 2008); Sven Grahn, "Sputnik-2, More News from Distant History," <http://www.svengrahn.pp.se/histind/Sputnik2/sputnik2more.html>, accessed January 25, 2008; Sven Grahn, "Sputnik-2, Was it Really Built in a Month?," <http://www.svengrahn.pp.se/histind/Sputnik2/Sputnik2.htm> (accessed January 25, 2008); Melissa Snowden, "Russian Space Dogs," http://www.silverdalen.se/stamps/dogs/library/library_space_dogs_russian.htm (accessed January 25, 2008).

40. "Moscow Animals," <http://www.moscowanimals.org/index.html> (accessed January 25, 2008).

41. Catherine Auer, "Ground Control to Comrade Ivan," *The Bulletin of the Atomic Scientists* vol. 58, no. 2 (2002): 10–12.

outer space. Like Oscar Wilde, a figure synonymous with wit and gay identity, Laika has become an iconic figure largely divorced from historical specifics. Her continued presence in the human imagination depends on her absence, on the bizarre and public circumstances of her demise, and on the contradictions between the grim realities of her life and people's idealized conceptions of dogs. In contemporary global culture, the memory of the first space dog remains vibrant, even as the historical particulars surrounding her place in the Space Age begin to fade.

LAIKA SINGLES WITH LYRICS

(Title, Artist, Album, Year, Genre, Artist's Country)

- "Sputniks and Mutniks," Ray Anderson and the Homefolks, NA, 1958, country, United States
- "Russian Satellite," The Mighty Sparrow, NA, 1959, reggae, Trinidad
- "Laika," Mecano, *Descanso Dominical*, 1987, alternative, Spain
- "Laika," Ice MC, *Cinema*, 1990, Eurodance/hip hop, United Kingdom
- "Laika," Åge Andersen, 1991, folk rock, Norway
- "Laika," Damon and Naomi, *More Sad Hits*, 1992, alternative / indie rock, United States
- "Laika," Moxy Früvous, *Bargainville*, 1994, folk, Canada
- "Laika, Laika," CCCP, *Cosmos*, 1996, rock, Germany
- "My Dog is an Astronaut, though," Pond, *Rock Collection*, 1997, indie rock, United States (Oregon)
- "Laika, se va," Massacre, *Aerial*, 1998, death rock, Argentina
- "La Ballata Di Laika," Daisy Lumini E Beppe, *El Paese Dei Bambini con la Testa*, 1999, folk / acoustic, Italy
- "Sputnik," Akino Arai, *Raining Platinum*, 2000, alternative, Japan
- "Laika," Gionata, *L'uomo e lo Spazio*, 2002, alternative, Italy
- "Laika," Kyler England, *A Flower Grows in Stone*, 2003, folk/indie rock, United States
- "Neighborhood #2 (Laika)," Arcade Fire, *Funeral*, 2004, indie rock, Canada
- "Absent Friends," Divine Comedy, *Absent Friends*, 2004, alternative, United Kingdom
- "Laika," Little Grizzly, *When it comes to an end I will stand alone*, 2004, indie rock, United States (Texas)
- "Sputnik (Song for Laika)," Sputnik, *Meet Sputnik*, 2004, rock, United States
- "Laika," Blip! *Impulser*, 2005, electronic / alternative, Sweden
- "Laika," Per Bonfils, *Exotic Fruits*, 2005, electronic, Denmark
- "Ultra Laika," Per Bonfils, *Exotic Fruits*, 2005, electronic, Denmark
- "Laika: an Allegory," Amoree Lovell, *Six Sadistic Songs for Children*, 2006, gothic rock, United States (Oregon)
- "Laika," Built by Snow, *Noise*, 2007, indie rock, United States (Texas)

“Laika,” Handshake, *World Won’t Wait*, 2007, folk, United Kingdom (London)

“Laika In Space,” The Antecedents, *Letters from Rome*, 2007, indie rock/pop, United States (Oregon)

“Laika,” Team Robespierre, *Everything’s Perfect*, 2008, punk/dance, United States (New York)

INSTRUMENTAL SINGLES NAMED AFTER LAIKA (Title, Artist, Album, Year)

“Laika,” Honey B. & The T-bones, *On the Loose*, 1990

“Laika,” The Cardigans, *The Other Side of the Moon*, 1997

“Laika,” Those Norwegians, *Kaminzky Park*, 2003

“Like Armstrong + Laika, Tied and Tickled Trio, *Observing Systems*, 2003

“Laika,” Alias, *Instrument No. 4*, 2004

“Laika,” Ghost 7, *New Directions in Static*, 2004

“Laika’s Theme,” The Divine Comedy, *Absent Friends*, 2004

“Laika,” Walnut Grove Band, *Black Walnut*, 2005

“Laika,” KDream, *Spacelab*, 2005

“Flight of the Laika,” Gabber Nullification Project, *Gabber Nullification Project*, 2006

“Laika Goes Techno,” Deliens, *Impacts*, 2006

“Laika,” Ratasseriet, *Beyond*, 2006

“Laika,” The Take, *Dolomite*, 2006

“Laika,” Jah on Slide, *Parole de Rude Boy*, 2007

“Neighborhood #2 (Laika), *Vitamin String Quartet*, 2007

“Laika,” Tony Corizia, *Basswoodoo*, 2007

“Laika (Part 1), CNTR, *Northern Deviation*, 2007

“Laika (Part 2), CNTR, *Northern Deviation*, 2007

“Laika,” Juri Gagarin, *Energia*, 2008

CHAPTER 14

FROM THE CRADLE TO THE GRAVE: COSMONAUT NOSTALGIA IN SOVIET AND POST-SOVIET FILM

Cathleen S. Lewis

“The Earth is the cradle of humanity, but mankind cannot stay in the cradle forever.”

—Tsiolkovskii

“Of all the arts, for us the most important is cinema.”

—Lenin

INTRODUCTION

Soviet film has featured space travel since its beginning. The first Soviet cinematic blockbuster drew on a contemporary science fiction novel about a pair of travelers to Mars. Since that time point, the popular images of human spaceflight and films in Russia and the Soviet Union have had a long, intertwined history that spanned a century. Over that period, the image of the cosmonaut changed along with political sensibilities. Prior to the revolution, the literary image of the cosmonaut began to take form when Russian writers began to explore the possibility of flying into space through the means of science fiction. As revolution approached, these writings took on ideological overtones, combining the ideas of spaceflight with concepts of utopia and revolution. After the Bolshevik revolution, the government undertook the reconstruction of the Russian film industry that had flourished during the years prior to the revolution. About the same time, recognizing the propaganda potential of the media, Lenin declared it a priority in the economic reconstruction of the country that followed the civil war. Over the next decade, a handful of movies treated the idea of space travel, each one conforming increasingly closely to predominant ideological mores about the demeanor and messages of space travelers should carry on their missions. The most popular media in the Soviet Union and the most popular and celebrated event in Soviet history combined to create a national memory and understanding of spaceflight.

In a conversation with Soviet Commissar of Enlightenment Anatolii Lunacharsky in the years immediately after the 1917 revolution, Lenin said,

“Of all the arts, for us the most important is cinema.”¹ Whether Lenin referred to the propaganda potential of the media or its ability to satisfy the country’s need for entertainment is unclear. Nonetheless, during the course of rebuilding the country after war and revolution, the new Soviet state went to great effort and expense to develop this young art form. Two of the earliest and most artistically innovative films of this era featured space travel and were adaptations of a Soviet science fiction novel that promoted the idea of interplanetary socialist revolution.² The reopening of Soviet cinemas and the first portrayal in spaceflight in film coincided with the cinematic production of Aleksei Tolstoy’s *Aelita* in 1924. Months later, a team of animators created their own version of Tolstoy’s tale, replicating the ambitious tone of revolutionary fervor of the time. By the end of the decade, Stalin had redirected that fervor internally towards transforming the U.S.S.R. into an industrialized country. Ideologically, transforming nature and political loyalty replaced the concept of exporting revolution. Man and machine traveling through space matched the prevailing political metaphor of the time of man using technology to master nature. Science fiction that emphasized man’s ability to engineer mastery over nature and political and personal loyalty gained favor during that brief period when officials tolerated speculative literature.

1. Translated and quoted in: *The Film Factory: Russian and Soviet Cinema in Documents, 1896-1939*, 1988, trans. Richard Taylor, ed. Richard Taylor and Ian Christie, paperback (London: Routledge, 1994), p. 56 from the original citation in G. M. Boltyanskii (ed.), *Lenin i kino* (Moscow/Leningrad, 1925), pp. 16-19. Although many historians cite Lenin’s quotation, there is thin evidence that Lenin actually said precisely those words. In the introduction to Josephine Woll’s book on the cinema of the Thaw era, Richard Taylor describes the quote thus, “Cinema has been the predominant popular art form of the first half of the 20th century, at least in Europe and North America. Nowhere was this more apparent than in the former Soviet Union, where Lenin’s remark that ‘of all the arts, for us cinema is the most important’ became a cliché and where cinema attendances were until recently still among the highest in the world.” Josephine Woll, *Real Images: Soviet Cinema and the Thaw*, Kino: The Russian Cinema Series, ed. Richard Taylor (London: I. B. Tauris Publishers, 2000), p. vii. Denise Youngblood casts doubts on whether Lenin actually made the statement, but does support the idea that Lenin had the intention to promote cinema as a means to propaganda, Denise J. Youngblood, *Movies for the Masses: Popular Cinema and Soviet Society in the 1920s* (Cambridge, UK: Cambridge University Press, 1992), p. 35. Peter Kenez discusses the likelihood that the words were consistent with Lenin’s actions, Peter Kenez, *Cinema and Soviet Society: From the Revolution to the Death of Stalin*, Kino: The Russian Cinema Series, ed. Richard Taylor (London: I. B. Tauris Publishers, 2006), p. 22.
2. The two films were adaptations of Aleksei Tolstoy’s novel, *Aelita*. Aleksey Nikolayevich Tolstoy, *Aelita*, trans. Antonnia W. Bouis, ed. Theodore Sturgeon, Macmillan’s Best of Science Fiction (New York, NY: Macmillan, 1981). The first was Yakov Protazanov’s film by the same name: Yakov Protazanov, *Aelita: Queen of Mars*, Kuinzhi, Valentina; Tseretelli, Nikolai; Eggert, Konstantin; Solntseva, Yulia; Zavadsky, Yuri; Ilinsky, Igor; Batalov, Nikolai (Mezhrabpom-Rus, 1924), 120 minutes. The second was an animated version: Nikolai Khodataev, Zenon Komisarenko, and Yuri Merkulov, *Mezhlplanetnaia revoliutsiia (Interplanetary Revolution)*, animation (Biuro gosudarstvenno tekhnicheskogo kino, 1924), 7:40 min.

After Stalin's death, options for speculative expression began to reopen. Soviet science fiction reemerged in the late 1950s after the Soviets launched Sputnik in 1957 and Gagarin in 1961. During the early era of human spaceflight in the 1960s, filmmakers undertook a new effort at portraying spaceflight with ideological undertones similar to the previous era. This time, instead of demonstrating how the new technology was transforming the economy and society these movies reassured the public, combining documentary and theatrical components. The focus was on the present indicating that the era of science fiction and the present were one. After the collapse of the Soviet Union, spaceflight attracted new interest, this time without the inhibitions of Party ideology. These new, post-Soviet films were one component of a reexamination of the 1960s as a pivotal period in Soviet history.

While Soviet and Russian portrayals of spaceflight have been sporadic over the decade, they have been consistent in the way in which they reflect their contemporary ideological realities. Similar to the real cosmonauts, film cosmonauts carried the ideology of their nation into space.

SPACEFLIGHT GAINS IDEOLOGY

Whether or not Lunacharsky's memory of Lenin's statement on the importance of film to the young Soviet state was accurate, the new government indeed demonstrated a commitment to film production that made its importance clear. Movies had been popular in pre-revolutionary Russia. In 1913, St. Petersburg and Moscow had over one hundred movie theaters even though the Lumières brothers' invention of the motion picture camera and projector had only arrived in Russia in 1896, one year after its introduction in France.³ Within five years of the first Russian film production, and at the onset of World War I, Russia was producing about ten percent of films that screened in nearly 1500 Russian movie theaters.⁴ As was true with European audiences, the Russians preferred costume dramas and literary adaptations in this new medium.⁵

Film was a very expensive industry for the young U.S.S.R. What World War I did not destroy of the Russian movie industry, the Civil War finished off. Movie theaters and production companies, like most enterprises that were not essential to life, dissolved due to neglect and scavenging during the Civil War. New foreign films were far too expensive for the government to import during the 1920s into the few surviving theaters. and precious materials for domestic film production were beyond the means of the impoverished state. Promising

3. Kenez, *Cinema and Soviet Society*, pp. 10-11 and 34.

4. Kenez, *Cinema and Soviet Society*, p. 13, and Youngblood, *Movies for the Masses*, p. 2.

5. Youngblood, *Movies for the Masses*, pp. 2-3, and Kenez, *Cinema and Soviet Society*, pp. 13-18.

and experienced Russian directors had fled the country to Western Europe where filmmaking remained a viable career.⁶

Early Soviet attempts to reignite the film industry were not successful. A film industry was far more complex than a factory and relied heavily on foreign trade as much as artistic talent. It was only the implementation of the New Economic Policy (NEP) that materially changed the situation. The NEP allowed the formation of joint stock companies that could earn income, which was the fiscal solution that allowed movie houses to reopen and make profits from ticket sales. After several iterations, Sovkino, the Soviet film production company, was established as a corporation with shares owned by the Supreme Council of the National Economy, Moscow and Petrograd workers' councils, and People's Commissariat of Foreign Trade, which was the largest stockholder.⁷ The resulting cooperation between Sovkino and the one remaining independent film studio, Mezhrabpom-Rus, solved the difficulty of marshalling resources to make films.⁸ Mezhrabpom-Rus used the profits from Sovkino to pay for film production.

The NEP period not only marked a relaxed attitude towards the economy and business, but it also marked a period during which attempts were made to encourage the repatriation of Russian intellectuals who had fled the country during World War I or the Civil War. One such person was Iakov Protazanov, the Russian film director who had directed widely popular costume dramas before the war and had lived in exile in Paris and Berlin since 1917.⁹ Today in the West, Protazanov's role in early Soviet cinema had been overshadowed by directors such as Vertov and Eisenshtein, but at the time, at age 41, this relatively old man of the cinema promised to reinvigorate Russian film.¹⁰ Probably at the behest of Lunacharsky, Protazanov returned to Russia with the promise that he would be allowed to adapt Aleksei Tolstoy's *Aelita* to film with few expenses or

6. Youngblood, *Movies for the Masses*, pp. 3–5, and Kenez, *Cinema and Soviet Society*, pp. 16–21. Both authors recount the disassembly of the Russian film industry and the dispersal of its resources.

7. Kenez, *Cinema and Soviet Society*, p. 40.

8. "In addition, the NEP allowed the formation of the private joint-stock companies. Of these, the two most important were Rus and Mezhrabpom, which were later to form Mezhrabpom-Rus. Mezhrabpom was an abbreviation of International Workers' Aid, an organization established in Germany in 1921 by pro-Soviet and pro-Communist elements. Its original task was to help Soviet Russian fight famine." *Ibid.*, p. 38.

9. "[Protazanov] made his directorial debut in 1912 with the production of *The Departure of the Great Old Man* ('Ukhod velikogo startsa'), an account of the final days of Lev Tolstoy. He made a star of Ivan Mozzhukhin in literary adaptations, such as *The Queen of Spades* ('Pikovaia dama') in 1916, based on Pushkin's short story, and *Father Sergius* ('Otets Sergei') after the novella by Tolstoy, made in 1918." David Gillespie, *Early Soviet Cinema: Innovation, Ideology and Propaganda*, *Short Cuts: Introductions to Film Studies* (London; New York: Wallflower, 2000), p. 10.

10. Jay Leyda, *Kino: A History of the Russian and Soviet Film*, 1960, Third (Princeton, NJ: Princeton University Press, 1983), p. 186.

resources spared. His allocation of film stock far exceeded the normal budgets of the time.¹¹

Protazanov took advantage of his prestige and drew on then-dormant Russian artistic resources. He hired established Russian stage actors, such as Nikolai Tsereteli, and offered the first screen roles to new actors Igor Ilinsky, Iuliia Solnetseva, and Nikolai Batalov, all of whom later became Soviet film stars. Modernist artist Isaak Rabinovich designed the massive Constructivist sets for the Mars scenes. In addition, Alexandra Ekster designed the modernist Martian costumes just prior to her departure from the Soviet Union.¹²

As a completed film, *Aelita* was almost two hours long—very long for the standards of the time.¹³ It was popular among the film going public. Rumors circulated that the director was unable to view the opening due to overcrowding.¹⁴ Most importantly, Sovkino was able to distribute the movie throughout Europe, thus earning hard currency, improving the Soviet Union's balance in foreign trade, and making a profit for future productions. As a measure of his success, Protazanov went on to make ten more silent films in the next six years and continued to make movies until two years before his death at the age of 63 in 1945.¹⁵ In spite of the taints of having returned from abroad after the revolution and producing an ideological suspect film as his inaugural post-Soviet film, Protazanov survived better than other, more revolutionary filmmakers.

As an adaptation of Tolstoy's novel, *Aelita* was the first Soviet science fiction film. It influenced subsequent and internationally better-known European

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11. Protazanov's production of *Aelita* was clearly a priority for Sovkino, as the expense of the project revealed: "The production history of *Aelita* indicated that Protazanov prepared for his Soviet debut with great care and forethought, but without political foresight. Though schooled in the breakneck pace of pre-Revolutionary filmmaking, averaging more than ten films annually before the Revolution, he took over a year to complete *Aelita*. According to the handsome programs that was distributed at screenings of the picture, Protazanov shot 22,000 meters of film for the 2841-meter film (a 3:1 ratio was the norm) and employed a case and crew of thousands." Youngblood, *Movies for the Masses*, p. 109. Advertising for the film, too, was unprecedented. Almost a year prior to its release, Soviet film newspapers and journals reported on the status of the production. In the weeks leading up to the opening in Moscow, *Pravda* advertised teasers for the perspective Moscow audiences. Aleksandr Ignatenko, "*Aelita*": *Pervyi opyt sozdaniia blokbastera v rossii* (Sankt-Peterburg: Sankt-Peterburgskii gosudarstvennyi universitet kino i teledeniia, 2007).
 12. Gillespie, *Early Soviet Cinema*, p. 11. Although Ekster associated with the Constructivists, she considered herself to be an art nouveau designer as she did not adhere to the Constructivist tenets of utility. She immigrated to Paris in 1925. Christina Lodder, *Russian Constructivism* (New Haven, CT: Yale University Press, 1983), pp. 153-155 and 242.
 13. Protazanov, *Aelita: Queen of Mars*.
 14. Mike O'Mahony, "Aelita," in *The Cinema of Russia and the Former Soviet Union*, ed. Brigit Beumers, 24 Frames (London: Wallflower, 2007), p. 37.
 15. Andrew J. Horton, "Science Fiction of the Domestic," *Central Europe Review* 2, no. 1, January 10, 2000: Kinoeye, February 7, 2007, http://www.ce-review.org/00/1/kinoeye1_horton.html, n.p.

science fiction films, such as Fritz Lang's *Metropolis* (1926).¹⁶ However, *Aelita* was in fact not a close adaptation of Tolstoy's *Aelita*, consequently shifting the central theme of the film away from science fiction. In fact, Protazanov's liberties with the novel's plot turned the film into a fantasy melodrama that, while appealing to the public, drew harsh criticism from the ideologically strict party elite. In the movie version of *Aelita*, the heroes Los and Gusev do travel to Mars and precipitate a worker's revolution, but the travel takes place in Los's dream that he has because of his jealousy over his wife. The director turned the export of revolution into a fantasy. His liberties transformed space exploration from a revolutionary activity into the daydreams of an engineer with lingering bourgeois sentiments. Moreover, Protazanov's production dwelled on the corruption and hypocrisy of the NEPmen and pointed out that no one was above the corrupting influences of poverty.

The Martian sequences and Los and Gusev's travel to the planet are of particular interest for their style and design even though their significance to the story is diminished. In contrast to the Soviet-set portions of the movie, which were filmed largely in the streets of Moscow, Mars was represented entirely with the constructivist set. Modern-designed costumes and even the movements of the actors seem to follow the choreography of modernist dance in the manner in which Sergei Diaghalev's *Les Ballet Russes* was popularizing in exile at the same time. Yet Protazanov used these modernist images to portray a dream fantasy of a feudal, slave-owning society. By doing so, he broke the intellectual link between the utopian ideal and modernist art that constructivist artists were demonstrating at the time.¹⁷ Even though Protazanov disassociated the revolutionary notions from space travel, his version of *Aelita* nonetheless established a standard for fictional space travelers in Russian culture. Los, in his dream, discovered his true self through spaceflight, even though the flight was imaginary. He discovered that his dreams of spaceflight interfered with his acceptance of reality, much in the way that the NEP period had been a step back from revolutionary idealism.

The implications of Protazanov's inclusion of modernist and constructivist designs and sets in *Aelita* merits separate discussion. In many ways, the period

16. Ibid.

17. Art historian Christina Kiaer defines constructivism as "this concept of the 'socialist object' as Russian Constructivism's original contribution not only to the history of the political avant-garde art movements of the 20th century, but also to the theory of a noncapitalist form of modernity." Christina Kiaer, *Imagine No Possessions: The Socialist Objects of Russian Constructivism* (Cambridge, MA: The MIT Press, 2005), p. 1. "From this it may be concluded that the term 'Constructivism' arose in Russia during the winter of 1920-1921 as a term specifically formulated to meet the needs of these new attitudes towards the culture of the future classless society. Strictly speaking, the term should not be used with reference to those works of art which were made prior to the Revolution, completely free of any utilitarian content of social commitment on the part of the artist who produced them." Christina Lodder, *Russian Constructivism* (New Haven, CT: Yale University Press, 1983), p. 3.

of the NEP was the freest time of intellectual experimentation in the Soviet Union. Among the many experimental movements active at the time was Aleksandr Rodchenko's Constructivist group that emerged from the Moscow Institute of Artistic Culture (INKhUK).¹⁸ The group sought to map out the role of material objects after the revolution eliminated the last vestiges of capitalism. Rodchenko and his group experimented with the modernist design of everyday objects, using geometric shapes and images of machines as the main themes of their designs. Their experimentation continued for some time into the 1930s, but it did not meet with any degree of success. Modernist preoccupation with stylistic innovation and machines contrasted with the central tenet of Socialist Realism that focused on the nature and concerns of the people.¹⁹ Leaders within the architectural community favored neoclassicism since it appeared to resemble Russian national ideals.²⁰ The protracted competition for the design of the Palace of the Soviets is one example of the manner in which architects and designers pulled away from modernism.²¹ These actions paved the way for the creation of monumental art works in which sculptors and painters collaborated with the architect.²² Over the ensuing years, constructivist designs lost their associations with progress in the Soviet Union until the death of Stalin.

Protazanov's *Aelita* sparked an immediate ideological response over his portrayal of NEP Soviet society. It also sparked a cinematic response. The same year that *Aelita* came out, Soviet animators Nikolai Khodataev, Zenon Komisarenko and Yuri Merkulov released an eight-minute animated short, *Mezhplanetnaia revoliutsiia* (*Interplanetary Revolution*).²³ This short, too, was loosely based on Tolstoy's *Aelita*. In this case, the revolutionary cosmonaut was Red Army Warrior Comrade Kominternov. His name is eponymous with the Communist International—the organization for the international spread of the revolution. The film began with the Bolshevik revolution that motivated the capitalists to flee Earth for Mars. Kominternov chased down the capitalists, following them on his own spacecraft. On Mars, he pursued the grotesque capitalists, emerged victorious, and then sent his message to an Earth receiving station decorated with a portrait of Lenin (see illustration). Khodataev's revolutionary message is not remarkable, but his techniques for portraying this

18. Kiaer, *Imagine No Possessions*, pp. 1–2.

19. Cynthia Simmons, "Fly Me to the Moon: Modernism and the Soviet Space Program in Viktor Pelevin's 'Omon Ra,'" *Harriman Review* 12, no. 4 (November 2000): 4.

20. Arthur Joyce, "Soviet Art and Architecture: Recent Developments," *Annals of the American Academy of Political and Social Science* 303, "Russia since Stalin: Old Trends and New Problems" (January 1956): 107.

21. Vladimir Paperny, *Architecture in the Age of Stalin: Culture Two*, trans. John Hill and Roann Barris (Cambridge, UK: Cambridge University Press, 2002), pp. 1–8.

22. Joyce, "Soviet Art and Architecture," 114.

23. Nikolai Khodataev, Zenon Komisarenko, and Yuri Merkulov, *Mezhplanetnaia revoliutsiia* (*Interplanetary Revolution*), animation (Biuro gosudarstvenno tekhnicheskogo kino, 1924), 7:40 min.



Kominternov declares victory in *Mezhplanetnaia revoliutsiia* (1924) Nikolai Khodataev, Zenon Komisarenko, and Yuri Merkulov. *Mezhplanetnaia Revoliutsiia* (Interplanetary Revolution). Animation. Biuro gosudarstvenno tekhnicheskogo kino, 1924. 7:40 min. Redistributed in: *Animated Soviet Propaganda: From the October Revolution to Perestroika*. Films by Jove in Association with Soyuzmultfilm Studio. Executive Producer: Oleg Vidov. Director/Writer/Producer: Joan Borsten. Restored version (c) 2006. (Films by Jove)

message are startling in their ingenuity. The animation used a combination of hand drawn cells and cutout animation. Although the ideology of Khodataev's short differed from that of Protazanov, these were the last two portrayals of space travelers using modernist designs for nearly 40 years.

Although creative artists began the portrayal of utopian spaceflight in film in the 1920s, the science popularizers were about a decade behind in the production of science fiction films. *Kosmicheskii reis* (*Spaceflight*) was a 1936 film that was the brainchild of director Vasilii Zhuravlev, a young director who evaded the ideological controversies that plagued Protazanov.²⁴ In contrast to Protazanov and Khodataev, Zhuravlev's goal was to portray spaceflight

24. Vasilii Zhuravlev, *Kosmicheskii reis* (*Space Flight*), S. Komarov; K. Moskalenko; V. Gaponenko; V. Kovrigin; N. Feoktistov; (Gosudarstvennoe upravlenie kinematografii i fotografii (GUKF), 1936), 70 minutes. The English translation of the film title is sometimes referred to as *Cosmic Voyage*.



The spacecraft *Iosif Stalin* waits for launch to the Moon in *Kosmicheskii reis* (1936) Vasili Zhuravlev. *Kosmicheskii Reis* (Space Flight). S. Komarov; K. Moskalenko; V. Gaponenko; V. Kovrigin; N. Feoktistov; Gosudarstvennoe upravlenie kinematografii i fotografii (GUKF), 1936. 70.

realistically and to produce a technical science fiction film. Previously the creator of educational scientific films, he called on the expertise of none other than Konstantin Tsiolkovskii for technical advice.²⁵ Tsiolkovskii had been a science popularizer, as well as an airship and rocket theorist. Even this late in his life, Tsiolkovskii enthusiastically contributed to the project, sketching and writing notes on his anticipation of the effects of spaceflight.²⁶

Kosmicheskii reis is set in the futuristic year of 1946, and begins at the fictional Tsiolkovskii Institute for Interplanetary Communications. In contrast to Protazanov's *Aelita*, the Earth scenes are modernist, resembling the art deco

25. Anatolii F. Britikov, *Russkii sovetskii nauchno-fantasticheskii roman* (Leningrad: Izdatel'stvo "nauka," 1970), p. 27.

26. Ben Finney, Vladimir Lytkin, and Liudmilla Alepko, "Tsiolkovskii's 'Album of Space Voyages': Visions of a Space Theorist Turned Film Consultant." 1997, in *Proceedings of the Thirty-First History Symposium of the International Academy of Astronautics, Turin, Italy, 1997*, ed. Donald C. Elder and George S. James, vol. 26, *History or Rocketry and Astronautics*, AAS History Series (San Diego, CA: Univelt, 2005), pp. 3-16.

style that was popular in Hollywood films at that time. The film features aged astrophysicist, Pavel Ivanovich Sedykh, who bears a remarkable resemblance to Konstantin Tsiolkovskii. The film opens with Sedykh planning a spaceflight to the Moon on board his space rocket (see illustration), the *Iosif Stalin*, in spite of a previous failed test mission with a cat. After a dispute over issues of personal loyalty and bureaucratic interference, Sedykh balks at concerns over his health and insists on accompanying his assistant and an adolescent boy, Andrushka, on the flight. The three astronauts successfully land on the Moon, unfortunately losing fuel and their radio in the process.²⁷ While en route to the Moon, the trio experience weightlessness, and on the Moon, they experience diminished gravitational pull. In the process of making a visual signal for Earth about their successful arrival, they discover the cat from the previous mission has survived and that frozen remnants of the lunar atmosphere can be used as fuel for their return mission. Meanwhile on Earth, scientists plan to launch a rescue mission. Just as the launch is about to take place, the Iosif Stalin returns with the jubilant crew. Sedykh declares that they have “opened the path to space.” During the late 1950s and early 1960s, Soviet cosmonauts, politicians, and journalists repeated that phrase again and again.

THE KOMSOMOL IN SPACE

Both science fiction film and literature diminished in prominence in the Soviet Union under Stalin. After *Kosmicheskii Reis*, there was not another space science fiction film in Moscow until 1958 when the East German film based on the Stanislaw Lem science fiction story, *Der Schweigende stern* (*Silent Star*) opened in theaters in the Soviet Union under the Russian title *Bezmolvaia zvezda*.²⁸ A new infusion of science fiction films, beginning with the prescient Soviet film *Nebo zovët* (*The Sky Calls*), followed in 1960. It predicted a space race between the United States and the Soviet Union to Mars.²⁹ Like *Kosmicheskii reis* before

27. Sedykh and Andrushka referred to themselves as “astronauts” and not “cosmonauts” throughout the film. This was the prevailing name of space travelers at the time, drawing from the Latin-based language of Verne. The decision to adopt the Greek-root cosmos for cosmonaut was deliberate and absolute in 1961. Morton Benson, “Russianisms in the American Press,” *American Speech* 37, no. 1 (February 1962): 41–47.

28. Kurt Maetzig, *Der Schweigende Stern* (*The Silent Star*), (*Bezmolvaia zvezda*), Tani, Yoko; Lukes, Oldrich; Machowski, Igancy; Ongewe, Julius (Deutsche Film (DEFA), 1959), 155 min.

29. Mikhail Kariukov and A. Kozyr', *Nebo zovët* (*The Sky Calls*), Pereverzev, Ivan; Shvorin, Aleksandr; Bartashevich, Konstantin; Borisenko, Larisa; Chernyak, V.; Dobrovolsky, Viktor (Gosudarstvenii komitet po kinematografii (Goskino), 1960), 77 min. American producer Roger Corman purchased the rights to the film and hired a young Francis Ford Coppola to rework the movie. *Battle Beyond the Stars* was an American interplanetary war movie with no reference to Cold War competition. Jimmy T. Murakami, *Battle Beyond the Stars*, Thomas, Richard; Vaughn, Robert, Saxon, John (New World Pictures, 1980), 104 min.



Masha bids farewell to her crewmates from the Vega, Shcherba and Allan Kern, as they prepare to land on Venus to rescue their colleagues from the *Serius* in *Planeta Bur'* Klushantsev, Pavel. *Planeta Bur'* (Planet of Storms). V. Emel'ianov; Iu. Sarantsev; G. Zhzhenov; K. Ignatova; G. Vernov; G. Teikh, Leningrad Popular Science Film Studio, 1962. 83 min. (Courtesy Seagull Films of New York)

it, *Nebo zovët* took pains at demonstrating the effects of spaceflight through special effects and set design.

Two years after the release of *Nebo zovët* and within one year of Yuri Gagarin's historic flight, another Soviet science education film director, Pavel Klushantsev, presented his own fictional interplanetary tale, *Planeta bur'* (Planet of Storms).³⁰ The movie began with a crash. A meteor crashes into one of three Soviet spacecraft en

30. Pavel Klushantsev, *Planeta bur'* (Planet of Storms), Emel'ianov, V.; Sarantsev, Iu.; Zhzhenov, G.; Ignatova, K.; Vernov, G.; Teikh, G. (Lennauchfilm, Leningrad Popular Science Film Studio, 1962), 83 min. Like its immediate predecessor, this film, too, had a second cinematic life in American theaters, first as the 1965 *Voyage to the Prehistoric Planet* and then in 1968 as *Voyage to the Planet of Prehistoric Women*. Director Peter Bogdanovich created the second American version. Curtis Harrington, *Voyage to the Prehistoric Planet*, Rathbone, Basil; Domergue, Faith; Shannon, Marc (Roger Corman Productions, 1965), 78 min. and Peter Bogdanovich, *Voyage to the Planet of Prehistoric Women*, Van Doren, Mamie; Marr, Mary; Lee, Paige (The Filmgroup, 1968), 78 min.

route to the planet Venus. The crews of the surviving spacecraft, “Vega” and “Serius,” had to make a decision about exploring the planet while waiting for a third craft to join them. They decided jointly that in the name of the party and the Soviet Union, they would go ahead with the risky exploration, leaving a lone crewmate and the only woman, Masha, in orbit (see illustration). With them, the men took the robot and its designer, an American, to the surface. In this movie, the cosmonauts found themselves separated from their spacecraft on the planet Venus, fighting prehistoric animals and surviving erupting volcanoes en route back to their spacecraft. The men survived the mission by maintaining Komsomol discipline. The robot was not capable of sacrificing himself for the good of the collective; therefore, the cosmonauts abandoned the robot in a river of molten lava. Meanwhile, onboard the sole remaining spacecraft orbiting the planet, Masha struggled to maintain discipline and remain in orbit over her desire to commit a pointless act of heroism. In the end Masha overcame her emotions, obeyed orders, and aborted her rescue attempt to the planet’s surface, thus leaving open the possibility of salvaging the mission.

Even though they were made a generation apart, *Planeta bur'* resembled *Kosmicheskii reis* in content and values. Both films relied heavily on the principles of science education for content, although the latter used wild fantasy in the Venus segments of the movie. The former presented an image of cosmonauts that announced the new age of human spaceflight to the world. *Planeta bur'* demonstrated that cosmonauts took the values of party discipline with them as they explored the solar system. The film also began Klushantsev’s 1960s trilogy that included the movies *The Moon* and *Mars*. All three films combined science education with realistic portrayals of science fiction, even though the later two were hybrids of documentary and theatrical film, switching from scientific lectures and interviews to dramatic demonstrations of scientific principles. This new genre reinforced the cosmonaut message during the 1960s. Through party discipline, the Soviet Union was leading the way into space.

Although popular cinema never achieved the propaganda effect that Lenin and Lunacharsky had predicted during the revolution, it did remain a popular diversion from everyday life. In spite of ideological mandates and the international popularity of Modernist film directors such as Eisenshtein and Vertov, Russian audiences preferred a comprehensible story line and rational adventure. As a result, the earliest Soviet science fiction movies subordinated the ideological aspects of space travel to the fantasies about the appearance of other worlds. Subsequent films attributed a nation’s ability to fly in space to personal loyalty and party discipline. This trend continued in the new Soviet science fiction films at the dawn of the Space Age. This style would continue in films and the portrayal of cosmonauts through the collapse of the U.S.S.R.

POST-SOVIET REEXAMINATIONS

After the dissolution of the Soviet Union in 1991, postmortem examination of the Soviet experience became a national pastime. Artists, writers, and filmmakers joined with journalists and common citizens to assess what the 75-year Bolshevik experiment had meant. There have been two recent Russian theatrical films, Aleksei Uchitel's *Kosmos kak predchuvstvie* (*Space as Premonition*, 2005)³¹ and Aleksei Fëdorchenko's *Pervye na lune* (*First on the Moon*, 2005),³² that address the legacy of the golden years of Soviet spaceflight in their own unique manner. Each film places spaceflight into the context of a specific period. Uchitel's film is set in the early 1960s and Fëdorchenko's begins in the 1930s. Both dissect the origins of the culture of real spaceflight.

Aleksei Uchitel's film takes a nostalgic approach in which the early Soviet space program provides the background for a story about the illusion of nostalgic optimism. The film takes place between the time of the launch of Sputnik and Yuri Gagarin's flight. The protagonist of the story is a hapless young man, Koněk, whose naïveté has benefited him. Unaware of the injustices around him, he is able to wonder through life unaffected by it. The main character is a cook whose real name is Viktor, but he goes by the nickname "Koněk" (Horsie). The story focuses on Koněk's relationship with a former sailor and dockworker, German. German, who is also known as "Lefty," is a former sailor who is trying to defect to the West. His persona allures Koněk, a man who is haplessly living with his mother and indecisive about committing to his girlfriend, Lara. In contrast, German is worldly and sophisticated. The men form bonds: both are war orphans and relish fights with sailors. To Koněk's mind, German is exotic and mysterious, possessing superior skills and knowledge about the world, as well as material possessions including an East German radio that picks up BBC. In spite of his seeming sophistication, German cannot articulate properly the English words to declare his intention to defect. Ironically, his new hapless friend demonstrates the ability to mimic the voices on BBC radio almost perfectly, although he has no ambitions for contact with the West and understands little of what he is saying.

Over the course of their relationship, Koněk begins to dress and act like German. He goes as so far as to practice swimming in the harbor. Koněk assumes that this activity is to improve his athletic performance; he is clueless that his

31. Aleksei Uchitel, *Kosmos kak predchuvstvie* (*Space as Premonition*), Mironov, Evgenii; Pegova, Irina; Tsyganov, Evgenii; Liadova, Elena (Rock Film Studio, 2005), 90 minutes. Uchitel' won the "Golden St. George" award at the Moscow International Film Festival in 2005 for this movie.

32. Aleksei Fedorchenko, *Pervye na lune* (*First on the Moon*), Vlasov, Boris; Slavnin, Aleksei; Osipov, Andrei; Otradnov, Anatolii; Ilinskaia, Viktoriia (Sverdlovsk Film Studio and Film Company Strana, 2005), 75 minutes. Ironically, this film won the "Best Documentary" award at the Venice Film Festival in 2005. The same year, it won "The Best Debut" prize at the Kinotaur Festival in Sochi, Russia.

friend intends to defect by swimming out to a foreign ship. Sailors eventually beat him up for his attitude and for flagrantly walking around town with the forbidden radio. As their relationship develops, German confesses that his mysterious secret assignment is to seek out the ten cosmonauts who are training for the first spaceflight in Kustanay in the Kazakh Republic. For a while, German insists to Koněk that soon men will travel to the Moon everyday, but, ultimately, he confesses again that he had been in prison in Kustanay, convicted for making wisecracks while in the Navy. German is last seen swimming toward a shipping vessel marked "Lake Michigan" as the ship moves away. Viktor (Koněk) marries Rima, Lara's sister, and they take a train to Moscow.

In *Kosmos kak predchuvstvie*, space is metaphor for hope. In the movie, Lara asks Koněk as a plea for reassurance if he can see *Sputnik* after German seduces her. A second use of the metaphor occurs during Koněk and Rima's trip to Moscow. While on the train, Koněk crosses paths with an equally unassuming young pilot named Gagarin whom the hero and audience believe to be the Yuri Gagarin. When speaking to Gagarin in the train, Koněk asks him if he is going to fly rockets. Gagarin responds by asking if he was referring to the predictions of Tsiolkovskii. Koněk replies, "No, German." Gagarin has not heard of that scientist, to which Koněk replies, "He is not a scientist, but he has already flown." When the pilot arrives at his stop, Koněk asks his name and notices that his shoelace is untied. Later Koněk recognizes Gagarin by this untied shoelace. By this time, Gagarin has made his flight and is walking down the red carpet to greet Khrushchev.

It is through this meeting that the director has tied the meaningless life of his hero to the equally unpurposeful mission of the space program. The experienced and knowledgeable character, German, is determined to escape the Soviet Union, even if it costs him his life. The more meandering of the two, Koněk, identifies most closely with Gagarin. One film reviewer has described the time between Sputnik and Gagarin's mission, "the two moments of Soviet triumph in space that, the contemporary audience knows, led nowhere and that provide the bookends of the film (the flights of Sputnik and of Gagarin)."³³ These two moments of triumph represent a memorable period that benefited the nation through their naiveté but provided no objective improvement in its circumstances.

Fëdorchenko's *Pervye na lune* is closer in tone to Viktor Pelevin's novel *Omon Ra* in its take on the space program.³⁴ Produced as a mock documentary or

33. Katerina Clark, "'Aleksii Uchitel,' Dreaming of Space [*Kosmos kak predchuvstvie*] (2005)," *KinoKultura*, no. October 2005, <http://www.kinokultura.com/reviews/R10-05kosmos.html> (accessed on August 11, 2006).

34. Pelevin's novella was an award-winning book in Russia in the early 1990s. The book is a modernist satire that tells the story of a boy, Omon, who wants above all things to become a cosmonaut. His journey to that goal takes him through the Byzantine depravations of a

mockumentary, this film fabricates the existence of a secret Cheka film archive of a Stalinist program to send men to the Moon during the 1930s. Where *Space as Premonition* parodies the unfulfilled potential of spaceflight weighed-down by a corrupt system, *First on the Moon*, portrays the cosmonauts as tragic victims of the state. The events of this film take place during the late 1930s and present footage of the selection and training of cosmonauts for a secret flight to the Moon. The purported documentary reports on the uncovered mission and the search for the survivor—cosmonaut Ivan Sergeevich Kharlamov—his journey from his crash site in Chile, and ultimate return to the Soviet Union. Although this is a parody, partly of the Stalinist Falcon's flights of the 1930s and partly of the space program of the 1960s, the treatment of the cosmonauts is deeply affectionate. They, too, are hapless and blameless in their efforts.

Ivan Sergeevich Kharlamov started his career as an aviation pioneer along with Chkalov and Baidukov, aviators who were the first heroes of the Soviet Union. At some point in his career, he joins a team of Soviets and Germans who were cooperating on rocket development under the conditions of the 1922 German-Soviet Treaty of Rapallo. Among the finalists for the mission are four people: Kharlamov; a girl known as the Komsomol princess, Nadia; a central Asian, Kharif Ivanovich Fattakhov; and a midget. All endure the final testing, and the chief designer makes the final selection of Kharlamov for a launch in 1938. After the launch, the ground control loses all contact with the spacecraft, throwing the entire program into turmoil. The chief designer commits suicide. Mysterious men sedate and kidnap the remaining cosmonaut-candidates from their barracks and destroy all evidence of the mission, saving only a scale model of the spacecraft.

What could have been a complete coverup of the program's existence was, however, imperfect. In March 1938, Chilean peasants report seeing a fireball in the sky. This episode refers to a real event in history of a meteor landing in the country. In Fedorchenko's film, it is not a rock, but Kharlamov's spacecraft that lands in Chile. He has survived his mission. However, without official status, Kharlamov has no resources with which to return home and has to become personally resourceful to do so. The Cheka interviews trace his steps in the return home. He travels through Mongolia during the Russo-Japanese War, after crossing the Pacific Ocean via boat and through China. Speaking only gibberish upon his return to the U.S.S.R., Kharlamov ends up spending time in a psychiatric hospital. It was this time that the People's Commissariat for Internal Affairs (NKVD) takes notice of his return to the U.S.S.R. Always not close enough on his trail, 30 NKVD agents gather information on his life as they follow him.

corrupt Soviet system that stages a mock-flight to the Moon. When Omon discovers the true level of deception about the program, and implicitly, the Soviet system, he flees. Viktor Pelevin, *Omon ra* (Moscow, Russia: Vagrius, 2001).

The bulk of the film contains interviews with those who knew or saw him. The materials that the NKVD agents salvaged include psychiatric footage of the administration of electroshock and insulin therapy that bear a remarkable resemblance to the flight-test footage. Agents also interview his wife after he leaves the psychiatric hospital. They later interview Fattakhov and the midget. The interviews with Fattakhov about Kharlamov's background are particularly instructive. Fattakhov has become a builder of giant mechanical insects for children's museums. His profession makes the analogy to Franz Kafka's *Metamorphosis* obvious, especially because the insects are always on their backs except for one final scene with Fattakhov at a museum.

The NKVD's trail of Kharlamov goes cold after they tracked down the midget who returned to his original profession—a circus performer. At one point, Kharlamov joins him where, for a while, he plays the part of a circus version of Aleksandr Nevskii, repelling the Teutonic invaders.³⁵ Although the NKVD gives up pursuit of Kharlamov at this point and eventually opts to destroy all evidence of the lunar program, they neglect one thing. There is one remaining source of evidence that they cannot destroy. In the closing scenes, the movie takes the viewer to the natural history museum in Chile, near where the peasants had seen the fireball in 1938. This museum retains the footage from Kharlamov's lunar mission and the hardware from his flight. The movie closes with film footage of a lunar landscape and a lone, silent cosmonaut sitting inside his spacecraft (see illustration).

Pervye na lune goes far to dissolve the links between the hero cosmonaut and the Soviet state. Kharlamov was loyal to his country to the end, returning even after his existence had been denied. Even his final known role was that of the legendary and publicly manipulated Nevskii. His reward for all this had been pursuit and abuse by the system that created him.

Both Uchitel and Fëdorchenko drew on the traditions of realistic science fiction in their films. In each case, spaceflight is technically accurate and not metaphysical. These films refer to the traditions that Zhuravlev and Klushantsev had pioneered. The difference between these post-Soviet filmmakers and their predecessors is that they have portrayed Soviet cosmonauts stripped of the either implicit (*Kosmicheskii reis*) or explicit (*Planeta Bur*) ideological discipline. Uchitel's Gagarin lived in morally reprehensible system that only the hapless can ignore. Fodorchenko's Kharlamov returned to a country whose state apparatus is determined to remove all evidence of his existence.

35. This scene was clearly homage to Sergei Eisenshtein's film version of the Nevskii story, completed in 1938 and withdrawn in 1939. In Fedorchenko's film, the invading midget Teutonic Knights bear the swastika-like crosses that Eisenshtein's attackers on Novgorod did. Sergei Eisenshtein, *Aleksandr Nevskii*, Cherkasov, Nikolai; Okhlopkov, Nikolai; Abrikosov, Andrei; Orlov, Dmitri; Novikov, Vasili (Mosfilm, 1938), 1:37. This is one of many allusions to Soviet films in the movie. At one point, the cosmonauts go to see Zhuravlev's *Kosmicheskii reis* during the course of their training.



Cosmonaut Kharlamov en route to the Moon in *Pervye na lune* Fedorchenko, Aleksei. *Pervye Na Lune* (First on the Moon). Vlasov, Boris; Slavnin, Aleksei; Osipov, Andrei; Otradnov, Anatolii; Ilinskaia, Viktoriia. Sverdlovsk Film Studio and Film Company Strana, 2005. 75 minutes. DVD: ©2004 Prokatnoe upravlenie Sverdlovskoi konostudii. ©2005 OOO "SR Didzhital." (©Dizain Oblozhki OOO "SR Didzhital.")

CONCLUSION

The 20th century began with great expectations about spaceflight and communist revolution. By the end of the century, although spaceflight had become a reality, it did not meet the expectations of the early visionaries, and the revolution had become a bitter disappointment to most. In real life, Russian and Soviet cosmonauts have traveled barely higher than Yuri Gagarin did in his 1961 flight, escaping the cradle of Earth by only a few hundred kilometers. In film, they traveled to Mars, the Moon, and Venus, carrying with them bold messages of interplanetary revolution and party discipline. When Russians began to reexamine the Soviet experience, they did not spare the once celebrated experience of spaceflight. Spaceflight had been a central focus of mid-century Soviet propaganda as demonstrable evidence that the Soviet Union had exceeded recovery from World War II and was overtaking the United States. Although pre-Gagarin film directors could easily refit fictional characters with appropriate political awareness for the given situation, once the

Soviet Union had sent men and a woman into space, those individuals were forever bound to the Soviet ideology of the 1960s. For that reason, the post-Soviet reassessment of the early years of human spaceflight paid close attention to the cosmonaut's relationship with the state. One consequence was that these films extricated spaceflight and cosmonauts from their ideological burden by passing the judgment that what might have held cosmonauts back from fulfilling the spaceflight dreams of the 1920s. According to these directors, it had been ideology and not technology. As Tsiolkovskii had predicted, humans had emerged from the cradle of Earth, but it was from the gravesite of the Soviet Union that cosmonauts gained their freedom from ideological burdens.

CHAPTER 15

EXAMINING THE ICONIC AND REDISCOVERING THE PHOTOGRAPHY OF SPACE EXPLORATION IN CONTEXT TO THE HISTORY OF PHOTOGRAPHY¹

Michael Soluri

*The exactly repeatable pictorial statement in its photographic forms has played an operational role of the greatest importance in the development of modern science and technology. It has become an essential to most of our industries and to all of our engineering.*²

I. PREFACE

My earliest recollection of space travel was the star-size dot of the Soviet Union's Sputnik blinking on then off then on as it arced across the then starry sky of Niagara Falls, New York. And the first photograph that ignited my fantasies of space exploration (not withstanding motion pictures like *Forbidden Planet*, *This Island Earth*, and *The Day the Earth Stood Still*) was the dismaying launch-explosion of the Navy's Vanguard One. It was the United States' first effort to place a satellite into Earth orbit in December 1957. The result was a

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1. I wish to thank Steve Dick and his committee (which included Asif Siddiqi) for having chosen me to participate in the "Remembering the Space Age Conference"—a dream come true. Thank you as well to Leslie Martin and the Aperture Foundation for their invaluable assistance in obtaining the artists' rights to some of the fine art photographs used in this paper. My gratitude to them for the inspiration I constantly receive from the world-class exhibitions, books, and lectures that have catalyzed my thinking for this paper. NASA Johnson Space Center's (JSC) Media Resource Center, Michael Gentry (and his dedicated team) was always available to find sought-after imagery, along with a wealth of information and insight on human spaceflight photography. Mary Ann Hager at the Lunar and Planetary Institute provided invaluable guidance on the flight photography of Project Apollo. Ed Wilson and Maura White of JSC's Information and Imaging Systems branch provided research and high resolution files from Apollo flight films. The Hubble SM4 crew of STS-125, whose wish to make more insightful images during their mission, inspired me to explore and share with them the photographic history of astronaut flight photography. And thanks to Loralee Nolletti, my wife and mother to our son, Gabriel, for her remarkable skill and patience in the editing of this paper.
 2. William M. Ivins, Jr., *Prints and Visual Communication* (Cambridge, MA: The MIT Press, 1969), p. 179.

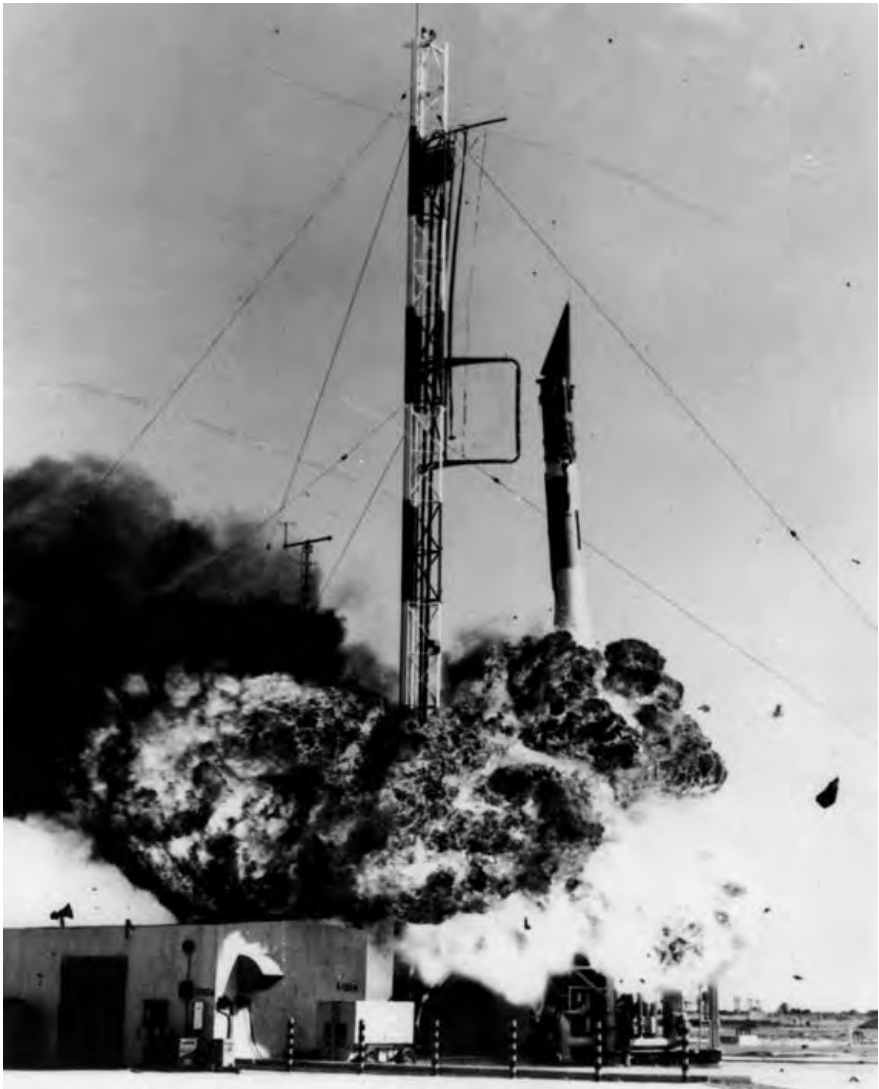
black-and-white image published over and over in various print media venues that, over the last five decades, has become a convincing visual report on the American effort to compete with the Soviets who already had two satellites in Earth-orbit. The Vanguard image is one of many now-familiar images that visually communicate the early days of the Space Age. As a result, it can be argued that this photograph has become iconic in the sense that it is a recognizable image whose familiarity is framed both by its historic relevance and its repeated publication in chronicling the first 50 years of space exploration.

In my process of rediscovering the iconic within these first 50 years of space exploration photography, I will first identify those images that I consider to be iconic, including the Vanguard launch explosion. Thereafter, I will discuss these photographs within the context of the history of photography, looking at both their technical evolution as record-keeping tools and their aesthetic appeal and importance as historic markers of American culture and beyond. Once this historical framework is established, I will move beyond the known iconic imagery to the emergence of other imagery. And why not consider new imagery? Aren't there other photographs beyond that one iconic photograph—the new and largely undiscovered photograph that tells the same story of an event? In fact, that new photograph may even offer a fresh perspective on the event. I will then critique these new and emerging photographs and juxtapose them to aesthetic markers in the history of photography, drawing from landscape, portraiture, documentation, photojournalism and fine art photography.

II. BEGINNINGS

On a January night in 1958, not even 60 days after the Vanguard's explosive entrée, the U.S. Army launched its Jupiter-C version of the Redstone rocket, introducing the first successful orbiting of an American satellite: Explorer 1. This event was historically significant for both space science and photography because it created a new and emerging iconographic image: the launching of a rocket thrusting into space. In addition, the postflight news conference was memorialized in a photograph of the jubilant Wernher Von Braun, William Pickering, and James Van Allen holding a model of America's first satellite over their heads.³ The photographs of Vanguard One, Explorer 1, and the postflight press conference were products of a distinctly American culture. With the Soviets not providing any immediate photographic evidence of their similar events, the American print media had ushered in a new photographic genre: space exploration photography. These photographs would be repeated again and again in both the print and electronic media for the next five decades. Moreover, images of a rocket explosion, a rocket launch and the people behind the scenes

3. The photographer of this image is unknown, according to Erik M. Conway, the Historian at the Jet Propulsion Laboratory.



Vanguard One Explosion at Cape Canaveral, Florida: December 6, 1957. (NASA)

would become immediate archetypes for those recording the exploits of future space exploration. These iconic images (and others that also eventually emerged) have had a profound impact on American culture, and the adaptation of American scientific and technological culture abroad.⁴

4. For a greater understanding on the association between space exploration and the American culture's space policy and history, see Howard McCurdy's *Space and the American Imagination* (Smithsonian Institution, 1997).



Explorer 1 Launch, Cape Canaveral, Florida: January 31, 1958. (NASA)

In examining the first 50 years of iconic imagery, space exploration photography has largely focused on the reporting of an event. According to William Ivins, photography actually has two possible outcomes: the recording of an event and the interpretation of that event:

The flood of photographic images (since its invention) has brought about a realization of the difference between visual reporting and visual expression. So long as the two things were not differentiated in the mind of the world, the world's greater practical and necessary interest in reporting had borne down artistic expression under the burden of a demand that it be verisimilar (true or real), and that a picture should be valued not so much for what it might be in itself as for the titular subject matter which might be reported in it.⁵

It is my intent to explore these assertions by examining the notions of visual reporting and visual expression in the photography of space exploration in the context of the evolving history of photography. What follows is a brief summary of that history.

5. William M. Ivins, Jr., *Prints and Visual Communication* (Cambridge, MA: The MIT Press, 1969), p. 177.



Explorer 1 post-launch news conference, Washington, DC: February 1, 1958. (NASA)

III. AN ABBREVIATED HISTORY OF PHOTOGRAPHY

The nineteenth century began by believing that what was reasonable was true and it wound up by believing that what it saw a photograph of was true—from the finish of a horse race to the nebulae in the sky. The photograph has been accepted as showing that impossible desideratum of the historian—wie es eigentlich gewesen—how it actually was.⁶

In 1836, more than 120 years before the dawn of the Space Age, the sciences of chemistry and optics began to come together, resulting in the inevitable invention of photography.⁷ As early as 1826 in France, Joseph Nicéphore Niépce was able to capture an image with an eight hour exposure of sunlight through a camera obscura. He called his results, which eventually faded on bitumen paper, a heliograph. What eluded Niépce, however, was the ability to fix and chemically secure the image permanently. A few years later, in 1837, Louis-Jacques-Mandé Daguerre discovered a process that captured and fixed an image on a polished silver surface. Before exposure to sunlight through a camera, the silver surface had to be exposed to the fumes of iodine. Once sensitized and exposed, it was developed in a vapor bath of hot mercury. This process resulted in a daguerreotype. Daguerreotypes, however unique and precious, were one-of-a kind, small in size, fragile, and not reproducible.⁸

By 1835, William Fox Talbot, a British nobleman, was able to do what scientists, alchemists, inventors, and artists had been unable to do: create exactly reproducible pictorial images. He called his image reproduction a calotype. With the calotype, Talbot figured out the basic principles of photography: how to get images of things he saw in a camera obscura on paper and how to make them permanent. Given both the competitiveness and thus simultaneity of photography's invention, he put together the findings in a paper presented to the Royal Society in London.⁹ Talbot read his paper, "Some Account of the Art of Photogenic Drawing, or the Process by which Natural Objects may be to Delineate themselves without the Aid of the Artist's Pencil," on January 31, 1839—six months before Daguerre's official presentation.¹⁰ When considering a timeline, it was 119 years to the day until the launch of Explorer 1.

6. Ibid., p. 94.

7. Ibid., p. 116.

8. Ibid., p. 120.

9. Ibid., p. 122.

10. By the next decade, photographic experimentation moved across the ocean to America. In 1840, Dr. John Draper of New York City was the first to make a 20 minute exposure of the Moon on a daguerreotype. To mark the historical significance of Draper's image, consider that the date was 230 years after the 1610 publication of Galileo's drawings of the Moon in *Sidereus Nuncius* and



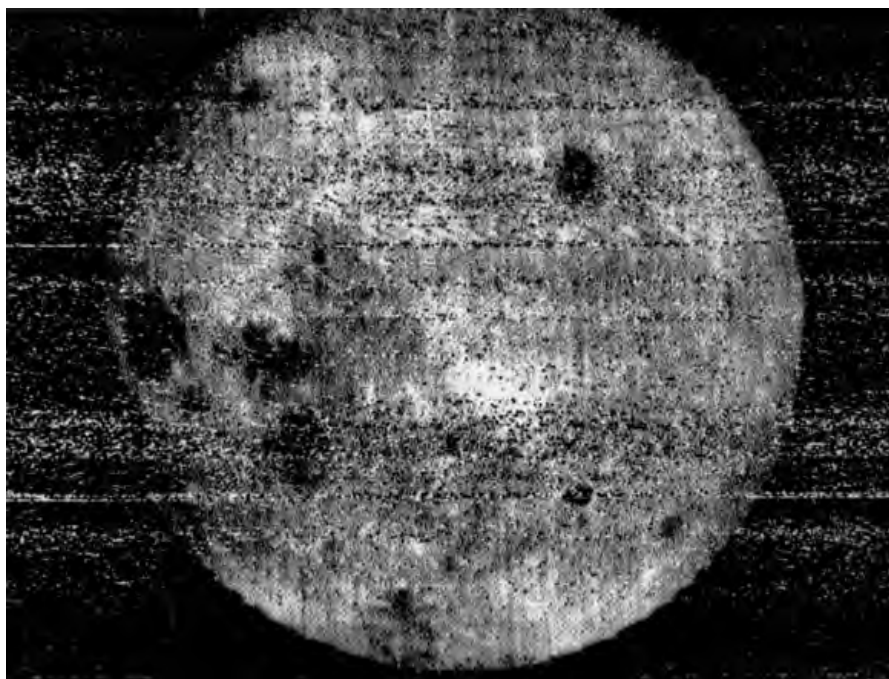
Fall of Richmond, Virginia: 1865. (Mathew Brady/Library of Congress)

And just two years into the Space Age in 1959 and approximately 95 years since Mathew Brady's exact and reproducible photographic images of the Civil War, the first still photograph from the backside of the Moon was radioed to Earth by the Soviet Union's robotic space probe, Luna III.¹¹ The resulting series of images, as crude as they were, added another element to the genre of space exploration photography: images captured and transmitted to Earth by robotic space probes of interplanetary objects and solar system phenomena.

Over the next 48 years since Luna III, the scope and scale of space exploration photography has evolved from the combination of interplanetary and Earth-orbiting robotic spacecraft, Earth-based telescopes, and human spaceflights. The methodical recording of space exploration technology, the engineering and construction of spacecraft, and the day-to-day operations of space centers and aerospace corporations (recorded by both NASA and its contractors) has augmented this robotic imagery. The sheer quantity of these images is considerable. Some of these photographs are classified or restricted and only available to engineers, scientists, and NASA Administrators. Others, depending on varying degrees of governmental policy, are classified, edited, catalogued, and released into the public domain for use by the media, academia, and the general public. Of these released images, they can be said to have become symbolic in the reporting and representation of space exploration.

128 years before the Apollo 8 astronauts became the first humans to photograph Earth rising over the Moon's surface in 1968.

11. Between 1861 and 1865, less than 25 years after the invention of the photograph, (not much more than the time between the launch of Sputnik and the first launch of the Space Shuttle), Mathew Brady's photographic record of the American Civil War—documentary images of people, battlefields, and the tools of war—became a first. His photographs eternalized the damage, carnage, and technology of that war for generations to come.



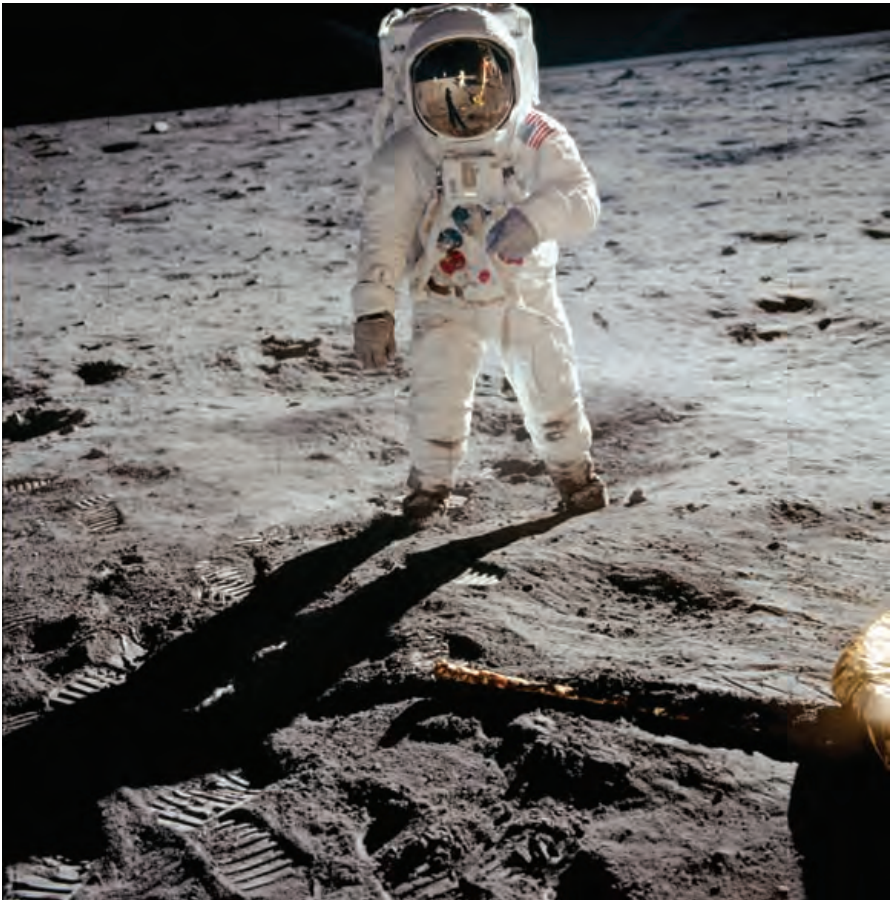
Back side of the Moon by the Soviet's Luna III: 1959. (NASA)

Indeed, a few of these photographs have even become iconic. These are photographic images that have transcended from the temporal to the iconic; they are now a part of our popular culture and photographic history.¹²

Examples of such iconic photographs are Neil Armstrong's 1969 snapshot-like portrait of Apollo 11's Buzz Aldrin at Tranquility Base and a series of self-portraits by Aldrin of his boot and resulting boot prints in the pristine lunar dust.¹³ These color photographs are now almost mythic in the sense that they have become the definitive photographic default setting for "first men on the Moon" and/or "first human-Moon landing." In context, however, other lesser known images from Apollo 12 and video still-frame images from Apollo 11 emerge equally important in terms of technical proficiency and aesthetics. For example, the black-and-white series of surface photographs made by the Apollo 12 landing crew (Charles Conrad and Alan Bean) are remarkable in

12. See program cover photograph for: "Remembering the Space Age: 50th Anniversary Conference," NASA History Office Division, Office of External Relations, NASA Headquarters and Division of Space History of the National Air and Space Museum (NASAM), October 22-23, 2007.

13. See Apollo 11 images AS11-40-5874 through AS11-40-5880 at the Lunar and Planetary Institute Apollo Image Atlas, 70mm Hasselblad Image catalog, <http://www.lpi.usra.edu/resources/apollo/catalog/70mm/mission/?11>.



Unaltered Buzz Aldrin Apollo 11 portrait: July 20, 1969. (Neil Armstrong/NASA)

their variety, description, and aesthetics.¹⁴ Specifically, Bean's photograph of Conrad along side, the Surveyor 3 spacecraft with their lunar module in the background documents the first evidence in one location, of human and robotic exploration on a celestial body.¹⁵ Bean's photograph of Conrad—their LEM in

14. The first four frames of Apollo 12's magazine "Y" by Alan Bean of Pete Conrad offers the most distinctive (color) sequence of an Apollo astronaut descending the Lunar Excursion Module (LEM) to the surface of the Moon of any of the six manned landings.

15. See Apollo 12 film magazine "X": AS12-48-7133 in the Apollo 12 flight photography at the Lunar and Planetary Institute Apollo Image Atlas – 70mm Hasselblad Image catalog, <http://www.lpi.usra.edu/resources/apollo/catalog/70mm/mission/?12>.

the background and Bean being reflected in Conrad's visor—is as captivating an image of man on the Moon as is the definitive Aldrin portrait.¹⁶

In addition to these photographs are the largely overlooked black-and-white photographic images of Apollo 11 made by Ed von Renouard, a video technician at the Honeysuckle Creek Tracking Station in Canberra, Australia.¹⁷ During Armstrong's historic descent from the LEM, von Renouard took 35 mm black-and-white images off of his video monitor while it was receiving the first live downlink to Earth. The downlink was being transmitted from a remote slow-scan, black-and-white video camera that was attached to the Modularized Equipment Stowage Assembly (MESA) unit on the side of the LEM descent stage.

Von Renouard photographs captured the ethereal look of “live” black-and-white TV images mixed with the silver-grain textures of black-and-white film as Armstrong descended down the ladder. In some respects, both the aesthetics and the nature of how and where these black-and-white images were made complement Armstrong and Aldrin's Hasselblad surface photography. Moreover, they document the first human to descend to the surface of another celestial world on film through video. These “mixed media” images made it possible to photograph and participate in an historic event as it happened off of a live TV broadcast without even being there.

Up to this point, I have discussed several iconic photographs from the first 50 years of American space exploration. However, in compiling a short list, I would also include: the first photograph of Earth from the orbiting satellite Explorer 6 in 1959; the May 1961 Redstone launch of Mercury astronaut Alan Shepard; the February 1962 Atlas launch with John Glenn; the first EVA (Extra Vehicular Activity) ballet of Ed White from Gemini 4 in 1965; the first Earthrise as seen from the Moon by Lunar Orbiter 1 in 1966; Neil Armstrong's Apollo 11 portrait of Buzz Aldrin standing against a black sky on the surface of the Moon in 1969; the full “blue-marbled” Earth showing Antarctica as photographed by the crew of Apollo 17 in 1972; Voyager 1's first image of Earth and the Moon from seven million miles away in 1977; Bruce McCandless, II in his MMU (Manned Maneuvering Unit) floating away from the Space Shuttle in 1984; the in-flight explosion of the *Challenger* in 1986; the Hubble Space Telescope's photograph of M16, the Eagle Nebula's “Pillars of Creation,” in 1995; the “pale blue dot” of Earth as photographed by Voyager 1 from four billion miles in

16. For further discussion on the altering of the iconic AS11-40-5903 of Buzz Aldrin by NASA, please refer to Eric Jones commentary from the Apollo 11 Lunar Surface Journal at: <http://history.nasa.gov/alsj/a11/a11-5903history.html>.

17. For an extensive description on both the role of the Honeysuckle Creek tracking station during the Apollo 11 and the resulting video and photography, see http://www.honeysucklecreek.net/Apollo_11/index.html.

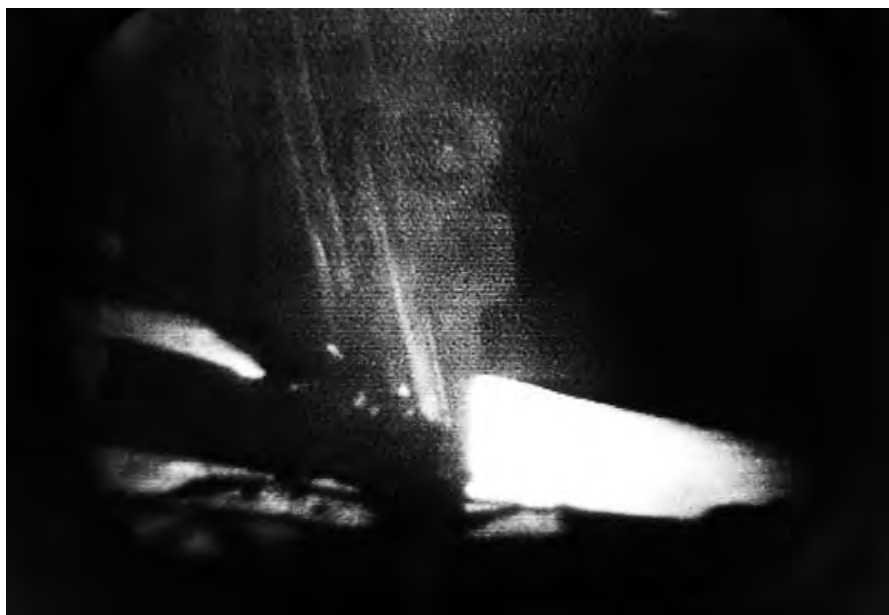


Pete Conrad, Apollo 12: November 19, 1969. (Alan Bean/NASA)

1996, and a full planetary view of Saturn and its myriad of rings by the Cassini spacecraft in 2006.¹⁸

In further examining the causal relationship between the emergence of an image that becomes iconic and its ability to sustain itself, William Ivins's analysis of "an exactly repeatable" report of an event (in this case a photographic one) can provide some context. Ivins writes that "The role of the exactly repeatable pictorial statement and its syntaxes resolves itself into what, once stated, is the truism that at any given moment the accepted report of an event is of greater importance than the event, for what we think about and act upon is the symbolic report and

18. This short list is based on what I believe represents classic iconic space exploration imagery.



Armstrong descends the LEM. (Ed von Renouard/Honeysuckle Creek Tracking Station)



Armstrong Steps Off the LEM. (Ed von Renouard/Honeysuckle Creek Tracking Station)

not the concrete event itself.”¹⁹ As a result, the iconic images just cited and others like them—however compelling and important as markers in the visual chronology and history of space exploration—have become the symbolic reports. And as symbolic reports, these photographs have been seen and experienced to the point of being too familiar. They have been routinely published over the decades in academic and scientific journals, popular weekly and monthly magazines, newspapers and magazine supplements, posters, online journals and reports, and any number of photographically inspired books. As a result, these iconic photographs have become predictable markers leaving the viewer with few surprises.

However, there are alternative editing possibilities to draw from the first 50 years of space exploration photography. These alternatives lend themselves to aesthetic considerations worthy of examination as I have attempted with the iconic space exploration photographs already defined and discussed. If the scope of space exploration photography is to mean anything beyond its intended technical, scientific, and utilitarian (day-to-day) reporting, there needs to be an aesthetic framework for examining these photographs as well. Given the accessibility to NASA’s photographic archives—and hopefully in the future from Russian, former Soviet, Chinese, European, Indian, and Japanese space agencies—it should be possible to reexplore the familiar and discover the unfamiliar with history and aesthetics in mind.

IV. THE AESTHETIC POSSIBILITIES OF PHOTOGRAPHIC DOCUMENTATION

*His (T. H. O’Sullivan) primary aim was not to philosophize about nature, but to describe the terrain. The West was a place to span with railroads, to dig for gold and silver, to graze cattle, or perhaps sell groceries and whiskey. Occasionally—and remarkably—an especially extravagant sample of spectacular landscape would be set aside, sacrosanct, for the amazement of posterity, but this was neither the first function, nor the first interest, of the Surveys.*²⁰

In the last half of the 19th century, as the technology of photography continued to evolve—the size of cameras, sensitivity of glass plate negatives to light, and darkroom apparatus—it became less studio-dominated and more portable. Furthermore, photography’s apparent verisimilitude resulted in opportunities for both American and European photographers to use the medium as a means of

19. William M. Ivins, Jr., *Prints and Visual Communication* (Cambridge, MA: The MIT Press, 1969), p. 180.

20. John Szarkowski, *The Photographer and the American Landscape* (New York, NY: The Museum of Modern Art, 1963), p. 3.

communicating to others what unexplored landscapes and native peoples looked like. Forty-five years after photography's invention, pioneers in America like T. H. O'Sullivan, William Henry Jackson, Alexander Gardner, J. K. Hillers, Edward Muybridge and Mathew Brady documented the territories of the United States unexplored by non-indigenous peoples. In numerous surveying expeditions between the Mississippi River and the Pacific (1867–1879), these photographers documented the “geographical and geologic” for the U.S. Government Survey.²¹

The aesthetic and historic examination of 19th and early 20th century landscape photography was first placed in context to the significance of the documentary photograph as art by John Szarkowski. He accomplished this in his seminal exhibition, and subsequent catalogue and book *The Photographer and the American Landscape*—by the Museum of Modern Art (MoMA) in New York in 1963.²² Szarkowski, then the eminent curator of photography at the MoMA, examined the aesthetics of landscape photography by looking at the role of the photographer:

The photographer-as-explorer was a new kind of picture maker: part scientist, part reporter, and part artist. He was challenged by a wild and incredible landscape, inaccessible to the anthropocentric tradition of landscape painting, and by a difficult and refractory craft. He was protected from academic theories and artistic postures by his isolation, and by the difficulty of his labors. Simultaneously exploring a new subject and a new medium, he made new pictures, which were objective non-anecdotal, and radically photographic.²³

From the photographer's new role as explorer-in-the-wilderness, Szarkowski continued: “This work was the beginning of a continuing, inventive, indigenous tradition, a tradition motivated by the desire to explore and understand the natural site.”²⁴ As a result, it is interesting to note that the recognition of landscape photography in the early 1960s paralleled the emerging human and robotic exploration of space. Perhaps these parallel photographic developments were no accident. They shared certain thematic roots, namely “incredible” landscapes and a certain challenge in the mechanics and labor of picture making.

Some of the still imagery captured by the 12 Apollo astronauts between 1969 and 1972 while on the low-angled, Sun-lit surface of the Moon, can be

21. *Ibid.*, p. 3.

22. Later in 1971, the George Eastman House in Rochester, New York, originated and exhibited “Figure and Landscape.” This exhibition further explored the relationship between manmade objects, people, and landscape.

23. John Szarkowski, *The Photographer and the American Landscape* (New York, NY: The Museum of Modern Art, 1963), p. 2.

24. *Ibid.*, p. 2.



Truckee Desert, Nevada: 1869. (T. H. O'Sullivan/U.S. Geological Survey)

likened to 19th and 20th century landscape photography. For example, the 19th century landscape photographer T. H. O'Sullivan's other worldly image of an ambulance covered wagon (containing his portable darkroom) and horses among the sand dunes of Nevada's Carson Desert can be compared to Apollo 12 astronauts Pete Conrad and Alan Bean's documentation of their Oceanus Procellarum landing site with the Surveyor 3 spacecraft in view.²⁵

In this 1869 black-and-white image, O'Sullivan positions his camera to look back towards his footprints that lead to a team of horses attached to a covered wagon. The *mis en scene* gives a sense of scale of the wagon to the vastness of the pristine dunes and the washed out white sky. By comparison, Alan Bean's 1969 black-and-white photograph of the surface of the Moon includes his shadow looking toward the near distant and insect-like Surveyor 3 robotic spacecraft in its 1967 landing place. The abstraction of Bean's long shadow—postured in making this photograph—falls off against the desolate lunar landscape of the Surveyor crater and the stark blackness of space. Both photographs give life to an otherwise lifeless landscape.²⁶

25. Apollo 12 black-and-white photograph AS12-48-7093 taken by Alan Bean.

26. Other comparisons to early landscape photography emerge from studying the photographs made by the Apollo 17 crew. During the Apollo 17 mission, Eugene Cernan and Harrison Schmitt



Shadow of Apollo astronaut Alan Bean at Surveyor III lunar landing site: 1969. (NASA)

The influence of 19th century landscape photography may extend beyond photography itself. Consider the work of the mid-20th century illustrator Chesley Bonestell. He was an illustrator of space exploration whose mixed illustrations often combined photography with pen, ink, and paint. His style of photorealism ultimately contributed to the American public's imagination of what space and

shot more than 3000 photographs. Schmitt and Cernan took a range of pictures documenting surface features and geologic formations in the Valley of Taurus Littrow with Earth floating above. The photographs showing a celestial body above the given horizon harkens back to Ansel Adams's "Moonrise over Hernandez, NM." This black-and-white photograph shows a turn-of-the-century adobe-like village set in the foreground with snowcapped mountains and a near full Moon set in a deep gray-black sky. Likewise, the Schmitt/Cernan photographs depict the blue-marbled Earth suspended in a black lunar sky and floating above the Moon's hills, craters, massive rocks and, occasionally, the landed LEM.

spaceflight might look like.²⁷ For example, Bonestell's photographic illustration of "Saturn from the surface of its Moon Titan" first published in 1944 offers an imaginary vision of what the exploration of our solar system might produce.²⁸ With Saturn and a few of its other moons, its rings suspended in the background and jagged mountains resting on an icy surface in the foreground, the sense of a mysterious and alien world permeates the work. Bonestell's technical and aesthetic process, however, was uniquely photographic. Like most of his illustrations, "Saturn from the Surface of Titan" was actually a carefully composed and artificially lit (to simulate the angle of the Sun) photograph of a model in which the artist constructed a mountainous landscape and painted the backdrop of Saturn, its rings, moons, and stars. Aesthetically, the constructed mountains of Titan may very well have been influenced by 19th century Western landscapes like those of the pioneer photographer J. K. Hillers.

Hillers worked on the documentation of the unsettled West during the Powell Survey (1870-1879) for the U.S. Geological Survey. His photographs, which often captured the monumental, depicted and celebrated geologic formations like the Grand Canyon and Yosemite Valley. However, it is Hillers's extensive documentation in Arizona's Canyon de Chelly that is likened most to Bonestell's imagined landscape of Saturn's moon Titan.²⁹

The work of Edward Curtis offers a transition from the photography of landscape to the inclusion of people and their habitats. Curtis's documentation, mostly during the first quarter of the 20th century, is often attributed to be among the most remarkable portrayal of Native Americans and their customs and habitats before emerging gentrification and containment on reservations. His work is remarkable because of his ability to gain access to and trust of his subjects, which resulted in a quality of photography that suggested the subject's inner life. Curtis worked with the complexity of the era's photographic technology and adapted it to his personal style, allowing him to connect with and capture the humanity of his subjects and their sacred landscapes in Alaska's Northwest, the Great Plains and South West. Along the way, he developed a list of "twenty-five cardinal points" which outlined the ethnographic and anthropological details to accompany the captions in his photographs.³⁰

A few of Curtis's landscape images can be compared to some of the photographs beamed to Earth from the surface of Mars by NASA's Viking Landers (1976), Pathfinder (1996), and most recently the Mars Exploration Rovers. The

27. A short list of other prominent illustrators of imagined space are Robert McCall, Pat Rawlings, Ron Miller, and David A. Hardy.

28. For a description of how Bonestell made this iconic image, see <http://www.bonestell.org/titan.html>.

29. The online site of the U.S. Geological Survey offers an impressive and comprehensive series of photo galleries regarding their 19th century pioneer photographers, including O'Sullivan and Hillers, at <http://libraryphoto.cr.usgs.gov/photo.htm>.

30. Alan Porter, "The North American Indian" *Camera* 52, no. 12 (December 1973): 4, 13-14, 23-24.



1944: "Saturn from the Surface of its Moon Titan." (©Bonestell Space Art)

two rovers have been scientifically studying, sampling, and photographing the surface of the Martian landscape since January 2004. Among the many startling photographs are the serene images looking back at the rover's wheel tracks and a hint of its solar panels, the lone trace of human ingenuity and technology amid a landscape of rocky debris on the wind-blown Martian sand. Some of these photographs recall Curtis's landscape documentation of Native American villages in the American Southwest. For example, Curtis took a photograph of a deserted Hopi Indian building in the village of Walpi, a 500-year-old village on a mesa in northern Arizona. The village rests at the near edge of an eroded rocky cliff protruding out into the desert. The aesthetics of this image and the warm-toned yellow hue, resulting from the gravure process that reproduced the original, can be compared to some of the rover Opportunity's panoramic photographs made in a location known as Meridiani Planum. In one reddish hued image, the curving wheel tracks from the rover show how it navigated around rock debris in the Meridiani Planum, a vast dry lakebed that may have once contained water, and the rim of Victoria crater on the horizon. The quality of light, the similarities in camera framing, and the feeling of desolateness offer a comparison between the geological evolution of Earth and



1870–1879: Canyon de Chelly, Arizona. (J. K. Hillers/U.S. Geological Survey)

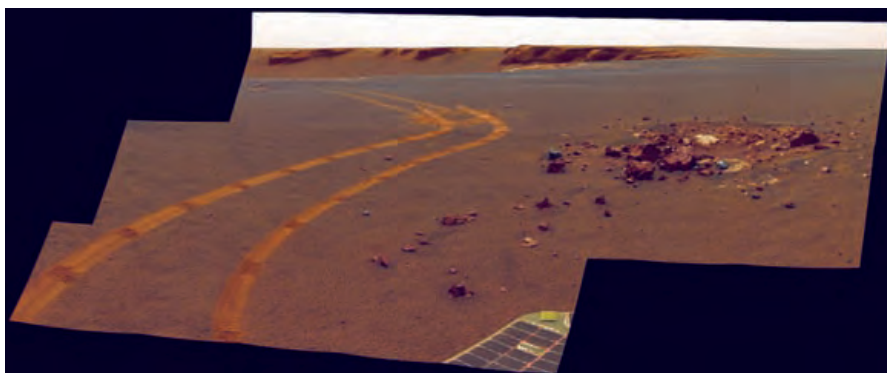


Walpi Village v.12: 1907. (Edward S. Curtis/McCormick Library of Special Collections, NW University Library)

Mars. It also offers consideration to the erosion of a landscape that may have once nurtured some form of life.

The Curtis Hopi landscapes were part of a grand design: the photographer attempted to systematically document the indigenous peoples of North America, focusing on Native Americans west of the Mississippi and into Canada.³¹ Consider Curtis's 1903 black-and-white portrait of a Zuni woman with a decorated ceramic bowl. The photographer's connection with his subject and the simplicity of his lighting and composition make this photograph a symbol of its era. The Zuni woman has a quality of the timeless, contributing to a sense of her profound dignity and humanity. Nearly a hundred years later, the relevance of Curtis's cardinal points and his aesthetic approach to documentary portraiture serve to influence my own photographic documentation of the people and place in space exploration. By comparison, my 2007 black-and-white portrait of an American astronaut, Megan McArthur, conveys a similar quality of lighting and composition. As with the Curtis image, I sought compositional

31. Ibid.



MER Opportunity on Mars at Victoria crater: 2008. (JPL/NASA)

simplicity, dramatic lighting, and eye contact that reveal McArthur's purpose, pride, dignity and humanness.³²

While the photographers of the American frontier were drawn to the possibilities inherent in the open range, others who were captivated by life in urban and industrial centers were emerging. The evolution of photographic technology—glass plate to acetate-based negative film and more reliable handheld cameras—resulted in equipment that was less cumbersome, allowing the photographer to respond to situations and environments with greater spontaneity than previously possible.³³ This directly contributed to the emergence of industrial and urban landscape photography. Paul Strand was among a group of early 20th century American photographers who explored the contrasts between urban people and place. His documentation captured a moment in American urban history. As his work defines the urban landscape at the time, it may seem to be a commentary on American and even western civilization. Take, for example, Strand's black-and-white image "Wall Street 1915." The photograph depicts the side of an indifferent stone building with massive, black rectangular windows reigning over shadowed and silhouetted figures. The figures walk anonymously alongside the tall and seemingly impenetrable building. In an interview in New York City in 1973, Strand discussed his aesthetic:

32. In documenting the SM4/STS125 mission preparations to the Hubble Space Telescope, the author secured the first authorized portrait session of an astronaut crew in more than 25 years. McArthur's portrait is from that series which was photographed in black-and-white and color in the anechoic laboratory at JSC.

33. 20th century landscape photographers like Alfred Stieglitz, Edward Steichen, Edward Weston, Ansel Adams, Paul Caponigro, and Harry Callahan among others sought environments and subject matter that responded to their intellectual curiosity and idiosyncratic manner of combining lighting and composition—all of which influenced their approach to interpreting both the natural and the human made.



Zuni Woman v.17: c. 1903. (Edward S. Curtis/McCormick Library of Special Collections, NW University Library)



Hubble SM4 Astronaut K. Megan McArthur: 2007. (©Michael Soluri)



Paul Strand: Wall Street, New York, 1915. (©Aperture Foundation Inc., Paul Strand Archive)

It wasn't just that I was wandering around and I happened to see something like that. I went down there with a (hand-held 3-1/4 x 4-1/4 English Reflex) camera in order to see whether I could get the abstract movement of the counter-point between the parade of those great black shapes of the building and all of those people hurrying below.³⁴

That same feeling of anonymity and imposing height extends 50 years later in an industrial photograph taken at NASA's former Lewis Research Center. There a man stands by a swinging valve door of a supersonic wind tunnel.³⁵ This uncredited photograph taken by an unknown space center photographer is among a significant body of NASA and aerospace industrial imagery that conveys the relationship between humans and their tools. More precisely, the

34. Jonathan Green, *The Snapshot* (Millerton, NY: Aperture, Inc., 1974), p. 47.

35. See Glenn Research Center GRC Image Net C1956-42070, "Swinging Valve for Supersonic Wind Tunnel," NASA GRIN database number: GPN-2000-0014474.



Swinging Valve for Supersonic Wind Tunnel: 1956. (NASA Lewis Research Center)

image depicts a nameless engineer in context to an imposing structure designed and built during the early years of space exploration.

In exploring the documentation of people and their industrial achievements, and focusing on the significant body of work made at the former NASA Lewis Research Center, I cannot ignore the work of the New York City photographer Eugene de Salignac. De Salignac was a New York City civil servant and the sole photographer of New York City's Department of Bridges/Plant and Structures from 1906 through 1934. During that period, he made over 20,000 glass plate negatives that documented the evolving infrastructure of

New York. Though the volume of de Salignac's work is impressive, the work had been largely ignored through the 20th century. Only recently were his photographs re-discovered, edited, and afforded a major exhibition at the Museum of the City of New York and a book in 2007.³⁶

Made within a year of Strand's "Wall Street 1915," de Salignac's "Brooklyn Bridge 1914" portrait shows a group of painters randomly suspended along the numerous ascending cables of the bridge, appearing like musical notes in a composer's score. This visualization of random or musical placement reoccurs in a NASA Lewis Research photograph of two engineers working with an oscilloscope connected to a scale model supersonic aircraft inside a wind tunnel. In the black-and-white image random streaks of white light from the multiple flash systems that illuminate the engineers and the model aircraft bounce around the highly reflective tunnel and its three circled windows. Again, this is an uncredited photograph made in 1957 with what I suspect was a large format camera (typical for extensive detail).³⁷ The photograph evokes a mid-20th century feel for communicating "high-tech men-at-work." It does so by posing the men (as is often the case) and then asking the two engineers to do their work. In comparison to de Salignac's (apparent) found moments of (staged) randomness, the Lewis Center image is a visually compelling portrait of the emerging era of aerospace, just as the de Salignac photograph is a portrait of emerging urban infrastructure in America.

By the 1930s the evolution of the camera and the subsequent reduction in the size and quality of film revolutionized the look of news reporting and signaled the emergence of the picture magazine. Magazines like *Time*, *Life* and *Fortune* sprang up in competition to newspapers. Along with this, photographers were beginning to discover that they could access, experience, and interpret a range of events and situations in unobtrusive ways with handheld cameras.³⁸ The result was a new genre of photography called photojournalism—an approach in both news gathering production and photographic documentation. Small, handheld cameras like the 35 mm and 2 1/4 size were formidable tools with which to discover more fluid, intimate, and strikingly visual opportunities between people and place. The small camera created opportunities to tell a story, communicate a point-of-view, or report an unfolding event in one or even in a group of photographs (photographic essay). The small camera afforded the photographer a means to enter new social and industrial worlds without lengthy planning

36. See *New York Rises – Photographs by Eugene de Salignac* (New York, NY, Aperture Foundation and New York City Department of Records/Municipal Archives, 2007), with essays by Michael Lorenzini and Kevin Moore.

37. See Glenn Research Center GRC Image Net C1957-45670, "Engineers Check Body Revolution Model," NASA GRIN database number: GPN-2000-001473.

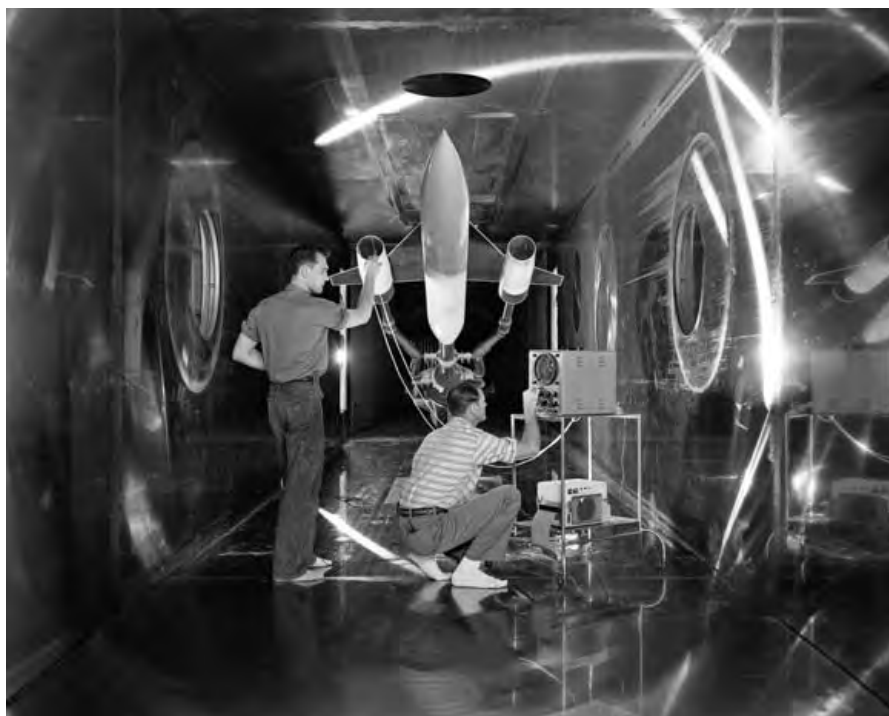
38. However, given the low grade quality of newsprint and photographic reproduction quality, large format cameras were still commonly used to obtain extensive detail and sharpness.



Brooklyn Bridge: 1915. (Eugene de Salignac/Courtesy NYC Municipal Archives)

and pretense. This new found spontaneity augmented the photographer's access with the given subject, thereby facilitating the telling of a story with depth and understanding. Photographic reporting and documentation—since the era of Curtis, Strand, and de Salignac—had now progressed to the point of actually capturing the immediate and even intersecting with the very fabric of life, war, industrialization and, on the not-too-far horizon, the exploration of space. At the same time, the increasing portability and decreasing cost of photography lead to the mass consumerization of home photography and the resulting cultural emergence of snapshot photography.

And with the snapshot, a new kind of photographic aesthetic evolved: a quality of imagery that has a kind of throwaway immediacy. Typically, they were images that were neither studied nor anticipated, but could be. For the casual amateur, the immediacy brought with it a freedom from the formal rules of photography. Since rules did not necessarily have to be adhered to, standards by which to measure quality changed. Hence evolved the notion that a good photograph is one that is not only technically correct, but easy to make. In all respects, it is the

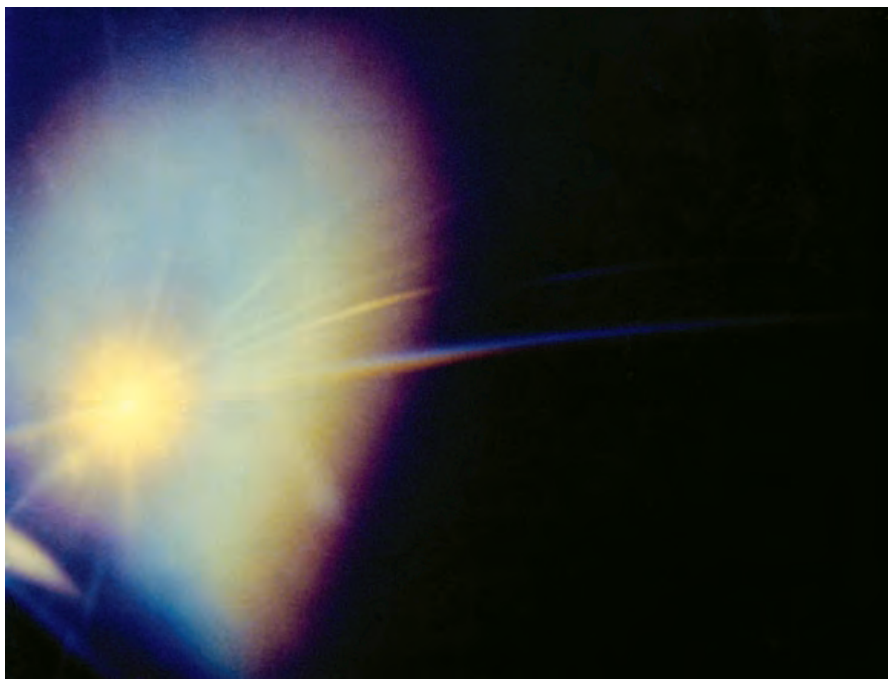


Engineers Check Body Revolution Model: 1957. (NASA)

essence of George Eastman's classic slogan: "You press the button and we do the rest." This idea has permeated American photography and photography itself for nearly a century. In his classic book, *The Snapshot*, Jonathan Green summed up the ambivalence toward and relevance of snapshot photography:

It has been bandied about as both praise and condemnation. It has been discussed as both process and product. A snapshot may imply the hurried, passing glimpse or the treasured keepsake; its purpose may be casual observation or deliberate preservation. The snapshot may look forward in time to a chaotic, radically photographic structure, the appropriate equivalent of modern experience; or it may look backward to the frontal formal family portrait of a bygone age.³⁹

39. Jonathan Green, *The Snapshot* (Millerton, NY: Aperture, Inc., 1974), p. 3.



One of the first snapshots taken in Earth orbit by John Glenn: February 20, 1962. (NASA)

This brings us to what I would call the snapshot aesthetic in space exploration photography. In examining the snapshot aesthetic, I cannot ignore the photography of astronauts in-flight by the astronaut themselves. Consider John Glenn on the eve of America's first manned orbital mission in 1962. John Glenn went out to buy an Ansco Autoaset 35 mm handheld camera (with a 55 mm lens) from a local store in Cocoa Beach.⁴⁰ With out formal photographic training, Glenn bought this modest camera because no one in the program at that time foresaw the necessity of an astronaut taking pictures. Glenn took the Ansco Autoaset on board MA6. This resulted in a series of 48 snapshots of Earth taken from the window of his Mercury space capsule.⁴¹ From Glenn's efforts and the resulting images, it can be argued that Glenn was the first human to record and take iconic snapshots in space.

40. Gary H. Kitmacher, "Astronaut Still Photography During Apollo," (Washington, DC: National Aeronautics and Space Administration), http://history.nasa.gov/apollo_photo.html (accessed March 6, 2008).

41. See John L. Kaltenbach, "A Table and Reference List Documenting Observations of Earth from Manned Earth Orbital and Suborbital Spaceflight Missions Including the Unmanned Apollo-Saturn 4 and 6 Missions" (Houston, TX, National Aeronautics and Space Administration Lyndon B. Johnson Space Center, December 1976), http://eol.jsc.nasa.gov/sseop/metadata/Apollo-Saturn_4-6.html (accessed March 18, 2008).

Of historic interest then is the in-flight photography by the Gemini crews (1965–66).⁴² Here the snapshot-like photographs that James McDivitt made of Ed White during the first American EVA (from one of the open twin hatches of Gemini 4) is among the iconic images of American human spaceflight. However, what has not been uncovered are the photographs that White made with a 35 mm Zeiss Contarex camera mounted on his handheld mini propulsion system.⁴³ By in large, these photographs should document his perspective of the Gemini capsule with both capsule doors open and his snapshots of his colleague James McDivitt. Of aesthetic relevance (in a snapshot sense) are the EVA images from Gemini 9 through 12. Among these photographs is the partially sunlit and shadowed close up of Buzz Aldrin during an EVA. The photographs' setting is outside the open hatch of his Gemini 12 spacecraft. James Lovell took this snapshot. Lovell's photograph captures an intense look in Aldrin's eyes. This image is unique because it captured in a passing glance a quality of human vulnerability in the void of space.

Perhaps the most distinctive in-flight astronaut "snapshot" photography is the Apollo 7 crew's photography of themselves.⁴⁴ Each portrait of the three crewmembers (Wally Schirra, Donn Eisele, and Walt Cunningham) was initiated by Cunningham, who felt that they needed a souvenir from their mission. The photographs are framed using a handheld Hasselblad 70 mm camera with an 80 mm lens. Cunningham also used a handheld spot meter to measure the sunlight entering the cabin windows. The results are not just a series of technically accurate exposed images, but they are a series of exquisite snapshots made under controlled conditions: the same environment, camera, lens, and quality of sunlight. Cunningham was able to capture both a vulnerability and intensity of each of his two crewmates. In turn, Schirra was able to capture similar qualities in his photograph of Cunningham under the same conditions. When all three snapshots are grouped together, the square-framed tight close-ups of Schirra, Eisele, and Cunningham offer an unimagined glimpse—in the stark sunlight of outer space—of three men's faces within the tight confines of the first ever Apollo space mission.⁴⁵ These photographs are timeless "souvenirs" whose aesthetic relevance

42. Since Project Mercury, handheld cameras have accompanied crews into space. The cameras were initially recordkeeping tools to study Earth from space. From these handheld cameras there also resulted opportunities to capture the spontaneous moments during spaceflight, both within and outside of a spacecraft.

43. See John L. Kaltenbach, "A Table and Reference List Documenting Observations of the Earth from Manned Earth Orbital and Suborbital Spaceflight Missions Including the Unmanned Apollo-Saturn 4 and 6 Missions" (Houston, TX, National Aeronautics and Space Administration Lyndon B. Johnson Space Center, December 1976), http://eol.jsc.nasa.gov/sseop/metadata/Apollo-Saturn_4-6.html (accessed March 18, 2008).

44. See Lunar and Planetary Institute *Apollo Image Atlas—70mm Hasselblad Image catalog* for Apollo 7, <http://www.lpi.usra.edu/resources/apollo/catalog/70mm/mission/?7>.

45. See John L. Kaltenbach, "A Table and Reference List Documenting Observations of the Earth from Manned Earth Orbital and Suborbital Spaceflight Missions Including the Unmanned

are—referencing Green’s consideration of the snapshot—a combination of both deliberate preservation and the appropriate equivalent of modern experience.

V. CONFOUNDING EXPECTATIONS

*At NASA, the elegance was in the design of the engineering systems rather than in the manners of the men.*⁴⁶

Some 38 years after the first publication of *Of a Fire on the Moon*, Mailer’s astuteness on NASA’s institutional culture during the era of Apollo 11 helps to suggest why most NASA generated photography from the first 50 years of space exploration tends to typically focus on the elegance and design of its engineering systems. Yet the results from some of its design and engineering systems are typically the first communication to the greater public. As a result, NASA releases pictures from weather satellites, robotic space craft flybys of the inner and outer planets, the era of Apollo 11, Skylab, the Space Shuttle, and the ISS programs. The elegance of its engineering systems is also celebrated in the manner of its rockets, rocket engines, guidance system avionics, the integration, testing and assembly of Earth orbiting satellites and space probes, interplanetary robotic spacecraft and so on. Yet confounding expectations in the need to report on the “elegance of its engineering systems” at often the expense of the “manners of men,” are the photojournalists who, given the precious commodities of accreditation, access, and time work mostly from “behind the velvet rope” to capture these essential moments. Essential moments that are typically captured in the routine of rocket launches, press conferences, and guided media tours.

Photographic coverage by the print media (in daily newspapers and weekly news magazines) reached its zenith during the first decade and a half of the American space program. Photographers working for the wire services like AP (Associated Press), UPI (United Press International), and Reuters provided the American audience with a steady supply of rocket launches—manned and unmanned. More extensive storytelling in the form of photographic essays and written reportage typically appeared in weekly magazines like *Life*, *Look*, *Time*, *Newsweek*, *US News and World Report*, and the monthly *National Geographic*. In *Life* magazine’s coverage of the first 16 years of the Space Age (between 1957 and 1972) for example, it published only 28 cover stories with 1962 and 1969 tying with 7.⁴⁷ With access, time, ingenuity and imagination, photojournalists

Apollo-Saturn 4 and 6 Missions” (Houston, TX, National Aeronautics and Space Administration Lyndon B. Johnson Space Center, December 1976) http://eol.jsc.nasa.gov/sseop/metadata/Apollo-Saturn_4-6.html (accessed March 18, 2008).

46. Norman Mailer, *Of a Fire on the Moon* (New York, NY: Signet Book/New American Library, 1971), p. 136.

47. See Time, Inc., *Life, the First 50 Years: 1936–1986* (Boston, MA: Little, Brown and Company, 1986).





Snapshot portraits of the Apollo 7 crew in flight: October 1968. (left top) Donn Eisele, (left bottom) Wally Schirra (Cunningham/NASA), (above) Walt Cunningham. (Schirra/NASA)

like Ralph Morse, Otis Imboden and Jon Schneeberge revealed the early years of space exploration that often revealed the “manners” of the men of NASA.⁴⁸ These photographers provided their (stylistic) interpretations of astronaut training to the launchings of the Atlas, Titan and Saturn-Apollo. However, access to these photographers’ complete work is challenging because it tends to be centralized within the news organization that they represented. Editorial photography made under contract by in-house photographers like Morse, Imboden, and Schneeberge is essentially owned and copyrighted by the magazine corporation, such as *Time-Life* and *National Geographic*.

Unlike access to NASA’s public domain photographs, either in a flight center’s archive or through its online Web portal, the decentralization of photographic archives among news media outlets creates a major challenge for

48. Other significant wire service photographers that covered the early years of the American space program were Jim Kerlin, Russ Yoder, Frank Beattie, and Hugo Wessels.

research.⁴⁹ Such is the case with Bruce Weaver, a former AP photographer currently with Agence France Press who has covered the American space program since the early 1980s. His 1986 photography of the *Challenger* launch (which are among those that revealed the subsequent puff-of-black smoke) is over shadowed by his clearly capturing the explosion 77 seconds later. In Weaver's case, the exposed roll of film was the property of AP, and subsequently, Weaver didn't have any say on the final edit nor did he have access to the film he had shot even though the photograph selected was among the most widely used in communicating the horror of the accident worldwide. It is impossible to track down Weaver's entire take from the AP archives, even today. And his "iconic" image of the explosion remains revenue intensive for the AP, but not for Weaver.

Contrary to this is the extensive and accessible photography by Bill Taub, the senior photographer at NASA headquarters in Washington, DC, from 1958 through 1975. During the early years of NASA, Taub was able to set the precedents in intimately capturing the nascent space agency. Taub's place was similar to the conditions that framed de Salignac's reign as sole photographer for the City of New York. However, de Salignac never saw his work published nor exhibited while Taub, on the other hand, was able to have his work credited in numerous stories in *National Geographic* during the early years of the space program. In addition, many of the public domain images in the NASA archive at Headquarters reflect his body of work.

Beyond those photographers already noted, there is a distinct group of photojournalists who have been covering the American space program since the 1980s for the AP, UPI, Reuters, *Florida Today*, and the *Orlando Sentinel*.⁵⁰ The scope of these photographers work is worth examining (although the restraints mentioned above will be formidable) given their continuous coverage and access to both human and robotic space missions from the Kennedy and Johnson Space Centers. There are, however, two photojournalists whose accessible work distinguishes itself. The first of these is Scott Andrews who has been photographing every shuttle and nearly every unmanned rocket/satellite launch since STS-1 in April 1981.

The quality of Andrews's work reflects a significant and stylistic approach in the reporting and documentation of the industrial landscape of space exploration photography. Within this landscape, Andrews portrays Mailers "elegance in the design" by constantly reexploring his subject matter. His subject matter is typically rockets, rocket launches, active and historically inactive launch pad complexes, and rocket assembly facilities.

49. Typically a photographer's space coverage is part of a magazine or media corporation's archive. In building its archives, a news group like AP selects only the most historically relevant or iconic to save and catalogue as a revenue bearing profit center for the organization. As a result, it may be difficult, even next to impossible, to examine a photographer's complete body of unedited work for possible alternative choices beyond the familiar or existing iconic.

50. Joe Skipper-Reuters; Bruce Weaver-Agence France Press; Pete Cosgroves-UPI; Phill Sandlin-AP; Mike Brown-*Florida Today*; Red Huber-*Orlando Sentinel*; and James Nielson-*Houston Chronicle*.



July 4, 2006: Shuttle *Discovery* Return to Flight. (©Scott Andrews)

Considered the guru of remote rocket launch photography by his peers, Andrews has been able to document both the magic and the elegance of the machines that launch into space through a combination of imagination and inventiveness.⁵¹ With no two launches ever identical, he achieves his imagery by strategically placing multiple motor driven cameras—with varying focal length lenses—in and around a rocket's launch pad complex regardless of weather and time of day.⁵² The scope of Andrew's work can be examined in context to

51. Andrews is a Washington, DC based photographer whose work has been published in magazines such as *Time*, *Newsweek*, *U.S. News and World Report*, *Smithsonian*, and *Discover*.

52. According to Andrews, the automated firing of the remote cameras around the launchpad, regardless of the time of day, is activated by the sound or vibration of the rocket engines at ignition. When the sound or vibration reaches a predetermined level, the camera trigger will fire the linked cameras.



April 26, 2003: Expedition 7 Soyuz Launch. (@Scott Andrews)

the photography of American railroads: specifically, the survey, building and operation of the American railway system by some of the pioneer late 19th century landscape photographers for the U.S. Geological Survey, and in the 20th century, the imaginative and stylistic (steam) railroad photography of O. Winston Link and Richard Steinheimer.⁵³ Their documentation of the fleeting era of steam locomotives set in context to the American landscape has been revered for detail. These photographers portrayed the scope and scale of the American railroad system with care and exactitude. This attention to detail of scope and scale exists in Andrews's work as well.

Andrews's photograph documenting the second return-to-flight of the Space Shuttle *Discovery* offers several references to the history of photography and space. Both the placement and framing of his remote Hasselblad camera is reminiscent of the remote video images of Apollo 17's LEM blasting off from the surface of the Moon. However, it is Andrews choice of black-and-white film and one of the dried out ponds that typically surround the launch pad complexes in dry weather that distinguishes this image. As a result, the foreground patterns of dried out clay playing against the ascending shuttle has aesthetics reminiscent of western American desert images captured by 19th century landscape photographers like T. H. O'Sullivan and J. K. Hillers. The other worldliness patterns of dried out clay can also be compared to some of the MRO (Mars Reconnaissance Orbiter) surface images of Martian polar cap regions. In contrast, Andrews remote close-up of a Russian Soyuz rocket just seconds in to its liftoff, offers an insightful document of the launch pad—the same one used to launch Sputnik nearly 40 years earlier. It also portrays the elegance of Russian rocketry, long hidden and secretive during the former Soviet era.

Next comes the photography of Bill Ingalls, currently the senior in-house photographer at NASA headquarters in Washington, DC. Ingalls has been the first NASA photographer to routinely document NASA's collaboration with the Russian space program. Ingalls tends to explore what Mailer describes as the "manners of the men" through unique access and time in which to photograph both the American and Russian human space flight programs. Since 1999 his continuous documentation has captured the cultural similarities and differences between both spaceflight programs. His documentation of the solemnity of the Russians in the training of their cosmonauts and launching of their rockets from the same launch complexes that supported Sputnik and Gagarin warrants examination. As of this writing, Ingalls remains the only photographer to have continuous access to every Russian launch involving

53. See O. Winston Link's *Steam, Steel and Stars* (Harry N. Abrams); *The Last Steam Railroad in America* (Harry N. Abrams); Richard Steinheimer's *A Passion for Trains* (W. H. Norton & Company) and Walker Evans photographic studies of railroad car insignias for a 1956 *Fortune* article "Before They Disappear."



Expedition 8 crew meets the media. (©Bill Ingalls/NASA)



Soyuz rocket being transported to launch pad. (©Bill Ingalls/NASA)

American astronauts.⁵⁴ For example, his photograph of the Expedition 8 crew (in a closed off, rather cage-like glass room) offers a distinct point of view of how the Russian's present a fully suited crew—only hours from their launch to the ISS—to space officials and the media. As a result, Ingalls has achieved continued access to a space exploration infrastructure, once remote and secretive, that harkens to de Salignac's continuous three decade documentation of New York City's urban infrastructure. By examining Ingalls's somber photograph of Russian security guards accompanying a Soyuz rocket being transported to its Baikanor launch pad, offers not only a contrast to shuttle launch preparations at the Kennedy Space Center in Florida. It provides an insightful observation on what the past history of Soviet era space exploration may have looked like in the desolateness of Kazakhstan.⁵⁵

VI. THE PAST, PRESENT AND FUTURE PHOTOGRAPHIC DOCUMENTATION OF NASA AS A LABOR FORCE

*I saw doing space history as investigating what space flight efforts could reveal about a particular time and place.*⁵⁶

—Margaret A. Weitekamp

The examination of space exploration photography to the history of photography has demonstrated relationships to landscape photography, photographic documentation, and the evolution of the snapshot. Now it is time to consider another photographic genre, documentary portraiture and its relationships to space exploration photography, specifically the people that make going into space happen. In her essay, "Critical Theory as a Toolbox," Margaret Weitekamp considers historically examining NASA as a labor force:

Many other aspects of NASA as a labor force remain unexamined Although the individual stories of astronauts, flight controllers and rocket scientists have been recorded,

54. See "Roads Less Traveled" by the photographer Jonas Bendiksen in *Aperture* 170, Spring 2003. Bendiksen documents the spent lower stages of Russian rockets that crash (and pollute) in the often populated and desolate areas of Kazakhstan and Siberia.

55. Since the return-to-flight of the Space Shuttle in 2005, Ingalls has also been able to frame all subsequent Shuttle launches from the perspective of the NASA Administrator in the firing room at Kennedy Space Center. Mission after mission, these photographs represent some of the most prolific unstaged documentation of a NASA Administrator and senior management during the moments of launch in the history of American space exploration.

56. Margaret A. Weitekamp, "Critical Theory as a Tool Box: Suggestions for Space History's Relationship to the History Subdisciplines" in *Critical Issues in the History of Spaceflight*, ed. Steve Dick and Roger D. Launius (Washington, DC: National Aeronautics and Space Administration, 2006), p. 562.

the collective stories of the thousands of people who made particular space projects work offer many opportunities for thinking about the space agency as a workplace.⁵⁷

In considering the last 50 years of existing photographic coverage of NASA as a workplace, (often within a framework of industrial photography), inspires close examination and comparisons to the genre of documentary portrait photography and to photographers like August Sanders, Lewis Hine, Walker Evans, W. Eugene Smith, Irving Penn, Richard Avedon and Arnold Newman.⁵⁸ In fact the work of Lewis W. Hine and W. Eugene Smith, specifically their photography of American industrialization and its labor (before and after World War II), offer a significant reference and comparison to the wide range of NASA's photography of its own labor force.

In examining the photography of Lewis Hine, I am immediately drawn to two seminal images: the black-and-white photograph of a goggled welder working on the Empire State Building and the photograph of a T-shirted powerhouse mechanic using a massive wrench to tighten a steam valve. In the circa 1932 photograph, an unnamed goggled worker is pictured amid an elliptically shaped piece of steel with a cut circle rimmed with bolts as he holds (in gloved hands) an ignited welding torch. Leaning slightly into the steel, his dark-colored goggles are juxtaposed to the circular black hole in the steel piece. The convex shape of his soft tweed-like hat that covers his head juxtaposes off of the concave cut into the steel. The harmony of this laborer with the work before him can be

57. *Ibid.*, p. 563.

58. The stylistic approach of 20th century portrait photographers like August Sanders, Irving Penn, and Richard Avedon yields distinct bodies of work that reveals the photographer's connection to his subject matter in the hope of capturing moments of vulnerability in body language and eye contact. Sanders's documentation of the physiognomy of Germans before World War II, for example, is significant in its breath and honesty. He often portrayed his subjects from all walks of life—pastry chef, musician, teacher, judge, lawyer, etc.—in their own work or personal environment. Sanders's influence is felt in the portraits of Irving Penn and of my own. Penn's black-and-white series on American and French working professionals and those of various Peruvian and African tribes (or even on American subcultures like Hell's Angels) are seminal in the cultural history of 20th century photography. Specifically, Penn's 1950s portraits of workers in Paris, London, and New York like bakers, butchers, waiters, charwomen, deep sea divers, and rag-and-bone men resulted in a seminal body of work called "The Small Trades." Each individual is photographed on a mottled gray background illuminated with natural daylight from windows or skylights. Richard Avedon believed that a photograph has a life of its own anchored in the era in which it was made. As a result, his approach was to both isolate and interpret his subjects without a definable location nor identifiable background. Avedon's portraits typically document an individual with a quality of flat lighting posed against a bath of pure white light. In some respects, this is not too different than the expected aesthetics of a passport photograph. By composing his subjects in different positions within the camera's frame, Avedon was able to capture the essence of an individual through the emotional expression of his or her body language and his or her direct or indirect eye contact.

compared to Paul Riedel's industrial image of a NASA TIG welder in the clean room of the Technical Services Building at the former Lewis Research Center.⁵⁹ Here a high tech welder in 1963 is similarly goggled however he is welding metallic objects by (safely) inserting his hands through protective gloves that securely enter a closed protective chamber. In both images each photographer discovers and frames a kind of unity between laborer and place of labor.

By comparing Hine's iconic 1920 staged portrait of a powerhouse mechanic to a 1964 NASA technician working on a "9 thruster ion engine array" furthers both the notion of unity and juxtaposition of laborer and place of labor.⁶⁰

These four images convey a sense of aesthetics in which a discovered harmony exists in the very choreography of the subject matter. As a result, the visual harmony between worker, workplace, and the labor itself is a useful foundation for viewing and analyzing labor-related imagery from the archives of NASA's various space centers.

My photographic documentation of NASA's labor force has its roots in the writing of the author Studs Terkel. Terkel's *Working* (based on oral interviews) provides both a narrative and intellectual framework for examining NASA as a labor force.⁶¹ To be sure, there are the engineers who, piece by piece, have pre-assembled every screw and electrical connection to all the parts of the ISS. Then there are the technicians who for the last 27 years have repaired and replaced tiles on shuttle orbiters. And there are the technicians who check, replace and check again the Space Shuttle's hydraulics and avionics. In any given Center on any given day, there exist countless photographic opportunities to document the labor force. Those men and women who work behind the scenes day-to-day. They are the laborers who make space exploration possible. Terkel understood the importance of the work that goes on behind-the-scenes in America. He celebrated that work and noted that it often goes unrecognized. In his book, *Working*, Terkel interviewed a steel worker, Mike Le Fevre:

It's not just the work. Somebody built the pyramids. Somebody's going to build something. Pyramids. Empire State Building—these things just don't happen. There's hard work behind it. I would like to see a building—say the Empire State, I would like to see on one side of it a foot wide strip from top to bottom with the name of every brick layerer, the

59. See Glenn Research Center GRC Image Net C-1963-63814: "TIG welder located in the clean room of the technical services building TSB – The inert gas welding facility is used for welding refractory metals in connection with the Columbiun Liquid Sodium Loop project."

60. See Glenn Research Center GRC Image Net C-1964-71003: "9 thruster ion engine array in tank 6 at the Electrical Propulsion Laboratory EPL."

61. Studs Terkel, *Working – People Talk About What They Do All Day and How They Feel About What They Do* (New York, NY: The New Press, 1972).



"Goggled Welder": c.1932. (Lewis Hine/Library of Congress)

name of every electrician, with all the names. So when a guy walked by, he could take his son and say "see, that's me over there on the 45th floor. I put the steel beam in" Picasso can point to a painting what can I point to? A writer can point to a book. Everybody should have something to point to.⁶²

62. Ibid., p. xxxii.



"TIG Welder": 1963. (Paul Riedel/NASA)

My own interest in documenting some of the technicians who work on a shuttle orbiter was sparked by reading interviews like Le Fevre's.⁶³ My desire to

63. Since 2005, I have been photographically documenting NASA's New Horizons mission to Pluto and the Kuiper Belt at the Goddard Space Flight Center, Kennedy Space Flight Center, Johns Hopkins University Applied Physics Lab, and the Lowell Observatory. I expect to continue this documentation through New Horizons flyby of Pluto in the summer of 2015. My documentation



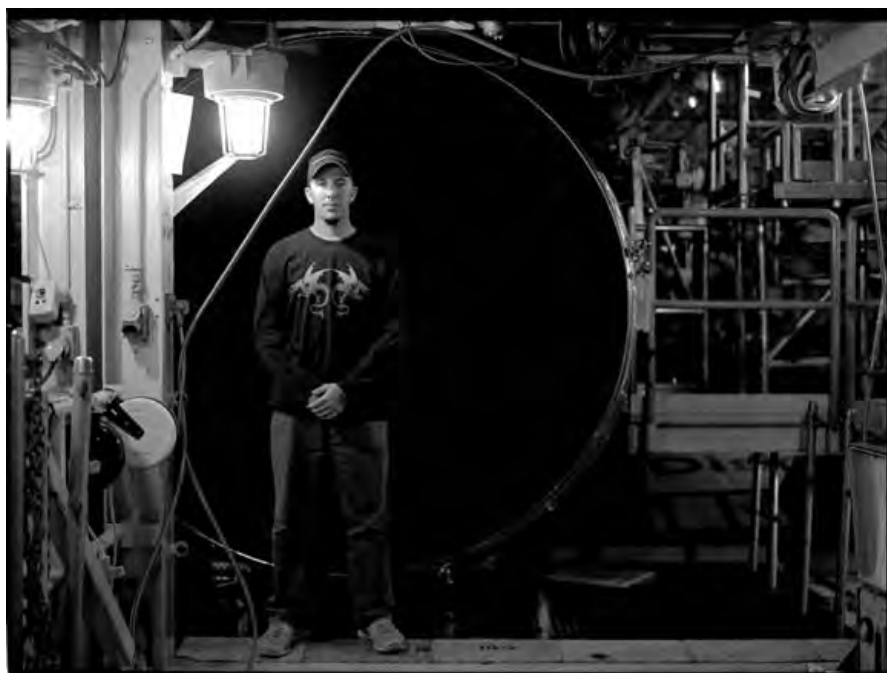
Powerhouse mechanic with wrench: 1920. (Lewis Hine/Library of Congress)



1964: Engineer at a 9 thruster ion engine array. (NASA)

visualize the relationship between a worker and their place of work is evident in my black-and-white portrait of a United Space Alliance technician. In this photograph made in one of the Space Shuttle's Orbiter Processing Facilities

and portraiture of the STS-125 crew and SM4 engineers, scientists, and technicians of the last NASA service mission to the Hubble Space Telescope began in February 2007. Like *New Horizons*, it is an ongoing exploration into the relationship between people and their place of work.



Technician at the engine base of shuttle orbiter *Discovery*. Kennedy Space Center: 2006. (©Michael Soluri)

(OPF) at the Kennedy Space Center, he is juxtaposed by one of the three main Shuttle engine insert positions. In scope and scale, I sought to explore the workspace of the people whose day job is working on a spaceship. In another exploration, I sought to document the engineers and technicians integrating the New Horizons spacecraft in the pre-clean room at the Goddard Space Flight Center. Working in a near sterile environment, these two electrical engineers are juxtaposed with a rolling cart of their tools and instruments. In both explorations, I sought the dignity of the space worker in context to his working environment.

While examining the photography of NASA's labor force, it is impossible to ignore the photography of the workplace itself. John Sexton has made Kennedy Space Center his industrial landscape. His highly crafted approach to black-and-white photography is informed by the history of landscape and documentary photography and his close working relationship with Ansel Adams.⁶⁴ Sexton's documentation of the Space Shuttle over a period of about

64. Sexton was Ansel Adams's technical and photographic assistant from 1979 until Adams's death in 1984.



Two “New Horizons” electrical engineers and their cart of tools in the Goddard Space Flight Center pre-Clean Room: 2005. (©Michael Soluri)



Forward Reaction Control System Detail, *Columbia*. Kennedy Space Center, Florida.
(©1994 John Sexton. All rights reserved)



Atlantis Vertical Vehicle Assembly Building. Kennedy Space Center, Florida. (©2000 John Sexton. All rights reserved)

eight years may very well be the most insightful and classic portrayal of an American spaceship to date.⁶⁵ It is unfortunate that Mercury, Gemini, nor

65. See John Sexton, *Places of Power: The Aesthetics of Technology* (Carmel Valley, CA: Ventana Editions, 2000).

Apollo spacecraft and their launch complexes were afforded such stylistic and personal interpretation.⁶⁶

Having successfully navigated NASA's Public Affairs Office (PAO) between the post-*Challenger* era of 1990 and the events of 9/11, Sexton was able to document in large format black-and-white, both the elegance and dignity of the most complex machine ever created by humans. With the coveted combination of quality access and time, Sexton, over a period of 13 visits to the Kennedy Space Center, carefully portrayed various angles of the orbiter in context to the cathedral-like interior of the Vehicle Assembly Building (VAB) as it was being processed for spaceflight. He also systematically identified and isolated distinctive elements of the Space Shuttle orbiter like one of its three main rocket engines, landing gear, the flight deck's glass cockpit, the thermal protection system tiles, and the skeletal interior of a stripped down cargo bay.

The subtleness and monumentality to the scale of surroundings, and the distinct qualities of light that typically emerge from an Adams landscape photograph like "Moonrise over Hernandez, New Mexico" can be examined in many of Sexton's nature and industrial landscape images. In his many interpretations of the Space Shuttle orbiter—in this example, hanging vertically by its nose in preparation for mating to its fuel tank and two solid rocket boosters—he conveys a similar adherence to scale, monumentality, and qualities of light. Comparisons to Sexton's sense of organic shapes in his nature work can also be seen in his composition of one of the Space Shuttle's Forward Reaction Control Thrusters.

VII. RESOURCEFUL EDITING, AUTHORING, AND THE APPROPRIATION OF SPACE EXPLORATION PHOTOGRAPHY

It is time to remember that the camera lures. Then compels a man to create through seeing. It demands that he learn to make the realm of his responses to the world the raw material of his creative activity. Creative understanding is more camera-like than invention.

— Minor White⁶⁷

In examining the context of different photographic genre to space exploration photography, it would be remiss to ignore fine arts photography. Although limited in number, a significant body of work by photographer-editors and fine art photographers has resulted in a range of significant, single-themed books and fine art photography that references the history of space exploration photography.

66. There are no known industrial landscape studies of the Apollo and Skylab configured launchpads, their crawler transports, VAB, and firing room configurations by fine art photographers.

67. Nathan Lyons, *Photographers on Photography* (Englewood Cliffs, NJ: Prentice-Hall, 1966), p. 164.

While there have been many high-end picture books that have published the iconic and familiar photography of space exploration, few have been edited to reflect an astronaut's insight while in space. One title that conveys the astronaut's perspective is *The Home Planet*.⁶⁸ The book remains one of the earliest "coffee table" books to cohesively portray an astronaut's photographic exploration of Earth and the Moon. The book brought together aesthetically compelling images (considering lighting, angle, composition) chosen from not just the American space program but also, for the first time since the space era began, from the then Soviet space exploration photography. The result is a book with visual continuity with images of Earth and Earth-related phenomena (weather, river and ocean patterns, and geologic formations). The photographs were mostly taken by astronauts in orbit around Earth and in orbit or on the surface of the Moon. What distinguishes this volume today is the quality of the editing. Complementing the minimalist design, layout and superb printing is the bilingual flow of first-person narrative in a variety of languages like, English, Russian, German, French, Hindu, and Bulgarian.

Hardly a decade later, the landscape photographer Michael Light published his book *Full Moon* in 1999. Light's book portrays the Moon as landscape and examines the sublime quality of light and detail from Project Apollo's space flight photography. Over a period of four years, Light researched and edited a substantial number of in-flight photographs made from Project's Gemini and Apollo (1965–1972). By gaining access to NASA's photo archive, he was able to make the first drum-scanned digital files from essentially second generation copies of the original flight films.⁶⁹ The resulting editing and juxtaposition of superbly reproduced full page black-and-white and color images created an aesthetic flow of a journey to the Moon and back via the historic timeline of manned spaceflight, beginning with the explosive fireball ignition of the Saturn Apollo's five rocket engines and ending with a view of the Pacific Ocean as seen through the window of a just landed Apollo module.

The subtext of Light's editing and editorial structure suggests themes of exploration and discovery. The quality of light and shadow in the photographs is significant. As a result, the actual quality of detail found on the printed page is stunning. This quality is impossible to appreciate in the familiar and iconic photography published by NASA and the print media. Even Light's handling of the iconic Apollo images discussed earlier (for example, the before and after photographs of Aldrin's boot print in the lunar dust) reveals a tonal range, and subtly of detail and texture that is impossible to draw out from the same images in familiar consumer print media.

Of particular interest to the author is the lighting captured by the Apollo astronauts. As explorers carrying cameras, the Apollo astronauts were similar to

68. See *The Home Planet*, ed. Kevin W. Kelly for the Association of Space Explorers, Reading, Massachusetts (Reading, MA: Addison-Wesley Publishing Company, 1988).

69. Michael Light, "The Skin of the Moon," *Full Moon* (New York, NY: Alfred A. Knopf, 1999).

the pioneer photographers of the 19th century who, with their cameras, were responding to the unknowns of the American West. However, unlike the physical conditions of the 19th century photographers, the Gemini and Apollo crews were responding to the new and unexplored by photographing their experiences inside their spacecraft and outside in the vacuum of space. They were able to capture qualities of light and shadow that were impossible to experience or capture on Earth. Commenting on the lunar landscape, Light puts it this way:

Issues of big and small comprise but one half of the sublime landscape; for me, the other is the rule of light itself. Concerns about light always lurked behind all the others that drove my selection, and so to me the (NASA) archive's most important images will always remain the black-and-white ones, in part because their finer grain carries a higher visual acuity and renders more detail, but mostly because of the way they distill light in a world without air.⁷⁰

As a result, not only does the handheld black-and-white photography from Apollo's 12 and 14 through 17 offer further aesthetic reexamination, the imagery from the automated metric and panoramic cameras (installed in the service module) also offer opportunities in visual exploration and discovery.

The writer, film maker, and photographer Michael Benson chose a different approach in conveying the sense of light, scale and landscape in space exploration photography. Benson researched and edited the still imagery that had been captured and beamed back to Earth by the robotic exploration of our solar system. Published in 2003, *Beyond, Visions of the Interplanetary Probes* often displays rediscovered photographs that have never been registered on a negative.⁷¹ The subject matter is most of our solar system's inner and outer planets, their Moons, asteroids and the Sun. The images were taken by Earth and Moon orbiting, and interplanetary robotic space probes like OrbView, Terra, Aqua, Galileo, Lunar Orbiter, Magellan, Solar and Heliospheric Observatory (SOHO), Viking Orbiters and its landers, Near Earth Asteroid Rendezvous (NEAR), Voyager and the Hubble Space Telescope.

Benson addresses his experience researching and editing the images. The results of this became a kind of philosophical treatise on the history of the photographic imaging systems used in these robotic probes. Benson's ideas on the nature of art in these images become relevant here:

I meditate on the fact that questions of authorship would tend to disqualify a space probe's pictures from serious

70. Michael Light, "The Skin of the Moon," *Full Moon* (New York, NY: Alfred A. Knopf, 1999).

71. Michael Benson, *Beyond-Visions of the Interplanetary Probes* (New York, NY: Harry N. Abrams, 2003) p. 295.

consideration as works of art—even though its scientific discoveries are undeniable, and attributed. Yet those same questions are very much present in the rarefied art-world air these days. Even Ansel Adams was only Ansel Adams part of the time. Like most photographers, he shot a lot of pictures and then selected those few that today constitute the work we connect with his name . . . What's left is choice—curatorship. And I would argue that these pictures qualify for another reason: their mysterious, Leonardo-esque smile.⁷²

One can look at a range of Benson's choices and make associations between a probe's photography and that of a photographic master. For example, Voyager's flyby of Jupiter takes on a modernist approach with its abstract colors and organic shapes. Next, there is Magellan's Minor White-like-exploration of Venus. The Synthetic Aperture Radar (SAR) imagery is all black-and-white, and White only worked in black-and-white. Also, Magellan captured unusual surface features, the quality of which are reminiscent to some of White's more interpretive work of objects and landscapes. And then there is the black-and-white exploration of Mars by the Viking Orbiters and Mars Global Surveyors that recalls the work of Ansel Adams, Edward Weston, and Aaron Siskind. Benson's choices also reinforce the notion that the photography from space exploration can be researched, edited and curated in a way that reflects the artistic proclivities of an author-curator.

While Benson and Light sought to convey various editorial approaches to the aesthetic possibilities of robotic and astronaut space flight photography, there are also artists who appropriate—take, borrow or are inspired by—space exploration in combination with photography, its related imaging technologies and even art. The work of the Spanish artist Joan Fontcuberta, for example, is distinctive for its humor, inventiveness and intellect. By experimenting with computer mapping software—used by cartographers to create realistic three-dimensional models and maps—Fontcuberta has created images of unimagined landscapes that look as though they were made by Earth orbiting satellites. Scanning examples of iconic paintings from artists like Rousseau, Turner, Cezanne, or Dali and feeding a digitized file from one of the paintings into the mapping software Fontcuberta achieved results in a fully rendered, realistic landscape of mountains, hills, valleys, rivers and lakes. The landscapes are, of course, visual fiction as experienced in his book fittingly entitled, *Landscapes without Memory*.⁷³ In context, Fontcuberta's fictional landscapes have an uncanny

72. Ibid., p. 304.

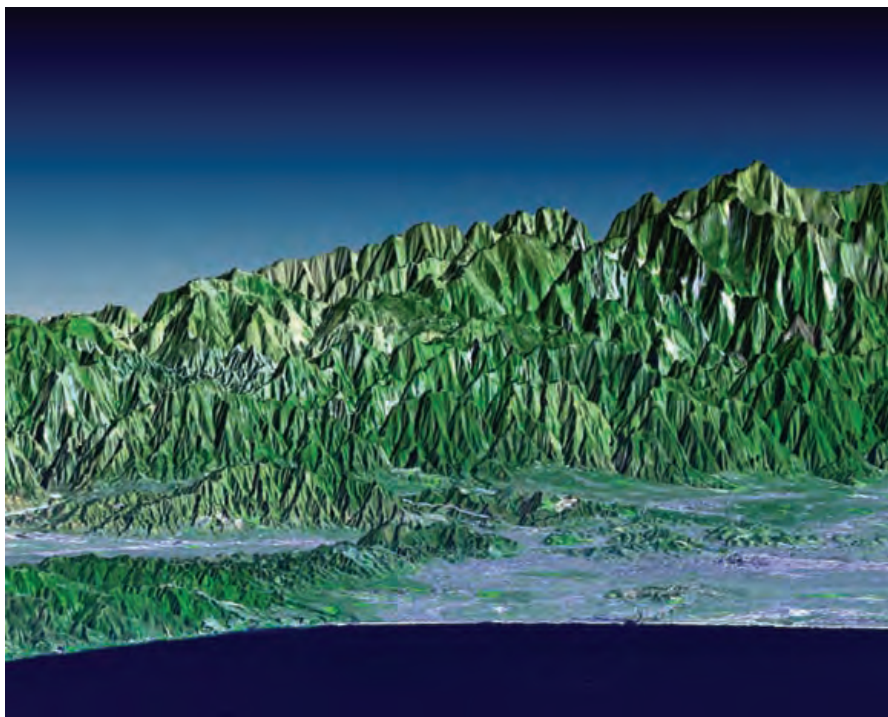
73. Joan Fontcuberta, *Landscapes Without Memory* (New York, NY: Aperture, 2005).



Henri Rousseau, "The Dream,": 1910. Oil on canvas. (The Museum of Modern Art, New York)



Derived photograph from "The Dream." (©Joan Fontcuberta)



SRTM image of Santa Monica Bay. ([PIA02779]/NASA)

resemblance to the imagery produced from the Shuttle Radar Topography Mission (SRTM) in 2000.⁷⁴

When the digital scan of, say, Rousseau's 1910 painting *The Dream* is generated into the mapping software, the resulting fictional landscape image of a lake, sharply defined mountains, the sky, and clouds can be contrasted to a SRTM radar image of Santa Monica Bay to Mount-Baden Powell, California.⁷⁵ In the SRTM bay photograph, the distinct quality of the mountains, and the colors of water and sky have a three-dimensional quality such as that experienced in the mountain and lake image derived from *The Dream*.

In a turn from a series of fictional landscapes with their own imbedded story, Fontcuberta has also experimented with stories based on invented photographs and created ephemera. One such story is based on a fabricated organization, the Sputnik Foundation, and a fictitious cosmonaut, Ivan

74. In addition to the SRTM of Earth, some of the images in Fontcuberta's book, *Landscapes without Memory*, also have an image quality similar to the imagery received from the Magellan space probe's radar imaging of the surface of Venus.

75. See JPL's "Shuttle Radar Topography Mission" online at <http://www2.jpl.nasa.gov/srtm/mission/htm>.



"Ivan Stochnikov and Klokha in their historical EVA," from the Sputnik project: 1997. (©Joan Fontcuberta)

Istochnikov. In 1998, Fontcuberta purports that the Sputnik Foundation sponsored an extensive, researched installation which examined the artifacts, details and life of the Soviet cosmonaut, Istochnikov who had apparently disappeared during the flight of Soyuz 2 in 1968. The reality, however, was that Fontcuberta had created an entirely fictitious narrative that reflected his actual research of the Soviet culture and its space program. Fontcuberta's portraits of Istochnikov are, in fact, those of Fontcuberta himself. The artist also created a series of



Eugene Cernan's EVA from GT9: June 1966. (NASA)

convincingly staged photographs of Ivan and his dog Kloka in their historical EVA from the flight of Soyuz 2. The photographs are reminiscent of (mid-1960s) EVA's by, among others, the American astronaut Ed White on Gemini 4 and Eugene Cernan on Gemini 9.

Another example of the appropriation of space exploration photography by members of the fine arts community is the conceptual piece, *The Apollo Prophecies*.⁷⁶ On first blush, its title would suggest yet another assertion that the Apollo trips to the Moon were staged on vast sound sets (such as those used in the making of the HBO series "From the Earth to the Moon.") While that television series was staged to recreate some of the actual historical events of Apollo,

76. Nicholas Kahn and Richard Selesnick, *The Apollo Prophecies* (New York, NY: Aperture Foundation, 2006).

The Apollo Prophecies are, in fact, a series of staged, edited and photoshopped black-and-white photographs that document a purely fictional event. The work centers on the Apollo landing on the Moon and the subsequent discovery of a lost mission of Edwardian astronauts who colonized the Moon nearly three quarters of a century earlier.

The Apollo Prophecies is both humorous and well researched. Drawing from both the history of photography and the history of the Apollo missions, the two fine art photographers Nicholas Kahn and Richard Selesnick wrote, staged, acted, photographed, and edited two seamlessly woven, multi-page panoramas that portray a two-man crew, their launch, journey, landing, discovery, and return to Earth. In addition, the two photographers also wrote and created an accompanying booklet, "Apollo: A Prophecy" that conceptually chronicles the mission profiles from Apollo 1 to Apollo XXX1. The booklet contains portraits made to appear turn-of-the 20th century and hand-drawn. The illustrations detail the Edwardians and the artifacts from their lunar colonization. In the "Editor's Note" the authors offer insight into the philosophical subtext of their work:

It is a little known fact that when the Apollo astronauts returned from the Moon, they brought back evidence of a previously unknown lunar expedition. This evidence comprised several cardboard canisters containing lunar breccia and, more significantly, a document written by the early explorer that prophesied the future arrival of the NASA astronauts themselves.

Most saw the documents as a forgery, not least because the early explorers viewed the coming astronauts as cosmic deities. Whether the prophecy is authentic or not, its vision is hard to deny—if any man is to be transformed in to a god, what better candidate is there than the one who has ascended into the celestial sphere and stood alone on a distant world?⁷⁷

On the surface the tone of the narrative could seem authentic but as readers and viewers, well aware of space history, we know it is not. In fact, we muse at Kahn and Selesnik's posturing. Calling the Apollo astronauts "cosmic deities" in the eyes of the early explorers is absurdly comical. Yet, there is also an irreverence that alludes to a belief on the part of some people that the Apollo landings were staged.

Within the panoramas of the book, though, a number of Gemini flight and Apollo surface photographs can be referenced to compare with some

77. Ibid., see accompanying pamphlet "Apollo: A Prophecy" (without page numbers), additional text by Erez Lieberman.



Panorama from *Apollo Prophecies*. (Kahn & Selesnick [Aperture, 2006]. All rights reserved)



"Apollo Bug," 1963. (Bill Bowles/NASA)



John Young, Commander of Apollo 16 on the lunar highland plains of Descartes April 1972. (Charles Duke/NASA)

of the staged scenes created by the photographers. As in Fontcuberta's EVA photograph of Ivan and Kloka, it would appear that Kahn and Selesnick appropriated the visual feeling of 1960s era EVA photography from Gemini missions like White's GT4, Cernan's GT9, and Aldrin's GT12. For example, on the outbound journey to the Moon, the crew of two astronauts emerge from their Gemini-inspired capsule on an EVA to study nearby asteroids. As the story continues, the crew lands and explores the lunar surface. The astronauts pick up rock samples and set up something that looks like the Far UV Camera/Spectrograph.⁷⁸ The detail and aesthetics of rock samples and camera recall the

78. See further information on George Carruthers (of the Naval Research Lab), who was the PI and inventor of the Lunar Surface Ultraviolet Camera and its related imagery from Apollo 16 at <http://apod.nasa.gov/apod/ap960610.html>.

surface imagery from Apollo 16. It also recalls a staged black-and-white NASA Lewis Research Center photograph—in the construction spirit of a Bonestell—of an early model of the LEM on a faux lunar surface with stars in a black sky and a Buck Rogers style of astronaut.⁷⁹

In the photograph that begins the second panorama of the book, the two astronauts have emerged from their lunar rover and have just discovered the Edwardian's camp. With the long-coated Edwardians' backs to the camera, the "Apollo" explorers survey the camp's infrastructure of housed rocks and space-suited pets, like a dog and elephant. The visual tone on the lunar surface can be compared to a black-and-white image of the Apollo 16 astronaut John Young.⁸⁰ In the photograph Young is just breaking into the right side of the camera frame and the lunar rover—its antenna aimed towards Earth—is parked in the background of the Descartes region landing site. The two images together create a contemplative, non-conspiratorial juxtaposition between historical fact and staged historical fiction.

VIII. CHOICES, TRANSITIONS, AND OPPORTUNITIES

Who built the seven towers of Thebes?
The books are filled with the names of kings.
Was it kings who hauled the craggy blocks of stone...
In the evening when the Chinese Wall finished where did
the masons go?

—Bertolt Brecht⁸¹

The first 50 years of space exploration has been visualized largely through the publication of iconic photography, those few identifiable and often repeated images. As I have argued, however, there are other images that exist. For the most part, these photographs have been largely overlooked or even undiscovered, and yet they too can be placed alongside these iconic images and be considered within the context of the history of photography. I have also been discussing the aesthetics of space exploration photography in terms of landscape, documentary, and snapshot photography as a means to a visual literacy. How then can *some* of these photographs of space exploration be defined as artistic? The noted landscape photographer Robert Adams offers some thought on art and the making of photographs:

79. See Glenn Research Center GRC Image Net: C-1963-65465, "Model of Apollo Bug to Simulate Lunar Landing" by Bill Bowles.

80. See Lunar and Planetary Institute *Apollo Image Atlas – 70mm Hasselblad Image catalog* for Apollo 16 <http://www.lpi.usra.edu/resources/apollo/catalog/70mm/mission/?16>.

81. Studs Terkel, *Working – People Talk About What They Do All Day and How They Feel About What They Do* (New York, NY: The New Press, 1972), p. xxxi.

It seems to me that what art has historically, traditionally focused on are these moments of recognition and insight. By looking closely at specifics in life, you discover a wider view. And although we can't speak with much assurance about how this is conveyed, it does seem to me that among the most important ways it's conveyed by artists is through attention to form.

The notable thing, it seems to me, about great pictures is that everything fits. There is nothing extraneous. There is nothing too much, too little, and everything within that frame relates. Nothing is isolated. The reason that becomes so moving is that the artist finally says that the form that he or she has found in that frame is analogous to form in life. The coherence within that frame points to a wider coherence in life as a whole.⁸²

It is my observation that a significant quality of space exploration photography is unique and idiosyncratic in form. The form is revealed in landscape and documentation as it spans through a whole host of photographic imagery (in color and black-and-white) not just produced and created on earth, but created from robotic spacecraft, human spaceflight, and Earth-based telescopes. Furthering the discussion on the aesthetics of art photography, it is worth noting the historical relevance that black-and-white space exploration photography has had on contemporary fine art photographers like Michael Light, Michael Benson, John Sexton, and even myself. Charlotte Cotton, a curator and writer on photography, offers some thought on the reascendancy of black-and-white in a recent online essay titled "The New Color: The Return of Black-and-white":

I am sure I'm not alone in beginning to think that the more complex, messy, unfashionable, and broad territory of black-and-white photography is where we are going to find some of the grist to the mill in photography's substantive and longer-term positioning within art.⁸³

Indeed, the rich tonalities of black-and-white photography—from velvety blacks to grays to pure whites—have defined the aesthetics of landscape and documentary photography since the late 19th century. The recent documentary and landscape work by contemporary photographers such as Sebastian Salgado

82. See more on Robert Adams "Photography, Life and Beauty" on PBS's *Art in the Twenty First Century*, <http://www.pbs.org/art21/artists/adams/clip2.html> (accessed February 13, 2008).

83. Charlotte Cotton, "The New Color: The Return of Black-and-white." Contribution to The Tip of the Tongue forum, March 2007, <http://www.thetipofthetongue.com> (accessed March 2007, now defunct).

(*Genesis*), Bernd and Hilla Becher (*Water Towers*), and John Sexton (*Places of Power*) re-affirms the significance of black-and-white as a means of exploration and discovery. Even the recent exploration of the daguerreotype process by the artist Chuck Close has resulted in finely crafted black-and-white portraits of contemporary artists and writers. The consideration of black-and-white as the “new color” is significant. To Cotton, it may even move photography to a new plane:

Contemporary black-and-white photography . . . has moved my thinking about the present state of photography onto a much more optimistic platform. Through these contemporary manifestations, the true, maverick character of photography, of our medium’s history, is far from lost. Indeed, these threads of the past are given new and meaningful effect.⁸⁴

One could conclude that the enthusiastic response of a few contemporary photographers to the abundance of black-and-white photography that NASA produced during the first 50 years of space exploration is no surprise.⁸⁵ It is compelling that Apollo 12 and 14 through 17 produced a significant amount of black-and-white photography, and it is the scope of that photography which tends to be referenced and appropriated by fine art photographers. This appropriation is significant because the inherent nature of black-and-white imaging foreshadows what art photography could contribute to the present and evolving history of space exploration photography, particularly in the documentation of people and place as human spaceflight transitions from the Space Shuttle and the ISS into the Constellation program.⁸⁶

84. Ibid.

85. It should be noted, however, that the institutional choice (by photographic engineers) at NASA to use color film on human spaceflight missions (since Project Mercury) was not arbitrary. The decision was pragmatic because it reflected the practical needs of the engineering and scientific communities. A technical philosophy unchanged as human spaceflight activities evolved from Project Apollo and Skylab, to the Space Shuttle and ISS programs. Although during the first 20 years of NASA, the PAO (Public Affairs Office) typically relied on black-and-white photography to record the day-to-day and staged media events given the medium’s immediacy and the historical nature of its use in the print media. However, by the late 1970s and with the emerging Space Shuttle program, black-and-white was eased out in favor of the immediacy (and cultural preference) that color coverage could provide. A choice unchanged as the second 50 years of space exploration begins, except to note that color films were gradually eased out in the late 1990s in favor of color digital technology.

86. The reemergent relevance of black-and-white, however, does not diminish the significance that color continues to have. For example, note the works by photographers like William Eggleston, Stephen Shore, Joel Meyerowitz, Robert Adams, and John Pfahl. It also must be considered that over the last several decades artist photographers, curators and teachers have emerged from MFA programs like those found at the Art Institutes of Chicago, San Francisco, Yale, and the Rochester Institute of Technology.

The quality of this transition to the Constellation program, one that has not been experienced since the close of Apollo and the emergence of the Space Shuttle, reinforces Weitekamp's suggestion that the history of NASA be examined in terms of its labor force. Weitekamp's proposition fits squarely within the landscape and documentary aesthetics found in the history of 20th century photography. This thinking can be considered as a catalyst in leading conversations that examine the existing photography of the labor force and its various work sites. Examining the first 50 years can help prepare and plan for a systematic and managed documentation of the next 50 years of space exploration.

In essence, it may be well worth evaluating the necessity for the researching and cataloguing NASA's photographic archives and the collections of its contractors as a means for creating the criteria for the next 50-year cycle. This would include the photography from Kennedy, Marshall, Michoud, Stennis, Dryden, Goddard, Glenn, Langley, Johnson, Ames, Vandenberg, and JPL. The results of such research may unveil collections of insightful work like high-speed engineering (Schlieren photography), industrial, portraiture, and the day-to-day workings of the labor force by one or more unrecognized photographers. For example, there are, in fact, decades of remarkably sophisticated work by the industrial photographers Bill Bowles, Paul Riedel, and Martin Brown at NASA's Glenn Research Center (formerly Lewis Research Center). I contend that research like this may yield historically significant discoveries (not unlike Michael Lorenzini's curatorial research, discovery, and exhibition of Eugene de Salignac's engineering and infrastructure photography). Perhaps, in conjunction with the NASA History Division and a flight center's archives, a combination of graduate students and doctoral candidates with affinities towards the realm of the curatorial would be likely resources in implementing such a long-term undertaking.

As the second 50 years of space exploration begins, so does its resulting photography. Rather than solely depending on NASA flight center photography, which is largely reactive to the moments at hand, I suggest taking a more proactive approach. Why not engage fine art photographers and photojournalists who may offer historians, curators, policymakers, and, ultimately, the public a more perceptive understanding of the current and future American space programs before they vanish forever. In many respects, why wait until an American space exploration program like the Space Shuttle is completed, scrapped, and rusted like remnants of Project Apollo's infrastructure.

Take for examples Scott Andrews prescient documentation of discarded and "abandoned in place" launch pads at the Kennedy Space Center. Well beyond the dusk of the Apollo years, Andrews documented (over a number of visits beginning in the late 1990s) all that remains of Launch Complex 34.⁸⁷ Andrews

87. See chapter two, Charles D. Benson and William Barnaby Faherty, *Moonport: A History of Apollo Launch Facilities and Operations* (NASA Special Publication-4204 in the NASA History Series, 1978), <http://history.nasa.gov/SP-4204/contents.html> (accessed March 27, 2008).



Saturn Apollo Launch Complex 34, Cape Canaveral Air Force Station: October 1999. (©Scott Andrews)

captured in black-and-white the discarded isolation of an elevated launch pad resting on four rectangular legs of steel and eroding concrete. The skeletal launch pad looms over cracked slabs of concrete like the “shattered visage” from Shelley’s “Ozymandias.”⁸⁸ When Andrews’s prosaic image is placed in context to the nostalgic years of Apollo, certain events become more understandable: the early testing of the Saturn rocket, the death of the first Apollo astronauts (trapped in fire within their Apollo capsule), the subsequent test launches of Saturn and the first manned mission of Apollo 7, leading to the quest to land on the Moon. What studied documentation of people and place that might have been photographed

88. Percy Bysshe Shelley, “Ozymandias,” Alexander W. Wilson, et al., *The Norton Anthology of Poetry* (New York, NY: W. W. Norton & Co., 1983), p. 619.

of Apollo, Skylab, and the initial emergence of the Space Shuttle program may never be known. What small in-roads of photographic documentation that have been made during the shuttle era may be considered a foreshadowing of what may be documented in the coming 50 years of American space exploration.

It is tantalizing to consider that if Project Apollo had had a combination of landscape and documentary photographers interpreting the scope and scale of this program from 1962 through 1975 (much like the photography that was directed and managed by the government supported Farm Securities Administration or FSA in the 1930s), the aesthetic range would have been invaluable to space historians and the public alike. Perhaps, the creation and implementation of a modestly funded artist and writers program (likened to some extent to the National Science Foundation's "Antarctic Writers and Artists" program) can be considered. Such a program could be an extension of NASA's educational outreach, its history office and even the Smithsonian's National Air and Space Museum (NASM). In combination with the research and curatorial needs of both NASA and the NASM, such a program could contribute to the direction of how space exploration photography is curated and documented. These efforts could also result in a foundation of relevant photographic documentation, and at the same time, identify iconic imagery from other space fairing nations like ESA, Russia, China, Japan, and India. All of which, of course, would contribute to an understanding of space exploration and its history on a worldwide level.

The necessity for planning and implementing a methodology of research and archiving becomes evident. It can result in an emerging visual literacy that is in sync with the proactive photographic documentation of the American space program over the next 50 years. Such a methodology would need to memorialize not just the intended scientific, technical and day-to-day record-keeping, but an aesthetic that embraces the essential labor force responsible for actualizing the next 50 years of human and robotic space exploration. From this a more salient visual literacy emerges which broadens and deepens the understanding of human exploration.

IX. EPILOGUE

As Brecht wondered about the Chinese masons and the Great Wall, I wonder about the photographic documentation of what remains of the Space Shuttle and ISS programs, and the visual evidence that both historians and curators will be able to examine, publish, and exhibit in the decades to come. I embrace a photographic approach whose framework encompasses the discovery of the past and the documentation and interpretation of the present in context to the evolving history of both photography and space exploration. I liken this approach to my poetic journey when walking through Richard Serra's *Sequence*—a vast sculpture consisting of a series of connected 13-foot high

torqued, curving, rust-colored steel plates. From an elevated position, *Sequence* resemble two gigantic violin scrolls standing back to back.⁸⁹ As I journey inward within one of the spirals, I experience an enclosed elliptical space where shafts of light cascade down the sides of the steel walls. I notice how the sunlight plays upon the scale of the space within the ellipse. When I move back into the wall's shadows, I discover a remarkable angled slit, an apparent exit. I exit and proceed through a narrow, disorienting corridor of curved steel, until I discover another interior space, similar yet different than the first. I retrace my steps back to the first only to realize that this time the path has lead me to yet another possible exit. Moving within these one of a kind structures, I could not have anticipated my journey or my exit. As with the commitment to an interpretative photographic documentation of people and place during the next 50 years in space exploration, we cannot begin to know where our efforts might lead.

APPENDIX

In all the history of mankind, there will be only one generation that will be the first to explore the solar system, one generation for which, in childhood, the planets are distant and indistinct discs moving through the night sky, and for which, in old age, the planets are places, diverse new worlds in the course of exploration.

—Carl Sagan⁹⁰

As I contemplate the next 50 years of space exploration photography, I find myself thinking about the serendipitous relevance between two rather unremarkable images from the photographic annals of Project Apollo. The very first image, recorded from the first launch of a Saturn V, came from Apollo 4's robotically controlled onboard camera. It is the image of a waxing crescent planet Earth in November 1967.⁹¹ Some five years later in December 1972, the very last image made by one of the Apollo 17 crew (before stowing the camera away for reentry) was of a waxing crescent planet Earth.⁹² Perhaps, these two images foreshadowed the next nearly 40 years of human spaceflight. The images

89. Tom Christie and Holly Meyers, "Stealing Beauty, Richard Serra's Advance Party," *LA Weekly*, August 15, 2007, <http://www.laweekly.com/art+books/art/stealing-beauty/17007/> (accessed February 16, 2008).

90. Dava Sobel, *The Planets* (New York, NY: Viking, the Penguin Group, 2005), pre-contents page (not numbered).

91. See Apollo 4 images at the Lunar and Planetary Institute *Apollo Image Atlas – 70mm Hasselblad Image catalog*, <http://www.lpi.usra.edu/resources/apollo/catalog/70mm/magazine/?01>.

92. See Apollo 17 images at the Lunar and Planetary Institute *Apollo Image Atlas – 70mm Hasselblad Image catalog*, <http://www.lpi.usra.edu/resources/apollo/catalog/70mm/magazine/?152>.

foreshadowed space flight limited to only the low Earth orbiting ventures of Skylab, the Space Shuttle and the International Space Station.

Now at the outset of the next 50 years of space exploration, I contemplate the extraordinary imagery beaming down from the Hubble Space Telescope: distant nebulae and galaxies (and the confirmation of the existence of an organic compound in the atmosphere of a planet in a near-by star system), Cassini's exploration of Saturn's moons Titan and Enceladus for water, the Mars Reconnaissance Orbiter's discovery of water deposited clay in a dry lake bed, and Messenger's first flyby of Mercury since Mariner 10.

As a result, I am drawn to the visual possibilities that will originate from both robotic spacecraft and human spaceflight. So it is reasonable for me to postulate what still photographic images may be reasonable candidates for "iconic" during the next 50 year cycle, among them:

- first discernable image of a water planet—with evidence of oceans, clouds, continents—in another solar system
- first image of alien life forms either alive or in fossil form
- first image capturing the earliest light of the universe just after the "Big Bang"
- Jupiter and some of its moons as seen from the surface of Europa
- first panoramic image from the surface of Europa illuminated by the reflected light of Jupiter, not the Sun
- Saturn and its rings as (possibly) seen from the surface of Titan
- first detailed image of the surface of Pluto in the foreground with Charon and/or other Plutonian moons in some crescent phase in the background
- defining color image of Earth and the Moon from the surface of Mars
- clear discernable image of Earth's "pale-blue-dot" taken from the outer fringes of our solar system
- first sequential or montage image of a Kuiper Belt Object
- image of the first group of civilian "tourists" to orbit Earth in a spaceship II type of spacecraft
- during SM4, the last human mission to the Hubble Space Telescope, a 180 degree montage of overlapping images of HST, the orbiter, Earth, and space taken from various vantage points in the Space Shuttle's cargo bay and from its robotic arm
- first detailed image of the Apollo 11 landing site by a robotic spacecraft (ideally in low angled sunlight) showing the LEM lander, American flag, ALSEP, discarded artifacts (camera bodies, etc.), and boot prints

- Earth and the Moon rising above the irregular horizon line of the first asteroid to be explored by humans
- astronauts (not waving) by their lander (in low angled or backlit sunlight) on the surface of the first asteroid to be explored by humans
- self-portrait of the first 21st century astronauts—with their lander amid lunar hills, mountains, boot and wire-rim tire tracks—to have landed on the surface of the Moon since Apollo 17's December 1972 exploration
- time exposed image from the lunar surface—during the two-week lunar night—of lunar surface geography and the stars above
- defining photograph from a northwest position—in low angled sunlight from the east— by the first astronauts to visit (but not enter) Apollo 11's Tranquility Base landing site
- first Chinese astronauts, by their flag and lander, to land on the Moon
- a series of black-and-white images—in film—made with a space hardened Leica by the first crew to inhabit the first lunar outpost created on the surface of the Moon
- a series of available light “self” portraits (without flash) of the first crew heading to Mars: one set made just as they pass the Moon; the second made half way in their journey; the third made 24 hours or less before they set out to first land on the surface; the fourth made during the first EVA on the surface of Mars by humans
- astronauts on the surface of Mars by just-discovered evidence of actual or recent water flow
- first astronauts (on the surface of Mars) at the location of the first discovered evidence of either life forms or fossilized life forms
- the first en route interstellar probe's imagery of its intended destination of a nearby star system and some of its planets

CHAPTER 16

ROBERT A. HEINLEIN'S INFLUENCE ON SPACEFLIGHT

Robert G. Kennedy, III

Robert Heinlein is one of the most influential science fiction authors of all time. His writings not only inspired numerous people to enter the sciences and engineering in general—and the field of spaceflight in particular—but also shaped the way that people thought about spaceflight. Thus, even though Sputnik was a strategic surprise for the United States, there were legions of young Americans predisposed to step up and get to work on the challenging task of winning the space race. Heinlein's influence can currently be seen in the activities of numerous private spaceflight entrepreneurs.

LOOKING BACKWARD

Science fiction has changed history. We know this happened at least once in a very direct and far-reaching way by the documented influence of the science fiction writer H. G. Wells upon the yet-to-be Manhattan Project physicist Leo Szilard—one of the seven so-called “Men from Mars,”¹—when crossing a London street in 1933. As Richard Rhodes relates this story in his Pulitzer Prize-winning *The Making of the Atomic Bomb*:

On February 27, 1932 . . . physicist James Chadwick of the Cavendish Laboratory at Cambridge University . . . announced the possible existence of a neutron . . . The neutron . . . had no electric charge, which meant it could pass through the surrounding electrical barrier and enter into the nucleus. The neutron would open the atomic nucleus to examination. It might even be a way to force the nucleus

1. The seven famous Hungarian Jewish physicists who emigrated to America before World War II were all products of the famous Minta Gimnasium in Budapest. Two of them would go on to win Nobel Prizes. They were in birth order: Theodor von Karman, George de Hevesy, Michael Polanyi, Leo Szilard, Eugene Wigner, John von Neumann, and Edward Teller. The joke among their American colleagues was that they were actually from Mars and not Hungary as they claimed because they possessed unearthly brilliance, spoke English with an impenetrable Central European accent, and nobody knew what a Hungarian accent really sounded like anyway.

to give up some of its enormous energy. Just then, in 1932, Szilard found or took up for the first time that appealing orphan among H. G. Wells's books that he had failed to discover before: *The World Set Free*. . . . It was a prophetic novel, published in 1914, before the beginning of the Great War [World War I]. As Szilard recalled, Wells described

The liberation of atomic energy on a large scale for industrial purposes, the development of atomic bombs, and a world war which was apparently fought by an alliance of England, France, and perhaps including America, against Germany and Austria, the powers located in the central part of Europe. He places this war in the year 1956, and in this war the major cities of the world are all destroyed by atomic bombs.²

It is difficult to read this story, even at nearly a century's remove, without chills running down one's spine in much the same way that a first reading of "Future Prospects of the United States" in *Democracy in America* by Alexis de Tocqueville produced during the depths of the Cold War.³ Such prescience and perspicacity is almost inhuman. According to Rhodes:

In London . . . across from the British Museum in Bloomsbury, Leo Szilard waited irritably one gray Depression morning for the spotlight to change . . . Tuesday, September 12, 1933

2. Richard Rhodes, *The Making of the Atomic Bomb* (New York, NY: Touchstone/Simon & Schuster, 1986), pp. 23-24.

3. de Tocqueville, Comte Alexis, *Democracy in America* (1835), chapter 21. "On the Future Prospects of the United States. There are at the present time two great nations in the world, which started from different points, but seem to tend towards the same end. I allude to the Russians and the Americans. Both of them have grown up unnoticed; and whilst the attention of mankind was directed elsewhere, they have suddenly placed themselves in the front rank among the nations, and the world learned their existence and their greatness at almost the same time." All other nations seem to have nearly reached their natural limits, and they have only to maintain their power; but these are still in the act of growth. All the others have stopped, or continue to advance with extreme difficulty; these alone are proceeding with ease and celerity along a path to which no limits can be perceived. The American struggles against the obstacles which nature opposes to him; the adversaries of the Russian are men. The former combats the wilderness and savage life; the latter, civilization with all its arms. The conquests of the American are therefore gained by the ploughshare; those of the Russian by the sword. The Anglo-American relies upon personal interest to accomplish his ends, and gives free scope to the unguided strength and common sense of the people; the Russian centres all the authority of society in a single arm. The principal instrument of the former is freedom; of the latter, servitude. Their starting-out point is different, and their courses are not the same; yet each of them seems marked out by the will of Heaven to sway the destinies of half the globe."

. . . Szilard stepped off the curb. As he crossed the street time cracked open before him and he saw a way to the future, death into the world and all our woe, the shape of things to come . . . Without question, Szilard read *The Times* of September 12, with its provocative sequence of headlines:

THE BRITISH ASSOCIATION

BREAKING DOWN THE ATOM

TRANSFORMATION OF ELEMENTS

Szilard was not the first to realize that the neutron might slip past the positive electrical barrier of the nucleus . . . but he was the first to imagine a mechanism whereby more energy might be released in the neutron's bombardment of the nucleus than the neutron itself supplied . . . As the light changed to green and I crossed the street," Szilard recalls, "it . . . suddenly occurred to me that if we could find an element which is split by neutrons and which would emit *two* neutrons when it absorbs *one* neutron, such an element, if assembled in sufficiently large mass, could sustain a nuclear chain reaction . . . In certain circumstances, it might be possible to . . . liberate energy on an industrial scale, and construct atomic bombs."⁴

The accidental discovery of x rays and radioactivity in 1895-96 upset everyone's notion of the immutable atom and the eternal clockwork universe, opening up grand new vistas of disturbing change. There at the turn of the century to interpret these mysterious new findings and extrapolate their potential meaning was one Herbert George Wells, a consumptive who in the fine tradition of impoverished tubercular writers before (Robert Louis Stephenson) and after (Robert A. Heinlein) was unable to do any heavier work than writing for a living. In 1899, he had already produced what Heinlein would call "the greatest speculative novel ever written," *When the Sleeper Wakes*.⁵ In this single novel, just one among many, Wells conceived:

- a) heavier-than-air engine-powered warplanes, including their major types (fighter, bomber, and large transport), as well as thought-out doctrine for

4. Rhodes (ref. 2), pp. 13, 27-28.

5. A good subtitle might have been *The Miracle of Compound Interest*.

their application in air battles (note that this was four years before the Wright brothers flew 300 feet in their contraption at Kitty Hawk)

- b) a variety of so-called “Babble Boxes”—audio media machines to appeal to every demographic segment that anticipated narrowcasting, blogs, and the World Wide Web—and “televisors” that resembled the information-retrieval capabilities of the Internet
- c) mass-transit systems such as slidewalks, automatic high-speed surface freight, and airports

In addition to predicting the Bomb (as well as related concepts that we would recognize as decapitating first strike, strategic atomic exchange by air, and mutual assured destruction) in *The World Set Free* (1914), in other novels, Wells forecast suburbia and many other political and social developments that would accompany these innovations and, like de Tocqueville, the superpower status of America.⁶ All during his own life, Robert A. Heinlein described H. G. Wells as his single greatest literary and intellectual influence.⁷

HEINLEIN'S INFLUENCE

So what about Heinlein himself? He was more technically prolific than even the incredible Wells, but his influence was regrettably less direct than the example above. This may simply be a characteristic of how things go in a naïve versus mature ecosystem, in which 80 percent of the significance is determined within the first 20 percent of the timespan.

Direct Effects on Society and Spaceflight via Technological Innovation

The Web site <http://www.technovelgy.com> attributes 120 (so far) inventions, novel devices (e.g., the waterbed), and neologisms (e.g., “free fall” and “grok”) to Robert A. Heinlein. An incomplete list of just some of his space-related ideas includes: various electromagnetically-levitated transport systems also known as “mass-drivers,” a hands-free helmet, the “parking” orbit, a Space Shuttle, stealth, and the gravity slingshot maneuver. This polymath’s skill at innovating was not limited to science, technology, and engineering either, which handicapped most of the writing in what came to be known as “the pulp era.” Heinlein brought originality to his craft, pioneering the literary technique of “Future History” used by many top writers of the genre since (implicitly or

6. Paul Crabtree, “The Remarkable Forecasts of H. G. Wells,” *The Futurist* 41, no. 5 (Sept./Oct. 2007): 40–46.

7. Michael Hunter, “First Look: the Influences of H. G. Wells on Robert A. Heinlein’s For Us, the Living,” *The Heinlein Journal*, no. 14 (January 2004): 15–18.

explicitly), and refining Wells' trick of "domesticating the impossible" (canonical instance: "the door dilated").⁸ Heinlein eventually grew impatient with what he called his Procrustean bed. According to Elwood Teague, a contemporary of his, Heinlein, who read as widely as Wells, was obsessed with "the coming of the Bomb" even in the late 1930s. This surely must have been the Wellsian influence. Heinlein did, in fact, manage to meet Wells in Los Angeles about that time, and would have seen the groundbreaking epic motion picture, *Things to Come*, which was based on Wells's work, both dystopian and utopian. He was in frequent correspondence with scientists such as the physicist Robert Cornog, as well as engineers who would go on to the Manhattan Project, informing and being informed, and using the new discoveries to lend the essential Heinleinesque verisimilitude to his art. In keeping with his deep sense of discretion and military honor, this speculative phase ended instantly when his editor at *Astounding Science Fiction*, John W. Campbell, Jr., told him in December 1940 that discussion of uranium-235 had "gone black" in the technical literature. (His salient novella, *Solution Unsatisfactory* was already in press by then. The story is remarkable even today for the essential political truths it captured.) Being the Renaissance Man of the world he was, Heinlein knew exactly what this blackout portended.⁹ He maintained this self-imposed censorship throughout the war years, though it is obvious he never stopped thinking about it.¹⁰ Others were not so discreet. For example, Cleve Cartmill, his fellow habitue of the Manana Literary Society (MLS) that met in the Heinleins' living room in prewar Los Angeles, published a short story called "Deadfall" in the March 1944 issue of *Astounding* that was so technically accurate, it resulted in a visit to Campbell's editorial office by the naturally irate FBI. Heinlein's contact with the community of "rocket science" (meaning rocketry, nuclear weapons, and strategic matters) resumed after Hiroshima and continued for the rest of his life. One group of atomic scientists eventually became the Federation of American Scientists, principally interested in disarmament and arms control. Another later group became the Citizen's Action Committee for Space, the first proponent of what came to be called the Strategic Defense Initiative. Heinlein was apparently never troubled by the hobgoblin of consistency.

Though an engineer by training and inclination, Heinlein did not promote engineering per se. In his frequent lectures on the value of a liberal education, he would only say that the stool of knowledge has three legs: mathematics, (foreign) language, and history. Three legs are all that are necessary to stand:

8. Bill Patterson, "A Study of 'If This Goes On . . .,'" *The Heinlein Journal*, no. 7 (July 2000): 29–42.

9. Heinlein also predicted the time, mode, and method of the Japanese attack on Pearl Harbor a week before the event, based on his own experience as a Navy gunnery officer aboard an aircraft carrier participating in a simulated attack exercise nine years before.

10. Robert A. Heinlein to J. S. Kean, "Tentative Proposal for Projects to be carried on at NAMC," August 14, 1945, Heinlein Archives, <http://heinleinarchives.net/> (accessed August 19, 2007).

neither engineering, technology, nor science are mentioned. The first leg exists because mathematics is the universal language of science. The second leg exists because one will never really understand one's own language, so one cannot know the true shape of one's mind until one has seen it from the outside through a foreign language (there's probably a connection to Godel's Incompleteness Theorem). The third leg exists because one will never be prepared for the future until one has first learned to see the present in the light of the past.

Direct Effects on Spaceflight via People

After the Japanese attack on December 7, 1941, Robert Heinlein tried to rejoin the Navy. After being turned down, he used his Annapolis connections to get an engineering job as a civilian in an aeronautical factory at the Philadelphia Navy Yard, relocating there from Los Angeles with his second wife, Leslyn.¹¹ His Navy classmates, who were well aware of Heinlein's gifts, at first had him spotting engineering talent before giving him a materials research position at the Navy Air Materials Center (NAMC). (It was here he met the woman who would become his third wife—and so important to his later work—a Navy WAVE lieutenant (j.g.) named Virginia Gerstenfeld, forever known to history as “Ginny.”) Turning to the science-fiction community, Heinlein recruited his fellow writers L. Sprague deCamp and Isaac Asimov to work at the Navy Yard in aeronautical engineering as well. De Camp took a Navy commission and, under Heinlein's guidance, eventually turned to work on high-altitude pressure suits at NAMC. Towards the end of the war, combat aircraft—particularly long-range heavy bombers—were flying so high that mere warm clothing and oxygen masks could not protect the crews from the elements. Heinlein's troubles with tuberculosis, which had invalidated him into early retirement from the Navy in 1934, precluded his direct participation in the altitude chamber and other experiments. But it is certain that the science fiction background of all three men—namely in regard to what would be called “spacesuits”—informed the work. The 1940 short story “Misfit” contains an accurate description of what a space suit should be.

One of Heinlein's new (and less famous) hires was Edward L. “Ted” Hays, a mechanical engineer like Heinlein himself. Hays worked as a flight test engineer on problems associated with carrier operations. (Heinlein's first billet after graduating from Annapolis was on the most advanced warship of her day, the carrier USS *Lexington*.) Hays went on to safety and survival equipment, became deeply involved in the development of Navy pressure suits, moved to NASA in 1961 after Project Mercury was underway, and eventually ending

11. Robert James, “Regarding Leslyn,” *The Heinlein Journal*, no. 9 (July 2001): 17–36.

up on the Apollo program as chief engineer of life support systems where he specialized in, of course, space suits!¹²

Indirect Effects on Society and Spaceflight via Literature

Because his literary genius was recognized so early by his readers and fellow writers in the late 1930s, Heinlein left an indelible imprint on the entire genre of science fiction, which might not have happened in a later more fractured and competitive age.¹³ His prewar influence on the other writers (e.g., L. Sprague deCamp, Frederick Pohl, Isaac Asimov) of what came to be known as the postwar “Golden Age of science fiction” was simply profound. It is no exaggeration to say that writing in the field experienced a quantum leap in quality compared to its pulp roots. Postwar, Heinlein even managed to bring his chosen genre out of the ghetto into the respectable “slicks” (glossy, large-format color weeklies such as the *Saturday Evening Post* and *Collier's*, bygone media of a bygone age), where he would continue to be published. A full generation later, he was still mentoring and guiding major new writers (e.g., Larry Niven and Jerry Pournelle for their seminal “First Contact” novel, *The Mote in God's Eye* (1973)).¹⁴ Heinlein not only transmitted literary technique to his colleagues—his values of service and sacrifice, an individualistic outlook, and ethos of competence also came through and were propagated to millions of these authors' readers in turn.

Indirect Effects on Society and Spaceflight via Politics

Though his postwar writing was certainly more polished and sophisticated, Heinlein's prewar thinking was more original and imaginative in some ways. His earliest work contained themes that were politically revolutionary even by today's jaded standards. *Revolt in 2100* comprised the novella *If This Goes On . . .* (1939), and two short stories “Misfit” (1939), and “Coventry” (1940)—graced with the best science fiction cover art ever—are in this genre.¹⁵

The first of these stories is perhaps the purest example of what MLS-member Henry Kuttner called “the innocent eye”—no surprise that it's among the earliest work before professionalism sets in. It is set in a world in which the United States has turned its back on interplanetary exploration and science

12. Bill Higgins interview, Kansas City, MO, July 7, 2007, (unpublished article forthcoming).

13. Again, early players are generally more significant in a field than later ones, notwithstanding their absolute level of skill. This is a fundamental property of evolution.

14. Robert A. Heinlein to Larry Niven and Jerry Pournelle, “Motelight,” June 20, 1973, (copy in U.C. Santa Cruz Heinlein Archives, UCSC Library, Santa Cruz, CA); Robert A. Heinlein to Larry Niven and Jerry Pournelle, “The Mote in God's Eye,” August 1973, (copy in Heinlein Archives).

15. Robert A. Heinlein, *If This Goes On . . .*, “Coventry,” and “Misfit” in *Revolt in 2100* (New York, NY: Signet Books, 1953).



Robert Heinlein's book, *Revolt in 2100*, was made up of the novella *If This Goes On . . .* (1939) and two short stories, "Misfit" (1939) and "Coventry" (1940).

after a period of “Crazy Years,” falling into a theocratic police state. One does not have to imagine how Depression-era readers received these words, either: we have their letters describing how awestruck they were and their immediate realization at what a talent they had in their mailboxes. (Regrettably, the background story of the novella *If This Goes On . . .* seems less outlandish now than it did 70 years ago.)

After Hiroshima, Heinlein wrote a remarkable (yet usual for him) valedictory memorandum to his superiors notifying them that the Bomb would put them out of business. Then he promptly resigned and returned to Los Angeles with his wife, Leslyn. He endured several lean years of hardship, during which his second marriage broke up, before returning to writing fiction. This was the period of 1945–47 when he engaged in what he disingenuously called “world saving”—articles for the general public about the significance of the new Atomic Age. Why distinguish his activity as disingenuous? Because, despite his protestations that he wrote just to keep the wolf from his door and his frequent declarations equating the value of his writing with the reader’s beer money, Heinlein was in fact deeply interested in politics—he ran for the California State Assembly in 1938—and educating his fellow human beings. These pungent articles were mostly ignored by the mainstream and never saw print except for one major exception. An early postwar collaboration with his Annapolis classmate Captain Caleb Laning called “Flight into the Future” appeared in the August 30, 1947 issue of *Collier’s*, which described a nightmarish vision of an atomic arms race in space. (The concept eventually became the core of the second juvenile novel, *Space Cadet*.) The article (which was mostly Heinlein’s work) did attract a lot of attention but ultimately led nowhere.

Why didn’t “Flight” succeed? Why were its prescriptions and prognostications ignored by the military establishment and the policymakers? One must recall that the USAF was once called United States Army Air Force (USAAF) before being split off from the Army by President Truman in 1947 in the same Act that created the Department of Defense (DOD) and the Central Intelligence Agency (CIA). Aviation’s roots in this country are in the Army, not the Navy.¹⁶ Recall also that the Manhattan Project, and the related Operation Paper Clip and Project ALSOS (netted the German nuclear scientists as well as the rocket scientists including Wernher von Braun), were primarily Army operations. Likewise, Project RAND—an R&D department spun off from Douglas Aircraft that drafted the seminal “Design of an Experimental World-Circling Spaceship” (1946)—was supported by the USAAF. Rocket research was chronically underfunded by Navy until the submarine-launched ballistic

16. Analogous to the situation in Russia, the Russian strategic missile forces and Russian rocketry in general have their roots in artillery (a classic army mission), not aerospace as is usually the case elsewhere, which has led to some interesting differences in design philosophy, doctrine, and operating procedures compared to the West.

missile (SLBM) program started in the mid-1950s.¹⁷ Caleb Laning was as original a thinker as Heinlein, but despite starting earlier, strategic weapons and, by extension, their platforms, were always the Army's rice bowl. Perhaps the Navy's early expression of interest stimulated the nascent USAF to actively take over satellite portfolio.

Indirect Effects on Spaceflight via Pop Culture

After his breakup with Leslyn towards the end of his hard times in 1947, Robert hooked up with Ginny and hit the road. The first of his juvenile novels, *Rocket Ship Galileo*, appeared, which would become the basis for the movie *Destination Moon*. Robert and Ginny worked out the *modus vivendi* that would guide the rest of their lives together. She became his first reader and indispensable partner. A long string of juveniles alternating with adult novels followed during an amazingly prolific decade.

In 1949, some of Heinlein's connections from his prewar Hollywood days led to a collaboration with the producer George Pal as technical advisor on the Oscar-winning science-fiction motion picture *Destination Moon* (1950). Heinlein enjoyed an unusually close (by Hollywood standards) productive relationship with the film's director, Irving Pichel, who took most of Heinlein's advice. Thus this film still looks remarkably good by today's standards and raised the bar for science fiction on the silver screen.¹⁸ *Destination Moon* led to the trio of great science fiction films by George Pal: *When Worlds Collide* (1951), *War of the Worlds* (1953), and *The Time Machine* (1960). These classic films with their high production values certainly had at least indirect effects on pop culture. It is interesting that Pal, starting at Heinlein, came around to Wells.

It is surely no accident that, a decade after *Rocket Ship Galileo* (1947) and the whole series of juvenile novels that inspired millions of people who were teenaged in 1947-1959, legions of young professionals were ready to answer the challenge of Sputnik and to choose technical careers, entering the workforce just as the space race began.¹⁹ One (current) NASA Administrator is the apparent exception, declaring that an interest in spaceflight led him to science fiction, not the usual way around.²⁰ The predominantly libertarian people who work in the free space movement almost universally cite Heinlein as their principal inspira-

17. R. Cargill Hall, "Earth Satellites, A First Look at the United States Navy," *Proceedings of the Fourth History Symposium of the International Academy of Astronautics*, Konstanz, German Federal Republic (October 1970): 253-277.

18. Like most of the crew, Heinlein did not enjoy the film's financial rewards, again standard for Hollywood. Also, and regrettably, it did not lower the bar on a lot of bad science fiction flicks yet to come, but one must remember that Sturgeon's Law is always in effect.

19. Bill Patterson, "A Study of 'Misfit,'" *The Heinlein Journal*, no. 3 (July 1998): 24-32.

20. Michael Griffin, "The Future of NASA," speech delivered at the Robert A. Heinlein Centennial Conference 1907-2007, Kansas City, MO, July 6, 2007. This was apparently the first time in history that a serving NASA Administrator addressed a science-fiction audience.

tion, including the most recent winner of the Ansari X-Prize.²¹ Oddly enough, Heinlein's values lap over into pop culture by another unexpected route—namely the computing/cyberpunk community, which has a high degree of congruence with the sets of libertarians, space enthusiasts, and science fiction fans.

CONCLUSION

Heinlein's diluted meta-gift of values—independence and liberty, technical competence and self-sacrifice, a paradoxically well-informed innocent eye—passed down and paid forward, may well turn out to be his greatest contribution to spaceflight.

We'll see.

Acknowledgments

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CHAPTER 17

AMERICAN SPACEFLIGHT HISTORY'S MASTER NARRATIVE AND THE MEANING OF MEMORY

Roger D. Launius

INTRODUCTION

The term master narrative typically refers to a set of sociocultural interpretations of events agreed upon by most of the interpreters of the event or age, and these are abundantly apparent when considering the history of the Space Age. They offer what might best be considered secure knowledge formed to delineate the trajectory of the historical event and center it in its appropriate cultural place. Master narratives are ubiquitous in American history. They serve important purposes in helping to create a useable past for the nation and its peoples. Historians, perhaps unthinkingly, accept the master narrative about whatever subject they are examining with relative ease most of the time and facilitate its creation and maintenance as bulwarks upon which the national, or other, story rests. In this instance they support a group identity, whether it be a subgroup or a nation-state, exhibiting varying degrees of commitment to, as well as detachment from, the concepts of the groups that they serve. They move between these two poles to construct historical perspectives that will be of value to the group. Rarely do historians create from whole cloth a master narrative, instead usually reinforcing the dominant perceptions, or master narrative, already held by the group.¹

It may be argued that there are four narratives that have emerged concerning the U.S. space program, one that is a master narrative and three minor variations. These include: 1) the overwhelmingly dominant narrative of American triumph, exceptionalism, and success; 2) the counter narrative of criticism of the space program from the left, wasting funds on a worthless expense that yielded little when so many Americans could have benefited from spending on social programs; 3) a more recent narrative of criticism of spaceflight from the right of the political spectrum focusing on the program as a representation of liberal taxing and spending strategies; and 4) a fringe narrative that sees in the U.S.

1. I have explored this issue in another context in Roger D. Launius, "Mormon Memory, Mormon Myth, and Mormon History," *Journal of Mormon History* 21 (Spring 1995): 1-24.



NASA's original Mercury 7 astronauts posing with a U.S. Air Force F-106B jet aircraft in 1959. These astronauts epitomized the perceived "American exceptionalism" that was considered to be such an intrinsic part of the national character. From left to right: M. Scott Carpenter, L. Gordon Cooper, John H. Glenn, Jr., Virgil I. "Gus" Grissom, Jr., Walter M. "Wally" Schirra, Jr., Alan B. Shepard, Jr., and Donald K. "Deke" Slayton. (NASA)

space program a close tie to all manner of nefarious activities. This last narrative emphasizes conspiracy theories—of extraterrestrial visitation, abduction, and government complicity, of denials of the Apollo Moon landings in favor of a deep-seated conspiracy, as part of a larger militarization scheme aimed at world domination, and a host of strange and bewildering conspiracies affecting the lives of normal Americans in negative ways. Each of these narratives has a place in the American consciousness as it remembers the Space Age. This essay will seek to discuss these four narratives and how they have interrelated over the 50 years of the Space Age.

CIVIL SPACEFLIGHT AS AMERICAN TRIUMPH AND EXCEPTIONALISM

The history of American spaceflight has rested for some 50 years on the master narrative of an initial shock to the system, surprise, and ultimate recovery with success after success following across a broad spectrum of activities. It is a classic story of American history in which a vision of progress, of moving from nothing to something, dominates the story. That master narrative offers comfort to the American public as a whole, but most especially to the governing class who take solace in how the nation responded to crisis.

For example, the surprising Soviet success with Sputnik, so the master narrative relates, created a furor and led the United States to “catch up” to the Soviet Union in space technology. This crisis forced the Eisenhower administration to move quickly to restore confidence at home and prestige abroad. With mounting pressure, the Eisenhower response became typical of earlier crises within the United States; politicians locked arms and appropriated money to tackle the perceived problem. In this effort, both the civilian and military space efforts benefited, one openly and the other in secrecy. The Department of Defense approved additional funds for an Army effort, featuring Wernher von Braun and his German rocket team, to launch an American satellite. The Army’s Explorer project had been shelved earlier in favor of concentrating on Vanguard as the first American scientific satellite, but drastic times called for drastic measures and suddenly the atmosphere in Washington had changed. The Army was told to orbit the first satellite by February 1, 1958, only four months after the first Sputnik. Von Braun and his team went to work on a crash program with a modified Jupiter C ballistic missile. The first launch took place on January 31, 1958, placing Explorer 1 in orbit. On this satellite was an experiment by James A. Van Allen, a physicist at the University of Iowa, documenting the existence of radiation zones encircling Earth. Shaped by Earth’s magnetic field, what came to be called the Van Allen Radiation Belts partially dictates the electrical charges in the atmosphere and the solar radiation that reaches Earth.²

Following this, Congress passed and Eisenhower signed the National Aeronautics and Space Act of 1958. This legislation established NASA with a broad mandate to explore and use space for “peaceful purposes for the benefit of all mankind.”³ The core of NASA came from the earlier National

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2. Robert A. Divine, *The Sputnik Challenge: Eisenhower's Response to the Soviet Satellite* (New York, NY: Oxford University Press, 1993), pp. 93–96; Roger D. Launius, *NASA: History of the U.S. Civil Space Program* (Malabar, FL: Krieger Publishing Co., 1994), pp. 26–27; James A. Van Allen, *Origins of Magnetospheric Physics* (Washington, DC: Smithsonian Institution Press, 1983).
 3. “National Aeronautics and Space Act of 1958,” Public Law #85-568, 72 Stat., 426. Signed by the president on July 29, 1958, Record Group 255, National Archives and Records Administration,

Advisory Committee for Aeronautics with its 8,000 employees, an annual budget of \$100 million, and its research laboratories. It quickly incorporated other organizations into the new Agency, notably the space science group of the Naval Research Laboratory in Maryland, the Jet Propulsion Laboratory managed by the California Institute of Technology for the Army, and portions of the Army Ballistic Missile Agency in Huntsville, Alabama.⁴ This set in train the necessary capabilities for the achievement of considerable success in space exploration during the 1960s.

According to this master narrative, the experience from Sputnik through the Apollo Moon landings have represented an epochal event that signaled the opening of a new frontier in which a grand visionary future for Americans might be realized. It represented, most Americans have consistently believed, what set the United States apart from the rest of the nations of the world. American exceptionalism reigned in this context, and Apollo is often depicted as the critical event in the United States' spaceflight narrative, one that must be revered because it shows how successful Americans could be when they try. At a basic level, Apollo served as a trope of America's grand vision for the future. This exceptionalist perspective has also dominated the public characterizations of spaceflight in general, and Apollo in particular, regardless of the form of those characterizations.⁵ For example, expressing this central perspective on Americanism, not long after the first lunar landing in July 1969 Richard

Washington, DC; Alison Griffith, *The National Aeronautics and Space Act: A Study of the Development of Public Policy* (Washington, DC: Public Affairs Press, 1962), pp. 27–43.

4. Launius, *NASA*, pp. 29–41.

5. Several years ago I prepared "A Baker's Dozen of Books on Project Apollo," and I have updated it periodically since. These are singularly worthwhile books, but all support the dominant trope in the historiography. The titles include: Donald A. Beattie, *Taking Science to the Moon: Lunar Experiments and the Apollo Program* (Baltimore, Maryland: Johns Hopkins University Press, 2001); Roger E. Bilstein, *Stages to Saturn: A Technological History of the Apollo/Saturn Launch Vehicles* (Washington, DC: National Aeronautics and Space Administration SP-4206, 1980); Courtney G. Brooks, James M. Grimwood, and Loyd S. Swenson, Jr., *Chariots for Apollo: A History of Manned Lunar Spacecraft* (Washington, DC: National Aeronautics and Space Administration SP-4205, 1979); Andrew Chaikin, *A Man on the Moon: The Voyages of the Apollo Astronauts* (New York, NY: Viking, 1994); Michael Collins, *Carrying the Fire: An Astronaut's Journeys* (New York, NY: Farrar, Straus and Giroux, 1974); Edgar M. Cortright, ed., *Apollo Expeditions to the Moon* (Washington, DC: National Aeronautics and Space Administration SP-350, 1975); David M. Harland, *Exploring the Moon: The Apollo Expeditions* (Chichester, England: Wiley-Praxis, 1999); Stephen B. Johnson, *The Secret of Apollo: Systems Management in American and European Space Programs* (Washington, DC: Johns Hopkins University Press, 2002); W. Henry Lambright, *Powering Apollo: James E. Webb of NASA* (Baltimore, MD: Johns Hopkins University Press, 1995); John M. Logsdon, *The Decision to Go to the Moon: Project Apollo and the National Interest* (Cambridge, MA: The MIT Press, 1970); Walter A. McDougall, . . . *the Heavens and the Earth: A Political History of the Space Age* (New York, NY: Basic Books, 1985); Charles A. Murray and Catherine Bly Cox, *Apollo, the Race to the Moon* (New York, NY: Simon and Schuster, 1989); David West Reynolds, *Apollo: The Epic Journey to the Moon* (New York, NY: Harcourt, Brace, 2002).

Nixon told an assembled audience that the flight of Apollo 11 represented the most significant week in the history of Earth since the creation.⁶ Clearly, the President viewed the endeavor as both path breaking and permanent, a legacy of accomplishment that future generations would reflect on as they plied intergalactic space and colonized planets throughout the galaxy. Perhaps the Americans were responsible for the second most important week in the history of the cosmos, placing an essentially godlike cast upon the nation.

Spaceflight has persistently represented a feel-good triumph for the nation and its people. It conjured images of the best in the national spirit and served, in the words of journalist Greg Easterbrook, as "a metaphor of national inspiration: majestic, technologically advanced, produced at dear cost and entrusted with precious cargo, rising above the constraints of the earth."⁷ Certainly Apollo represented this in the imagery that became iconic in the public consciousness—an astronaut on the Moon saluting the American flag served well as a patriotic symbol of what the nation had accomplished—but so have the later human missions of the Space Shuttle, the International Space Station, and the robotic probes and observatories that have pulled back the curtain to reveal a wondrous universe. This self-image of the United States as a successful nation has been repeatedly affirmed in the spaceflight master narrative since 1957.⁸

It might be argued that spaceflight represented an expression of national power in the context of the "positive liberal state" offered the world by the United States. In essence, this position celebrates the use of state power for "public good." Human exploration of the solar system was always viewed as reasonable and forward-looking and led to "good" results for all concerned, or so adherents of this master narrative believed. Without perhaps seeking to do so, Apollo offered an important perspective on a debate that has raged over the proper place of state power since the beginning of the republic. As one historian remarked about this philosophy of government, the state would actively "promote the general welfare, raise the level of opportunity for all men, and aid all individuals to develop their full potentialities." It would assert active control in this process, seeking improvements to society "both economic and moral, and they did not believe in leaving others alone."⁹

The Democrats of the 1960s believed in activist government, and examples on the part of the Kennedy and Johnson administrations abound. This translated into an ever increasing commitment to the use of the government to

6. 10:56:20 PM, EDT, 7/20/69 (New York: CBS News, 1969), p. 159.

7. Greg Easterbrook, "The Space Shuttle Must Be Stopped," *Time*, February 2, 2003, available online at http://www.mercola.com/2003/feb/8/space_shuttle.htm (accessed February 24, 2006).

8. I made this argument in relation to Apollo in Roger D. Launius, "Perceptions of Apollo: Myth, Nostalgia, Memory or all of the Above?" *Space Policy* 21 (May 2005): 129-139.

9. Daniel Walker Howe, *The Political Culture of the American Whigs* (Chicago, IL: University of Chicago Press, 1979), p. 20.

achieve “good ends”—the war on poverty, the Peace Corps, support for civil rights, numerous Great Society programs, space exploration, and a host of other initiatives are examples. These all represented a broadening of governmental power for what most at the time perceived as positive purposes.

Such statements of triumph and exceptionalism have permeated the narrative of spaceflight from the beginning. For only one example among many that might be discussed, Andrew Chaikin’s 1994 *A Man on the Moon* oozes the narrative of triumph in the context of Apollo.¹⁰ Alex Roland captured the importance of this book best when he proposed that Chaikin offered a retelling of a specific myth and in that retelling it performed a specific purpose. It is not so much history as it is “tribal rituals, meant to comfort the old and indoctrinate the young.” He added:

All the exhilarating stories are here: the brave, visionary young President who set America on a course to the moon and immortality; the 400,000 workers across the nation who built the Apollo spacecraft; the swashbuckling astronauts who exuded the right stuff; the preliminary flights of Mercury and Gemini—from Alan Shepard’s suborbital arc into space, through John Glenn’s first tentative orbits, through the rendezvous and spacewalks of Gemini that rehearsed the techniques necessary for Apollo. There is the 1967 fire that killed three astronauts and charred ineradicably the Apollo record and the Apollo memory; the circumlunar flight of Christmas 1968 that introduced the world to Earth-rise over the lunar landscape; the climax of Apollo 11 and Neil Armstrong’s heroic piloting and modest words, “that’s one small step for a man, one giant leap for mankind”; the even greater drama of Apollo 13, rocked by an explosion on the way to the moon and converted to a lifeboat that returned its crew safely to Earth thanks to the true heroics of the engineers in Houston; and, finally, the anticlimax of the last Apollo missions.

Roland finds that Chaikin had to struggle to maintain a triumphal narrative of Apollo, however, for the missions became a deadend rather than a new beginning and no amount of heroic prose could overcome that ironic plot twist.¹¹

American exceptionalism has dominated the vast majority of the national discussion of spaceflight, represented perhaps best in popular culture. As only one example among many, the late comedian Sam Kinison once ranted to other

10. Chaikin, *A Man on the Moon*.

11. Alex Roland, “How We Won the Moon,” *New York Times Book Review*, July 17, 1994, pp. 1, 25.

nations seeking to replicate the “greatness” of America: “You really want to impress us! Bring back our Flag!”¹² This statement of American exceptionalism and triumph in relation to Apollo, while it has a form of jingoism at its center, expresses a core truth about how these efforts have been embraced and celebrated in the United States. While Kinison’s challenge symbolized for many Americans national superiority—at the same time signaling the inferiority of all others—NASA situated its spaceflight aspirations within the arena of international prestige. If anything this trope of national exceptionalism and triumph has only intensified over time, clearly dominating discussion of America’s spaceflight efforts.¹³

At sum, Americans have usually viewed space exploration as a result of a grand visionary concept for human exploration that may be directly traced to the European voyages of discovery beginning in the 15th century.¹⁴ Given this observation, these endeavors have been celebrated as an investment in technology, science, and knowledge that would enable humanity—or at least Americans—to do more than just dip their toes in the cosmic ocean, to become a truly spacefaring people. Accordingly, Americans have taken as a measure of the majesty of this vision the length of time, complexity, and expense of the program, and the linkage of the length of time, complexity, and expense of its space exploration activities to earlier explorations. The Spanish exploration of the Americas proved time consuming, complex, and expensive. So did the efforts of other European powers in the sweepstakes of exploration and imperialism that took place over long periods made possible by these explorations. The exploration of space was much the same only more so, and this made it special and grand and visionary.

12. See “Bush to announce goal of returning to the moon,” online at <http://forums.pcper.com/printthread.php?threadid=277513> (accessed April 19, 2004).

13. Representative works include, Frutkin, *International Cooperation in Space*; Roger Handberg and Joan Johnson-Freese, *The Prestige Trap: A Comparative Study of the U.S., European, and Japanese Space Programs* (Dubuque, IA: Kendall/Hunt Publishing Co., 1994); Brian Harvey, *The New Russian Space Programme: From Competition to Collaboration* (Chichester, England: Wiley—Praxis, 1996); Dodd L. Harvey and Linda C. Ciccoritti, *U.S.-Soviet Cooperation in Space* (Miami, FL: Monographs in International Affairs, Center for Advance International Studies at the University of Miami, 1974); Joan Johnson-Freese, *Changing Patterns of International Cooperation in Space* (Malabar, FL: Orbit Books, 1990); Joan Johnson-Freese, “Canceling the U.S. Solar-Polar Spacecraft: Implications for International Cooperation in Space,” *Space Policy* 3 (February 1987): 24–37; Joan Johnson-Freese, “A Model for Multinational Space Cooperation: The Inter-Agency Consultative Group,” *Space Policy* 5 (November 1989): 288–300; John M. Logsdon, “U.S.-Japanese Space Relations at a Crossroads,” *Science* 255 (January 17, 1992): 294–300.

14. The best example of this is Stephen J. Pyne, “Space: A Third Great Age of Discovery,” *Space Policy* 4 (August 1988): 187–199.

Celebrants of spaceflight have long argued that returns on investment in this age of exploration changed Americans' lives.¹⁵ As President Lyndon B. Johnson remarked at the time of the third Gemini flight in August 1965, "Somehow the problems which yesterday seemed large and ominous and insoluble today appear much less foreboding." Why should Americans fear problems on Earth, he believed, when they had accomplished so much in space?¹⁶ In this triumphalist narrative, the reality of spaceflight demonstrated that anything we set our minds to we could accomplish. "If we can put a man on the Moon, why can't we . . ." entered the public consciousness as a statement of unlimited potential.¹⁷ Spaceflight, of course, remains a powerful trope of American exceptionalism to the present.

CRITICISM OF SPACEFLIGHT FROM THE POLITICAL LEFT AS WASTEFUL GOVERNMENT SPENDING

A counter narrative to the master account of American triumph, exceptionalism, and success also emerged in the 1950s and argued that a large space exploration program deserved criticism from the left as a waste of expenditures of federal funds that could have been much more effectively used to feed the poor, help the elderly, care for the sick, or otherwise carry out critical social programs.¹⁸ Left-leaning critics argued that NASA's efforts

15. Stephen J. Pyne, *The Ice: A Journey to Antarctica* (Iowa City, IA: University of Iowa Press, 1986); Nathan Reingold, ed., *The Sciences in the American Context: New Perspectives* (Washington, DC: Smithsonian Institution Press, 1979); Norman Cousins, et al., *Why Man Explores* (Washington, DC: NASA Educational Publication-125, 1976); Sarah L. Gall and Joseph T. Pramberger, *NASA Spinoffs: 30 Year Commemorative Edition* (Washington, DC: National Aeronautics and Space Administration, 1992).

16. Lyndon B. Johnson, "President's News Conference at the LBJ Ranch," *Public Papers of the Presidents*, August 29, 1965, p. 944-45. See also Lyndon B. Johnson, "Michoud Assembly Facility, Louisiana," *Weekly Compilation of Presidential Documents*, December 12, 1967, p. 1967.

17. To determine how widespread this question is, in 2001 I undertook a search of the DowJones database, which includes full text of more than 6,000 newspapers, magazines, newswires, and transcripts. Some of the publications go back to the 1980s but most have data only from the 1990s. Except for perhaps Lexis-Nexis, DowJones is the largest full-text database available. There are more than 6,901 articles using this phrase, or a variation of it, in the database. Among them was a statement by former White House Chief of Staff, Mack McLarty concerning Mexico on National Public Radio's "All Things Considered," entitled, "Analysis: President Bush to visit Mexico and its President." Maria Elena Salinas, co-anchor at Miami-based Spanish-language cable network Univision, used this phrase when discussing her decision to list the Apollo Moon landings as first in the top 100 news events of the 20th century. Levinson A. Atomic bombing of Hiroshima tops journalists' list of century's news. Associated Press. February 24, 1999.

18. Among those criticisms, see Hugo Young, Bryan Silcock, and Peter Dunn, *Journey to Tranquillity: The History of Man's Assault on the Moon* (Garden City, NY: Doubleday, 1970); Erlend A. Kennan and Edmund H. Harvey, Jr., *Mission to the Moon: A Critical Examination of NASA and the Space Program* (New York, NY: William Morrow and Co., 1969); John V. Moeser, *The Space Program and the Urban Problem: Case Studies of the Components on National Consensus* (Washington, DC: Program of Policy Studies in Science and Technology, George

were, in the words of aerospace historian Roger E. Bilstein, “a cynical mix of public relations and profit-seeking, a massive drain of tax funds away from serious domestic ills of the decade, or a technological high card in international tensions during the Cold War.”¹⁹ Some of those attacks were sophisticated and involved, others were simplistic and without appeal to all but those with the predilection to believe them.

For example, Vannevar Bush, a leading and well-respected scientist who appreciated the marshaling of the power of the federal government in the furtherance of national objectives, questioned large expenditures for spaceflight. He wrote to NASA Administrator James E. Webb in April 1963 voicing his concerns about the cost, versus the benefits, of the human space exploration program. He asserted “that the [Apollo] program, as it has been built up, is not sound.” He expressed concern that it would prove “more expensive than the country can now afford,” adding that “its results, while interesting, are secondary to our national welfare.”²⁰

Sociologist Amitai Etzioni was even more critical. In a reasoned, full-length critique of the Moon landing program in 1964, he deplored the “huge pile of resources” spent on space, “not only in dollars and cents, but the best scientific minds—the best engineering minds were dedicated to the space project.” Could not those resources have been better spent on improving the lives people in modern America?²¹ Etzioni bemoaned the nation’s penchant for embracing both high technology and unsustainable materialism: “we seek to uphold humanist concerns and a quest for a nobler life under the mounting swell of commercial, mechanical, and mass-media pressure.”²²

As Etzioni remarked in a 1962 article that also expressed his concern about spaceflight: “If private foundations or some university professors wish to continue to satisfy their own and the common human desire to know about outer space, fine. But can the public spend 30 billion dollars—the amount required to send one man to the moon—to answer some questions about the shape of the moon? Are we that curious, when the same amount of money would serve to develop . . . India?” Furthermore, he noted, “As emotional as it might sound, this is truly [sic] a question of investment in feeding starving children

Washington University, 1969); Edwin Diamond, *The Rise and Fall of the Space Age* (Garden City, NY: Doubleday and Co., 1964).

19. Roger E. Bilstein, *Testing Aircraft, Exploring Space: An Illustrated History of NACA and NASA* (Baltimore, MD: Johns Hopkins University Press, 2003), p. 200.

20. Vannevar Bush to James E. Webb, Administrator, NASA, April 11, 1963, p. 2, Presidential Papers, John F. Kennedy Library, Boston, MA.

21. Amitai Etzioni, *The Moon-Doggie: Domestic and International Implications of the Space Race* (New York, NY: Doubleday, 1964), p. 70. See Alton Frye, “Politics—The First Dimension of Space,” *Journal of Conflict Resolution* 10 (March 1966): 103–12, for a review of *Moon-Doggie*.

22. Etzioni, *Moon-Doggie*, p. 195.

as against improving the maps of Van Allen belts, of suppressing ignorance and disease on earth as against finding new moons in the skies.”²³

Other critics were even more impulsive in their censure. If spaceflight was truly about demonstrating to the world American capabilities, cautioned nuclear physicist Leo Szilard, “we are making the wrong choice.” Americans could demonstrate this in other more positive ways. “To race the Russians to the moon and let our old people live on almost nothing is immoral,” he remarked specifically about the Apollo lunar program. “The moon is not science—not bread. It is circus. The astronauts are the gladiators. It’s lunacy, I say.”²⁴ As time passed, for Szilard and a minority of other Americans, space exploration seemed like an increasingly embarrassing national self-indulgence.²⁵

Several of the leaders in the U.S., especially those within the Democratic Party, found that support for NASA’s space exploration agenda clashed with supporting funds for social programs enacted through “Great Society” legislation. They disparaged Apollo both as too closely linked to the military-industrial complex and defense spending and too far removed from the ideals of racial, social, and economic justice at the heart of the positive liberal state the Democrats envisioned. Liberal senators such as J. William Fulbright, Walter Mondale, and William Proxmire challenged the Johnson administration every year over funding for NASA that they believed could be more effectively used for social programs. Accordingly, Bureau of the Budget Director Charles Schultze worked throughout the middle part of the 1960s to shift funds from NASA to such programs as the war on poverty. Johnson even tried to defend NASA as a part of his “Great Society” initiatives, arguing that it helped poor southern communities with an infusion of federal investment in high technology. Nonetheless, this proved a difficult sell and the NASA budget declined precipitously throughout the latter half of the 1960s.²⁶

Indicative of this concern, even as Apollo 11 was being prepared for launch from the Kennedy Space Center in Florida on July 16, 1969, Rev. Ralph Abernathy led a protest at the gates of the Center for 150 protesters and 4

23. Amatai Etzioni, “International Prestige, Competition and Cooperative Existence,” *Archives of Europeennes de Sociologie* 3, no. 1 (1962): 21–41, quotes from pp. 38–39.

24. Quoted in Oscar H. Reisch, ed., *Reflections on Space: Its Implications for Domestic and International Affairs* (Colorado Springs, CO: USAF Academy, 1964), p. 118, available from Defense Technical Information Center, accession no. AD0602915.

25. W. Henry Lambright, *Powering Apollo: James E. Webb of NASA* (Baltimore, MD: Johns Hopkins University Press, 1995), pp. 140–141.

26. Robert Dallek, “Johnson, Project Apollo, and the Politics of Space Program Planning,” in Roger D. Launius and Howard E. McCurdy, eds., *Spaceflight and the Myth of Presidential Leadership* (Urbana, IL: University of Illinois Press, 1997), pp. 75–88.

mules. His aim was to call attention to the plight of the poor even as the U.S. government spent lavishly on flights to the Moon.²⁷

In contrast to the triumphalist, exceptionalist narrative that celebrates space exploration, this narrative views the endeavor as a waste, a missed opportunity to further important and necessary goals in America. Indeed, the triumphalist narrative of spaceflight has been so powerful a memory that most people in the United States reflecting on it believe that NASA enjoyed enthusiastic support during the 1960s and that somehow the Agency lost its compass thereafter.²⁸ Contrarily, at only one point prior to the Apollo 11 mission, October 1965, did more than half of the public favor the lunar landing program. Americans have consistently ranked spaceflight near the top of those programs to be cut in the federal budget. Such a position is reflected in public opinion polls taken throughout the Space Age when the majority of Americans ranked NASA as the government initiative most deserving of reduction, and its funding redistributed to Social Security, Medicare, and numerous other programs. While most Americans did not oppose space exploration per se, they certainly questioned spending on it when social problems appeared more pressing.²⁹ At some level it was like the characterization of the overlanders en route westward on the Oregon Trail who opined that the Platte River that they followed was a mile wide and an inch deep. Support for space exploration was broad but not deep and almost always lost in comparison to other federal initiatives.

Since the heyday of Apollo, little has changed in this support for NASA and its space exploration agenda. Many on the left view spaceflight, usually characterized exclusively as the human space program, as a waste of resources that might be more effectively deployed to support other good ends. Many find themselves nodding in agreement when Josh Lyman, the White House Assistant Chief of Staff in the fictional *West Wing* television series told NASA officials that his one priority for the space Agency was that it stay out of the newspapers with tales of mismanagement and woe. He added that his agenda included using precious federal funds here on Earth to help people rather than to conquer space.³⁰

27. Bernard Weinraub, "Some Applaud as Rocket Lifts, but Rest Just Stare," *New York Times*, July 17, 1969, p. 1.

28. James L. Kauffman, *Selling Outer Space: Kennedy, the Media, and Funding for Project Apollo, 1961-1963* (Tuscaloosa, AL: University of Alabama Press, 1994); Mark E. Byrnes, *Politics and Space: Image Making by NASA* (New York, NY: Praeger, 1994); Neil de Grasse Tyson, "Expanding the Frontiers of Knowledge," in Stephen J. Garber, ed., *Looking Backward. Looking Forward: Forty Years of U.S. Human Spaceflight Symposium* (Washington, DC: NASA SP-2002-4107, 2002), pp. 127-136.

29. Roger D. Launius, "Public Opinion Polls and Perceptions of U.S. Human Spaceflight," *Space Policy* 19 (August 2003): 163-175.

30. "The Warfare of Genghis Khan," Episode #513, *West Wing*, broadcast: February 11, 2004.

Of course, criticism of the space exploration initiatives of NASA have taken myriad turns within the space community itself, as losers in the debate question the course taken. Because NASA pursued the Space Shuttle program in the aftermath of Apollo it was unable to undertake other projects that might have been more fruitful, the argument goes. There is no question that this is true, and usually critiques along these lines take one of three forms. The first is a criticism that NASA spent the last 30 years in Earth orbit and it could have—indeed should have—used the same funding that it received for the Space Shuttle and Space Station to return to the Moon or to explore Mars.

Robert Zubrin, a persistent advocate for a mission to Mars, made this case in testimony before the U.S. Senate in 2003. He said:

In today's dollars, NASA[s] average budget from 1961–1973 was about \$17 billion per year. This is only 10% more than NASA's current budget. To assess the comparative productivity of the Apollo Mode with the Shuttle Mode, it is therefore useful to compare NASA's accomplishments between 1961–1973 and 1990–2003, as the space agency's total expenditures over these two periods were equal.

He concluded: “Comparing these two records, it is difficult to avoid the conclusion that NASA's productivity in *both* missions accomplished *and* technology development during its Apollo Mode was at least ten times greater than under the current Shuttle Mode.”³¹

A second criticism of “paths not taken” comes from representatives of the scientific community and usually involves questioning the role of humans in space at the expense of science missions. University of Iowa astrophysicist and discoverer of the radiation belts surrounding Earth that bears his name, James A. Van Allen, never believed that human spaceflight was worth the expense. In 2004 he remarked, “Risk is high, cost is enormous, science is insignificant. Does anyone have a good rationale for sending humans into space?”³² Undoubtedly, large numbers of scientific missions could have been developed had funding used for human missions been used instead to fund other types of scientific efforts. But it is not a zero-sum-game, and there is little reason to believe that

31. Testimony of Robert Zubrin to the Senate Commerce Committee, October 29, 2003, p. 2, available online at <http://www.marssociety.org/content/Zubrin102903.PDF> (accessed February 26, 2006).

32. James A. Van Allen, “Is Human Spaceflight Obsolete?” *Issues in Science and Technology*, vol. 20 (Summer 2004), available online at http://www.issues.org/20.4/p_van_allen.html (accessed August 3, 2004).

reducing funding for human spaceflight would translate into greater funding for robotic missions.³³

Most recently, the NASA Administrator, Mike Griffin, questioned the human space exploration agenda of NASA since Apollo, calling the Space Shuttle program the result of a "policy failure" that was relentlessly pursued by NASA for more than a generation. "It is now commonly accepted that was not the right path," Griffin told *USA Today* in an interview that appeared as a page one story on September 28, 2005. "We are now trying to change the path while doing as little damage as we can." When asked pointedly if the shuttle had been a mistake the NASA Administrator responded, "My opinion is that it was . . . It was a design which was extremely aggressive and just barely possible."³⁴

A subtext in all of this is that conservative political decisions, especially Richard Nixon's decision to approve only the Space Shuttle in the aftermath of Apollo, set course down a wasteful, useless road when it might have been possible to reach other decisions and pursue much more productive paths. All of these criticisms about the place of space exploration in modern America have become part of a larger counter to the master narrative that questions the dominant story of American exceptionalism. At some level, as political scientist Howard E. McCurdy remarked, space exploration "was to America what the pyramids were to Egypt. It's one of our great accomplishments . . . But when you go back and look, there were people, at the time who are expressing public misgivings. And in private—where you can get those kinds of conversations—[they] are pulling their hair out about this program."³⁵

This theme has been played out repeatedly in the American left since the beginning of the Space Age. For example, NASA came under congressional fire even as it tried to pursue new space exploration initiatives at the beginning of the 1970s. Faced with domestic unrest, urban problems, and escalating military spending in Vietnam, Congress was eager to cut whatever programs it could, and NASA presented an appealing target. As New York Congressman Ed Koch mused, "I just for the life of me can't see voting for monies to find out whether or not there is some microbe on Mars, when in fact I know there are rats in the Harlem apartments." Even some pro-space legislators questioned the necessity of further space exploration after Apollo and wondered if NASA had fully considered its options. Congressman Joseph Karth led the opposition because of what he considered NASA's hubris. "NASA must consider the members of

33. See Daniel S. Goldin, speech at California Institute of Technology, December 4, 1992, NASA Historical Reference Collection, NASA History Division, Washington, DC.

34. Traci Watson, "NASA Administrator says Space Shuttle was a Mistake," *USA Today*, September 28, 2005, p. 1A.

35. "Transcript: Washington Goes to the Moon, Part 1: *Washington, We Have A Problem*," aired May 25, 2001, WAMU FM, transcript available online at http://wamu.org/d/programs/special/moon/opp_show.txt (accessed October 17, 2007).

the Congress a bunch of stupid idiots," he complained. "Worse yet, they may believe their own estimates—and then we are really in bad shape."³⁶

A persistent drumbeat of criticism from the left for NASA's efforts in human space exploration has sometimes reached crescendo proportions. Critics have long condemned NASA for "overselling" the space exploration agenda and then failing to deliver on that promise. Many liberal Americans have agreed with Leo McGarry, the White House Chief of Staff in the fictional *West Wing* television series when asked about NASA's overreach: "Where's my jet pack, my colonies on the Moon? Just a waste."³⁷ More recent ventures in space exploration, and especially their failure, have wrought even more energetic criticisms.³⁸

CRITICISM OF SPACEFLIGHT FROM THE POLITICAL RIGHT

From the beginning of the Space Age, some figures on the right of the American political spectrum have also criticized NASA's exploration agenda as an excess of federal power, another counter to the master narrative. In their view, the federal government should not do much of anything, offering a persistently libertarian position that emphasized individual prerogative and personal freedom over state action. As an example, for this reason Eisenhower believed that empowering NASA to accomplish the Apollo Moon landings of the 1960s was a mistake. He remarked in a 1962 article: "Why the great hurry to get to the moon and the planets? We have already demonstrated that in everything except the power of our booster rockets we are leading the world in scientific space exploration. From here on, I think we should proceed in an orderly, scientific way, building one accomplishment on another."³⁹ He later cautioned that the Moon race "has diverted a disproportionate share of our brain-power and research facilities from equally significant problems, including education and automation."⁴⁰ Likewise, in the 1964 presidential election, Republican candidate Senator Barry Goldwater urged a reduction of the Apollo commitment to pay for national security initiatives.

With the coming of the successful Moon landings, however, the American right largely retreated from any high profile criticism of Apollo. That position dominated until the 1980s when a full-scale assault on the "Great Society" efforts

36. Quoted in Ken Hechler, *Toward the Endless Frontier: History of the Committee on Science and Technology, 1959-79* (Washington, DC: Government Printing Office, 1980), p. 274.

37. "The Warfare of Genghis Khan," Episode #513, *West Wing*, broadcast: February 11, 2004.

38. Greg Easterbrook, "The Case Against NASA," *New Republic*, July 8, 1991, pp. 18-24; Alex Roland, "Priorities in Space for the USA," *Space Policy* 3 (May 1987): 104-114; Alex Roland, "The Shuttle's Uncertain Future," *Final Frontier*, April 1988, pp. 24-27.

39. Dwight D. Eisenhower, "Are We Headed in the Wrong Direction?" *Saturday Evening Post*, August 11-18, 1962, p. 24.

40. Dwight D. Eisenhower, "Why I Am a Republican," *Saturday Evening Post*, April 11, 1964, p. 19.

of the Democrats in the 1960s emerged in the public realm. A questioning of the Apollo program became part of a conservative strain in American political discourse that increasingly found expression during the Reagan era of the 1980s. Percolating for many years, it emerged full-blown during the era to reconsider the history and policy of liberal ideology in the United States. In the process, reappraisals have castigated the social upheaval of the 1960s, defeat in Vietnam, and Great Society programs as failures of American politics.⁴¹ There was also a conservative space history, as well as a conservative space policy, that emerged during the same era. Some have even hinted that criticism of Apollo was appropriate as part of a larger assault on the "products of the maniacal 1960s."⁴²

No one has been more successful in offering a conservative critique of the early efforts to explore space than Walter A. McDougall, who published a Pulitzer Prize-winning "political history of the Space Age."⁴³ His situation of the history of Apollo in the context of the United States' well-documented political "right turn" may well represent the central thrust of space history and policy since the 1980s, for many have followed in his footsteps.⁴⁴ This critique has emphasized a derogation of government programs as wasteful and inefficient, a celebration of private sector space initiatives, a relaxation of the regulatory environment,

41. The reinterpretation of America in the 1960s has been a major cottage industry in recent years, and the reassessment has as often as not been negative. Anyone wishing to pursue study of the reorientation of American society in the 1960s should read Milton Viorst, *Fire in the Streets: America in the 1960s* (New York, NY: Simon and Schuster, 1979); Allen J. Matusow, *The Unraveling of America: A History of Liberalism in the 1960s* (New York, NY: Harper and Row, 1984); William L. O'Neill, *Coming Apart* (Chicago, IL: Quadrangle Books, 1971); Godfrey Hodgson, *America in Our Time: From World War II to Nixon, What Happened and Why* (Garden City, NY: Doubleday and Co., 1976); Morris Dickstein, *Gates of Eden: American Culture in the Sixties* (New York, NY: Basic Books, 1977). For works that question the "Great Society" and the social upheaval of the 1960s, see Myron Magnet, *The Dream and the Nightmare: The Sixties Legacy to the Underclass* (New York, NY: William Morrow and Company, 1993); Thomas C. Reeves, *The Empty Church: The Suicide of Liberal Christianity* (New York, NY: Free Press, 1996); Charles Murray, *Loosing Ground: American Social Policy, 1950-1980* (New York, NY: Basic Books, 1984); Irwin Unger, *The Best of Intentions: The Triumph and Failure of the Great Society Under Kennedy, Johnson and Nixon* (Naugatuck, CT: Brandywine Press, 1995); Gareth Davies, *From Opportunity to Entitlement: The Transformation and Decline of Great Society Liberalism* (Lawrence, KS: University Press of Kansas, 1997); Arthur Benavie, *Social Security Under the Gun* (New York, NY: Palgrave Macmillan, 2003); Ellen Schrecker, ed., *Cold War Triumphalism: The Misuse of History After the Fall of Communism* (New York, NY: New Press, 2004).

42. Walter A. McDougall, "Technocracy and Statecraft in the Space Age: Toward the History of a Saltation," *American Historical Review* 87 (October 1982): 1010-1040, quote from p. 1025.

43. Walter A. McDougall, . . . *the Heavens and the Earth: A Political History of the Space Age*, in *Journal of American History* (New York: Basic Books, 1985).

44. Darryl L. Roberts, "Space and International Politics: Models of Growth and Constraint in Militarization," *Journal of Peace Research* 23 (September 1986): 291-298.

and a redistribution of federal research and development funds from traditional sources to organizations less tied to Democratic administrations.⁴⁵

Nothing expresses this “right turn” better than the rehabilitation of Dwight D. Eisenhower as President. He has emerged as the hero of the Space Age, seeking to hold down expenditures, refusing to race the Soviet Union into space, and working to maintain traditional balances in policy, economics, and security. As Alex Roland noted concerning Water McDougall’s study of the subject, Eisenhower stands “alone against the post-Sputnik stampede, unwilling to hock the crown jewels in a race to the moon, confident that America’s security could be guaranteed without a raid on the Treasury, and concerned lest a space race with the Russians jeopardize America’s values and freedoms and drag us down to the level of the enemy.” Conversely, the Democrats—especially Kennedy and Johnson—emerge as villains in this drama, ever seeking to enhance the power of big government to reshape the landscape of the United States as a means of facilitating their schemes of social revolution. Indeed, as NASA Administrator James E. Webb asked, if we can accomplish Apollo “why can’t we do something for grandma with Medicare?”⁴⁶ The linkage of space policy and social policy may seem tenuous at first, but in this critique the power of the federal government and the state system to “intrude” in individual lives required denunciation.

Critiques from the right also noted that the mandate to complete Apollo on President John F. Kennedy’s schedule prompted the space program to become identified almost exclusively with high-profile, expensive, human spaceflight projects. This was because Apollo became a race against the Soviet Union for recognition as the world leader in science and technology and, by extension, in other fields. For example, McDougall juxtaposed the American effort with the Soviet space program and the dreams of such designers as Sergei P. Korolev. While he recognized the American effort as a significant engineering achievement, he concluded that it was also enormously costly both in terms of resources and the direction to be taken in state support of science and technology. In the end, NASA had to stress engineering over science, competition over cooperation, and international prestige over practical applications.

45. This subject has been discussed in Andrew J. Butrica, *Single Stage to Orbit: Politics, Space Technology, and the Quest for Reusable Rocketry* (Baltimore, MD: Johns Hopkins University Press, 2003); W. D. Kay, “Space Policy Redefined: The Reagan Administration and the Commercialization of Space,” *Business and Economic History* 27 (Fall 1998): 237–247. An element of manipulation science data has also surfaced. For instance, this may be found in such works as Mark Bowen, *Thin Ice: Unlocking the Secrets of Climate in the World’s Highest Mountains* (New York, NY: Henry Holt and Co., 2005), which talks at length about NASA and censorship concerning global climate change.

46. Alex Roland, “How Sputnik Changed Us,” *New York Times*, April 7, 1985, pp. 1, 6, quote from p. 6.

Most importantly, McDougall argued that the Space Age gave birth to a state of “perpetual technological revolution” because of the technocracy that arose to support this incredibly complex set of machines and activities. In essence, driven to respond to the Soviet challenge the United States recreated the same type of command technocracy that the Soviets had instituted. McDougall concluded that the space race led to nothing less than “the institutionalization of technological change for state purposes, that is, the state-funded and managed R&D explosion of our time.”⁴⁷ As McDougall wrote:

[I]n these years the fundamental relationship between the government and new technology changed as never before in history. No longer did state and society react to new tools and methods, adjusting, regulating, or encouraging their spontaneous development. Rather, states took upon themselves the primary responsibility for generating new technology. This has meant that to the extent revolutionary technologies have profound second order consequences in the domestic life of societies, by forcing new technologies, all governments have become revolutionary, whatever their reasons or ideological pretensions.⁴⁸

And once institutionalized, technocracy has not gone away. McDougall concluded that it was enormously costly to the nation, and not just in public treasure. Emphasizing the effect of the space race upon American society, this critique focused on the role of the state as a powerful promoter of technological progress—to the detriment of the nation as a whole.

The spaceflight critique from the right bemoaned fundamentally what one observer called so much nostalgia for “the lost world of Thomas Jefferson and Adam Smith, its seeming faith in the untrammelled operation of the marketplace, its occasionally strident anticommunism, or its neo-orthodox assertions about humanity’s sinful nature.”⁴⁹ Whether or not such a world ever actually existed was problematic, but in reality the debate over spaceflight from the right revolved around how much activity by the federal government is appropriate. Conservatives question an activist government and spaceflight clearly demonstrated activism in a most significant manner. While most Americans accepted at face value the benign nature of this power, conservatives tended to challenge its legitimacy.⁵⁰

47. McDougall, . . . *the Heavens and the Earth*, p. 5.

48. *Ibid.*, pp. 6–7.

49. Robert Griffith, “Roots of Technocracy,” *Science* 230 (December 6, 1985): 1154.

50. Ralph E. Lapp, *The New Priesthood: The Scientific Elite and the Uses of Power* (New York, NY: Harper & Row, 1965), pp. 227–228. Similar cautions, but aimed at the use of science and

Though distinctive in many respects, critics from the right believed the power accrued by NASA corrupted it, making it exploitative of others and engendering in them cynicism toward those they dominated. They may have tried to conceal that fact by laying claim to the dominant myths and symbols of the American frontier, invoking heroes from American folklore, positivist images of “manifest destiny,” and happy visions of white-topped wagon trains traveling across the prairies, but conservative critics declared that only a ruse. Through space exploration the federal government enhanced its power and while many Americans celebrated this use of federal power, conservatives bemoaned its intrusion into their vision of individual liberty for the future. That concern has enjoyed a persistent presence in the American spaceflight community since the 1980s.

Of course, absent the power sharing relations present on Earth—state to state, local to national, philosophy to philosophy—the regime above Earth’s atmosphere must be ruled by concentrated state power, much of it U.S. power, often hidden behind beguiling masks. They have been reminded by conservative critics of the subtle nature of strenuous and sometimes capricious governmental power in this experience. The region has, of course, been the scene of intense struggles over power and hierarchy, not only between nations but also between classes, genders, and other groups. The outcome of those struggles has a few distinctive features found nowhere else in America, especially power elites that are not much like those in other areas, particularly those elites located at intersections between the federal agencies, corporations, and interest groups. At sum, these concerns suggest an uneasy relationship to the bureaucracy that made possible the advance of space exploration.

This is seen in at least one criticism of space exploration from the political right in the mid-1990s when then Speaker of the House Newt Gingrich (R-GA) criticized NASA as having too much power and becoming muscle-bound. He said that while he generally favored science and technology investment by the federal government he always believed that NASA should have been dismantled after Apollo. In the aftermath of the Moon landings, Gingrich said, NASA had become a bureaucracy in the worst sense of the term. “If you keep people there,” he contended, “they become obsolescent.”⁵¹ That was a metaphor for the whole of NASA as it moved beyond its glory of the Moon landings.

In an irony too great to ignore, criticism of space exploration—especially the Apollo program—from the right has largely been juxtaposed with support for NASA from conservative politicians in the years since the Moon landings. Whereas the Apollo program, expensive and large and successful, had been the

technology to dupe Americans, may be found in Robert L. Park, *Voodoo Science: The Road from Foolishness to Fraud* (New York, NY: Oxford University Press, 2000); Amitai Etzioni, *The Limits of Privacy* (New York, NY: Basic Books, 2000).

51. “Gingrich Says NASA Should Have Folded,” *New York Times*, February 5, 1995, p. 24.

initiative of a Democratic President; the period since has been dominated by a Republican political consensus that has become increasingly conservative. That criticism then took on the added flavor of enthusiasm for private sector space activities instead of large government efforts. Core questions plaguing space policy since the 1950s have revolved around the role of the government versus the private sector in facilitating space exploration. Should all activities be undertaken by the federal government? Should there be some type of public/private partnership put into place to accomplish these tasks? Should the government leave these activities entirely to private companies, involving itself only insofar as required to assure safety of its citizens? Should some entirely different model be employed to ensure space exploration? If the macroeconomic studies sponsored by NASA were an indication, the returns on investment in space research and development were astounding. The Midwestern Research Institute (MRI) study of 1971 determined that NASA R&D provided an overall 7:1 return. Essentially, for every dollar spent on R&D, seven dollars were returned to the GDP. MRI refined its study in 1988, calculating this time an even higher 9:1 return on investment. Chase Econometrics performed a more sophisticated study in 1975 that reported a whopping 14:1 return on investment.⁵² If this was true, said the conservative critique of spaceflight, should not the private sector pursue this objective free from government interference.

The Reagan administration of the 1980s certainly thought so and proceeded to privatize spaceflight. At Reagan's behest Congress passed the Commercial Space Launch Act of 1984 that enshrined in law the desire to open space access to private sector providers.⁵³ There followed a series of moves intended to create a commercial space capability while reducing government funding for space exploration.⁵⁴ Increasingly since the Reagan era spaceflight has become increasingly private, in no small measure the result of efforts to reduce the role of the federal government.

Many examples exist. Beginning in the mid-1990s, several start-up companies were organized to undertake new space initiatives. Indeed, 1996 marked something of a milestone in the history of spaceflight as worldwide

52. "Economic Impact of Stimulated Technological Activity," Final Report, Midwest Research Institute, October 15, 1971, Contract No. NASW-2030; Michael K. Evans, "The Economic Impact of NASA R&D Spending," Chase Econometric Associates, Inc., Bala Cynwyd, PA, April 1976; "Economic Impact and Technological Progress of NASA Research and Development Expenditures," Midwest Research Institute, Kansas City, MO, for the National Academy of Public Administration, September 20, 1988; BDM, "Economic Return on Technology Investments Study: Final Report," September 30, 1994.

53. "Commercial Space Launch Act of 1984, Public Law 98-575," in John M. Logsdon, gen. ed., *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program, Volume IV, Accessing Space* (Washington, DC: NASA SP-4407, 1999), pp. 431-440.

54. Space Launch Policy Working Group, "Report on Commercialization of U.S. Expendable Launch Vehicles," April 13, 1983, p. 3, NASA Historical Reference Collection.

commercial revenues in space for the first time surpassed all governmental spending on space, totaling some \$77 billion. This growth continued in 1997, with 75 commercial payloads lofted into orbit, and with approximately 75 more military and scientific satellites launched. This represented a threefold increase over the number the year before. Market surveys for the period thereafter suggested that commercial launches would multiply for the next several years at least.⁵⁵ In that context many spaceflight advocates believed that the market had matured sufficiently that government control was no longer necessary. Instead, they asked that the federal government simply “get out of the way” and allow the private sector to pursue their efforts in space free from bureaucratic controls.⁵⁶

This critique has also found expression in the first decade of the 21st century. Even as NASA was given a new responsibility to return to the Moon, conservative policymakers refused to appropriate the federal funds necessary to accomplish the task. By 2007, accordingly, it had become highly uncertain that the initiative could be realized. It appeared increasingly that this proposal would follow the path of the aborted Space Exploration Initiative (SEI) announced with great fanfare in 1989 but derailed in the early 1990s.⁵⁷ Indeed, one candidate for the presidency during the 2008 election, Senator Hillary Rodham Clinton (D-NY), has already stated her opposition to continuing George W. Bush’s Vision for Space Exploration should she become President. As reported in the *New York Times*, “Travel to the Moon or Mars ‘excites people,’ she said, ‘but I am more focused on nearer-term goals I think are achievable’.”⁵⁸ It seems that critics of human space exploration on the left were intent on ending this large space initiative because they viewed it as taking funds away from more pressing social needs while critics on the right were unwilling to put much funding into it and emphasized greater private sector involvement.

55. Tim Beardsley, “The Way to Go in Space,” *Scientific American*, March 1999, special issue on “The future of Space Exploration.”

56. Craig R. Reed, “Factors Affecting U.S. Commercial Space Launch Industry Competitiveness,” *Business and Economic History* 27 (Fall 1998): 222–236; Andrew J. Butrica, “Commercial Spaceports: Hitching Your Wagon to a VentureStar,” *Space Times: Magazine of the American Astronautical Society* 37 (September/October 2000): 5–10.

57. Frank Sietzen, Jr. and Keith L. Cowing, *New Moon Rising: The Making of the Bush Space Vision* (Burlington, Ontario: Apogee Books, 2004); Craig Cornelius, “Science in the National Vision for Space Exploration: Objectives and Constituencies of the ‘Discovery-Driven’ Paradigm,” *Space Policy* 21 (February 2005): 41–48; Wendell Mendell, “The Vision for Human Spaceflight,” *Space Policy* 21 (February 2005): 7–10.

58. Patrick Healy and Cornelia Dean, “Clinton Says She Would Shield Science From Politics,” *New York Times*, October 5, 2007.

SPACE EXPLORATION AND THE CULT OF CONSPIRACY

Americans, certainly, and perhaps all the cultures of the world, love the idea of conspiracy as an explanation of how and why many events have happened. Certainly this is the case in one of the counter narratives of spaceflight. These conspiracy theories play to the innermost human fears and hostilities that there is a well-organized, well-financed, and Machiavellian design being executed by some malevolent group, the dehumanized "them," which seek to rob "us" of something we hold dear. Usually the "something" being robbed is one of the constitutionally defined rights of all Americans: life, liberty, or property.

Conspiracy theories abound in American history. Oliver Stone's film, *J.F.K.*, while presenting a truly warped picture of recent American history, shows how receptive Americans are to believing that Kennedy was killed as a result of a massive conspiracy variously involving Cuban strongman Fidel Castro, American senior intelligence and law enforcement officers, high communist leaders in the Soviet Union, union organizers, organized crime, and perhaps even the Vice President, Lyndon B. Johnson. Stone's film only brought the assassination conspiracy to a broad American public. For years amateur and not-so-amateur researchers have been churning out books and articles about the Kennedy assassination conspiracy. It has been one of the really significant growth industries in American history during the last 40-some years.⁵⁹

Conspiracy theories, of course, have been advanced to explain many other historical events in the United States. A favorite is the "backdoor to war" conspiracy thesis of U.S. entry into World War II. As stated, President Franklin D. Roosevelt had intelligence information about the Japanese attack on Pearl Harbor hours beforehand and with the help of other highly placed national leaders withheld that information from the Navy's Pacific Fleet so that it would be destroyed—all so he could get the American people behind a war with Germany.⁶⁰ Another conspiracy argues that there has been a grand intrigue in the 20th century "to control the foreign and domestic policies of the United States, subvert the Constitution, and establish a totalitarian society."⁶¹

59. David R. Wrone and DeLloyd J. Guth, *The Assassination of John F. Kennedy* (Westport, CT: Greenwood Press, 1980), listed more than 5,000 publications dealing with the subject. The number has grown substantially since that bibliography was published.

60. Charles A. Beard, *President Roosevelt and the Coming of the War, 1941: A Study in Appearances and Realities* (New Haven, CT: Yale University Press, 1948) makes the case for conspiracy. Countervailing positions are argued in Roberta Wolstetter, *Pearl Harbor: Warning and Decision* (Palo Alto, CA: Stanford University Press, 1962) and Gordon A. Prang, "*At Dawn We Slept*": *The Untold Story of Pearl Harbor* (New York, NY: McGraw-Hill, 1981). A superb discussion of the memory of the Pearl Harbor attack may be found in Emily Rosenberg, *A Date Which will Live: Pearl Harbor in American Memory* (Durham, NC: Duke University Press, 2003).

61. Chesly Manly, *The Twenty-Year Revolution: From Roosevelt to Eisenhower* (Chicago, IL: n.p., 1954), p. 179, as cited in Richard Hofstadter, *The Paranoid Style in American Politics and Other Essays* (New

What are the general attributes of these historical conspiracy theories writ large? A central point revolves around how to define a "conspiracy." At its most innocuous a conspiracy is simply the planning and execution of some activity by a group of people. All actions of any consequence require some planning with others and could be considered conspiracies in that sense. The dictionary definition of conspiracy, however, is "a joining secretly with others for an evil purpose," a connotation first acquired during the politically charged 1960s, and most planning efforts, therefore, do not qualify.⁶² One could argue that conspiracies do indeed exist, even when using the dictionary definition. Even so, much rides on what defines an "evil purpose," for very often that is a matter of perspective. From the American perspective, whether or not Roosevelt was involved matters not, in the strictest sense of the term Pearl Harbor was attacked as a result of a conspiracy, for the Japanese high command struck an evil plot against the United States. Even so, from a Japanese perspective it was not so much a conspiracy as good strategic planning. The definition of a conspiracy, therefore, is subjective.

At least in the minds of conspiracy theorists, however, there is always a belief that there is or has been a vast and well-organized plot to carry out some sinister goal, often the very destruction of a way of life. At its extreme form the theorist might consider the conspiracy the vast and prime mover of history. Thus, Americans on the political right have interpreted many of the world's events in the 20th century as a "communist conspiracy" against which the "free world" had always to react.⁶³ As a result, opponents fighting a perceived conspiracy see themselves as the last bastion of what is good and just and true in the world. There is an especially powerful apocalyptic vision that motivates those who accept such conspiracy ideologies. These opponents have often had an almost messianic belief in the rightness of their cause and that the time remaining to salvage whatever is at stake is running out. At a fundamental level, conspiracy theories serve as a "particular narrative form of scapegoating that frames demonized enemies as part of a vast insidious plot against the common good, while it valorizes the scapegoater as a hero for sounding the alarm."⁶⁴

Additionally, those who truly believe that a conspiracy has been afoot do not have any interest in talking over differences. They are at war with a malicious, sinister, powerful, ubiquitous personification of evil. That evil is responsible for most of the negative events that happen. It makes crises; starts

York, NY:Vintage books, 1965), p. 25; Kevin Phillips, *American Theocracy: The Perils and Politics of Radical Religion, Oil, and Borrowed Money in the 21st Century* (New York, NY:Viking, 2006).

62. *The New Lexicon Webster's Dictionary of the English Language* (New York, NY: Lexicon International-Publishers Guild Group, 1989), p. 208.

63. See Daniel Bell, ed., *The Radical Right* (New York, NY:Vintage Books, 1963).

64. Chip Berlet and Matthew N. Lyons, *Right-Wing Populism in America: Too Close for Comfort* (New York, NY:The Guilford Press, 2000), p. 9.

economic depressions, wars, and disasters; and enjoys the misery foisted upon the culture under attack. Advocates of conspiracy assign demonic omnipresence to whatever and whomsoever they have decided are a part of the conspiracy. They possess a special source of power which is used malevolently against others, especially those who have learned about the conspiracy and are seeking to combat it. Any suggestion from non-believers that a presumed conspiracy might be just as easily and accurately explained by some less diabolical method is met with a sharp rebuke that the non-believer is either a willing participant or a dupe being used by the conspirators.⁶⁵

Almost from the point of the first spaceflight missions, a small group of Americans began to spin conspiracy theories. These range from fantastical theories of extraterrestrial visitation, abduction, and government complicity, to the development of secret technologies such as the Aurora ultra-secret spaceplane, to elaborate collusions between great powers to subvert human liberties. By far the most important of these were those that emerged to question the Moon landings undertaken by NASA during Project Apollo, and it is this conspiracy theory that I intend to discuss in this short essay. The Moon landing had, they argued, been faked in Hollywood by the federal government for purposes ranging—depending on the particular Apollo landing denier—from embezzlement of the public treasury to complex motivations involving international intrigue and murderous criminality. For example, Andrew Chaikin commented in his massive history of the Apollo Moon expeditions that at the time of the Apollo 8 circumlunar flight in December 1968 some people thought it was not real; instead it was “all a hoax perpetrated by the government.” Bill Anders, an astronaut on the mission, thought live television would help convince skeptics since watching “three men floating inside a spaceship was as close to proof as they might get.”⁶⁶ He could not have been more wrong.

Some of those skeptical of the Apollo flights made their cases based on naïve and poorly constructed knowledge, but imagery from space did not seem to help. For example, my paternal grandfather, Jeffrey Hilliard Launius, was a 75-year-old farmer from southern Illinois at the time of the first Moon landing in 1969. A Democrat since the Great Depression of the 1930s—because, as he said, Roosevelt gave him a job with the Work Projects Administration (WPA) when he could not feed his family and was on the verge of losing everything—his denial of the Moon landing was based essentially on lack of knowledge and

65. This conspiracy motif has been an important part of the “political correctness” debate currently raging in which everyone who does not accept at face value the arguments about minority oppression and the means of ending it, even though those committed to the goal do not themselves agree on the proper means, are charged with racism, chauvinism, or prejudice. See Aaron Wildovsky, *The Rise of Radical Egalitarianism* (Washington, DC: American University Press, 1991).

66. Chaikin, *A Man in the Moon*, p. 100.

naïveté. In his estimation such a technological feat was simply not possible. Caught up in the excitement of Apollo 11 in the summer of 1969, I could not understand my grandfather's denial of what appeared obvious to me. He did not assign any conspiratorial motives to the government, especially the Democrats; after all, it was a party he had trusted implicitly for more than 35 years. Even now I still cannot fully fathom his conflicting position of trust of the Democrats in government and unwillingness to believe what they said about the Moon landing. In his insular world change came grudgingly, however, and a Moon landing was certainly a major change. As a measure of his unwillingness to embrace change, my grandfather farmed his entire life with horses rather than adopting the tractor because in his estimation tractors were "a passing fad." Jeff Launius still did not believe that America had landed on the Moon at the time of his death in 1984.

President Bill Clinton recalled in his 2004 autobiography a similar story of a carpenter he worked with not long after the Apollo 11 landing. As he wrote about him in August 1969:

Just a month before, Apollo 11 astronauts Buzz Aldrin and Neil Armstrong had left their colleague, Michael Collins, aboard spaceship Columbia and walked on the Moon, beating by five months President Kennedy's goal of putting a man on the Moon before the decade was out. The old carpenter asked me if I really believed it happened. I said sure, I saw it on television. He disagreed; he said that he didn't believe it for a minute, that "them television fellers" could make things look real that weren't.

Clinton thought him a crank at the time and since, a homespun skeptic. He then allowed that a healthy criticism of everything was not necessarily a bad idea.⁶⁷

How widespread were the skeptics about the Moon landings in the 1960s? That is almost impossible to say. For example, the *New York Times* science reporter John Noble Wilford remarked in December 1969 that "A few stool-warmers in Chicago bars are on record as suggesting that the Apollo 11 moon walk last July was actually staged by Hollywood on a Nevada desert."⁶⁸ More important, the *Atlanta Constitution* led a story on June 15, 1970, with: "Many skeptics feel moon explorer Neil Armstrong took his 'giant leap for mankind' somewhere in Arizona." It based its conclusion that an unspecified "many" questioned the Apollo 11 and 12 landings, and presumably the April 1970 accident aboard Apollo 13, on an admittedly unscientific poll conducted by the Knight

67. Bill Clinton, *My Life* (New York, NY: Alfred A. Knopf, 2004), p. 244.

68. John Noble Wilford, "A Moon Landing? What Moon Landing?" the *New York Times*, December 18, 1969, p. 30.



The launch of Apollo 11 on July 16, 1969. On the essential character of this experience, Ray Bradbury wrote: "When the blast of a rocket launch slams you against the wall and all the rust is shaken off your body, you will hear the great shout of the universe and the joyful crying of people who have been changed by what they've seen." (NASA)

Newspapers of 1,721 U.S. citizens in “Miami, Philadelphia, Akron, Ohio, Detroit, Washington, Macon, Ga., and several rural communities in North and South Carolina.” Those polled were asked, “Do you really, completely believe that the United States has actually landed men on the moon and returned them to earth again?” While numbers questioning the Moon landing in Detroit, Miami, and Akron averaged less than five percent, among African Americans in such places as Washington, DC, a whopping 54 percent “doubted the moon voyage had taken place.” That perhaps said more about the disconnectedness of minority communities from the Apollo effort and the nation’s overarching racism than anything else. As the story reported, “A woman in Macon said she knows she couldn’t watch a telecast from the moon because her set wouldn’t even pick up New York stations.”⁶⁹

Not everyone who denied the Moon landings at the time were so naïve in their assessments. Some spun conspiracy theories of complex structure and shocking intent. As Howard McCurdy opined, “To some, the thrill of space can’t hold a candle to the thrill of conspiracy.”⁷⁰ Over the years many conspiracy scenarios have been concocted, and it sometimes appears that the various theorists are even more cantankerous toward rival theories than they are toward NASA and the Apollo program. An early and persistent theme has been that as a cold war measure the U.S. could not afford to lose the race to the Moon, but when failure loomed NASA faked the landing to save face and national prestige. It used the massive funds dedicated to the effort to “pay off” those who might be persuaded to tell the truth; it also used threats and in some instances criminal actions to stop those who might blow the whistle.⁷¹ One of the most common assertions has been that in the latter 1960s the U.S. government was in disarray because of the debacle of the Vietnam War, the racial crisis in the cities, and social upheaval. The Apollo program proved an ideal positive distraction from this strife, a convenient conspiracy designed to obscure other issues. One story published in 1970 stated this belief as expressed by an African American preacher: “It’s all a deliberate effort to mask problems at home,” *Newsweek* reported, “the people are unhappy—and this takes their minds off their problems.”⁷²

Other conspiracy motifs were more absurd. For example, William Brian asserted that perhaps Americans did go to the Moon, but they did so through the

69. “Many Doubt Man’s Landing on Moon,” *Atlanta Constitution*, June 15, 1970.

70. Howard A. McCurdy, “Moonstruck,” *Air & Space/Smithsonian*, October/November 1998, p. 24.

71. All of these arguments, as well as variations on them, are offered in Bill Kaysing and Randy Reid, *We Never Went to the Moon: America’s Thirty Billion Dollar Swindle* (N.P., 1974). This pamphlet has been reissued several times, notably in Pomeroy, OR: Health Research, 1976, and again in 2002.

72. *Newsweek*, July 20, 1970, quoted in Rogier van Bakel, “The Wrong Stuff,” *Wired 2* (September 1994): 108–113, 155.

means of some extraterrestrial technology. In his estimation NASA employed captured—or perhaps given—technology from beings beyond Earth to reach the Moon. This forced the Agency to create a cover story for more sinister purposes. “You can’t let one bit of information out without blowing the whole thing,” he noted. “They’d have to explain the propulsion technique that got them there, so they’d have to divulge their UFO research. And if they could tap this energy, that would imply the oil cartels are at risk, and the very structure of our world economy could collapse. They didn’t want to run that risk.” Likewise, others suggested that astronauts found evidence of alien civilization on the Moon, à la the 1968 feature film *2001: A Space Odyssey*, and had to fake imagery on the Moon to cover up that fact.⁷³

The first conspiracy theorist to make a sustained case for denying that the U.S. landed on the Moon was Bill Kaysing, a journalist who had been employed for a few years in the public relations office at Rocketdyne, Inc., a NASA contractor, in the early 1960s. His 1974 pamphlet, *We Never Went to the Moon*, laid out many of the major arguments that have been followed by other conspiracy theorists since that time. His rationale for questioning the Apollo Moon landings offered poorly developed logic, sloppily analyzed data, and sophomorically argued assertions. Kaysing believed that the failure to land on the Moon all sprang from the fact that NASA lacked the technical expertise to accomplish the task, requiring the creation of a massive coverup to hide that fact. He cited as evidence optical anomalies in some imagery from the Apollo program, questioned the physical features of certain objects in the photographs (such as a lack of a star field in the background of lunar surface imagery and a presumed waving of the U.S. flag in an airless environment), and challenged the possibility of NASA astronauts surviving a trip to the Moon because of radiation exposure.⁷⁴

Throughout the latter third of the 20th century and into the 21st, with confidence in the U.S. government by the American public declining—because of Vietnam, Watergate, and other scandals and malfeasance—it became somewhat easier for people to believe the worst about such a cover-up. For example, responding to a public opinion survey in 1964, 76 percent of the Americans polled expressed confidence in the ability of their national government “to do what is right” most or all of the time. This was an all-time high in the history of polling, and this goodwill helped lay the foundation for all manner of large initiatives during the 1960s, including all types of reforms. This consensus collapsed in the post-Vietnam and post-Watergate era of the 1970s, to a low of

73. van Bakel, “The Wrong Stuff,” *Wired*, p. 112.

74. Kaysing and Reid, *We Never Went to the Moon*.

less than 25 percent of Americans believing that the government would seek to do right all or even a majority of the time by the early 1990s.⁷⁵

Additionally, as time passed and more people were born and grew to maturity since the last of the Moon missions had been completed in 1972, youngsters became increasingly skeptical since they had no firsthand recollection of Apollo. Evidence of that issue was found in a 2004 poll about attitudes toward spaceflight among Americans. While polls had consistently shown that only about six percent of the public as a whole questioned the Moon landings, and a whopping 89 percent firmly believed in their reality, among Americans between 18 and 24 years old “27% expressed doubts that NASA went to the Moon,” according to pollster Mary Lynne Dittmar in a 2004 study. Doubt is different from denial, but it was a trend that seemed to be growing over time.⁷⁶

Major media sources, especially, fueled doubts. For example, folklorist Linda Degh asserted that the 1978 fictional feature film *Capricorn One*, in which NASA supposedly faked a landing on Mars, may have fostered greater acceptance of the denials of the Moon landings. No question, the February 2001 airing of the Fox special, *Conspiracy Theory: Did We Land on the Moon?*, changed the nature of the debate. In this instance a major network presented a conspiracy scenario without any serious rebuttal that might have been offered.⁷⁷ As *USA Today* reported in the aftermath of the “news special”:

According to Fox and its respectfully interviewed “experts”—a constellation of ludicrously marginal and utterly uncredentialed “investigative journalists”—the United States grew so eager to defeat the Soviets in the intensely competitive 1960s space race that it faked all six Apollo missions that purportedly landed on the moon. Instead of exploring the lunar surface, the American astronauts only tromped around a crude movie set that was created by the plotters in the legendary Area 51 of the Nevada desert.⁷⁸

75. Paul R. Abramson, *Political Attitudes in America* (San Francisco, CA: W. H. Freeman, 1983), p. 12. See also Seymour Martin Lipset and William Schneider, *The Confidence Gap* (New York, NY: Free Press, 1983).

76. Mary Lynne Dittmar, “Building Constituencies for Project Constellation: Updates to The Market Study of the Space Exploration Program,” presentation at Building and Maintaining the Constituency for Long-Term Space Exploration workshop, George Mason University, Fairfax, VA, July 31–August 3, 2006; The Gallop Poll, “Did Men Really Land on the Moon?” February 15, 2001, available online at <http://www.galluppoll.com/content/?ci=1993&pg=1> (accessed June 26, 2007).

77. For a discussion of the claims made in this “documentary,” as well as rebuttal to it, see Phil Plait, “Fox TV and the Apollo Moon Hoax,” February 13, 2001, available online at <http://www.badastronomy.com> (accessed October 14, 2002).

78. “Faking a Hoax,” *USA Today*, April 9, 2001.

While the program claimed to “Let the viewer decide” about the validity of the claims for denial of the Moon landings, it made no attempt whatsoever to offer point and counterpoint, thereby giving the viewers a seriously biased view of the issue and skewed evidence in favor of a hoax.

The Fox television show exposed the arguments of the Moon landing deniers to a much broader public than ever before. As Linda Degh noted, “The mass media catapult these half-truths into a kind of twilight zone where people can make their guesses sound as truths. Mass media have a terrible impact on people who lack guidance.”⁷⁹ Without a proper rebuttal available from NASA—the Agency had taken an official position before of not responding to what it considered absurd claims—many young people publicly began to question the Apollo landings. Several astronauts stepped forward to affirm the legitimacy of the program, but others thought the charges too silly to warrant response. Many debated the issues in the emerging world of the Internet. Indeed, the Internet became a haven for conspiracy theorists of all stripes, and with the barrier for publication online so low anyone could put up any page they wished with any assertions they wished to make. But it also became a haven for counters to the conspiracy theorists and a healthy debate has resulted.⁸⁰

At the same time, the twin features of modern society—a youth movement and post-modernism—helped to raise questions about the Moon landings. More than half the world’s population had been born since the last of the Moon landings had taken place in December 1972. Consequently, they had not lived through the excitement of the experience. This raises the specter of how individuals view time and history. Mostly without even realizing it, individuals tend to divide time into three general, inconsistent, and individualistic spheres or cones of memory. The first is a sphere of personal experience. Events that individuals participated in personally or that had salience to their individual lives are the first and most immediate sphere. These differ from person to person, and include not only activities that the individual experienced firsthand but events of great importance that took place in their memory. For instance, there are colossal events that mark the time of our lives, and they hold great resonance for those participating in them. Virtually all Americans know where they were and what they were doing when they learned of the 9/11 attacks in New York and Washington. The same is true for other dramatic incidents in individual lives such as the Moon landings for those who remember them. It is this memory of our individual and immediate experiences that govern most people’s perspective on the past. Roy Rosenzweig and David Thelen in their study of popular uses of history in American life noted that far from Americans

79. van Bakel, “The Wrong Stuff,” *Wired*, p. 113.

80. A search on the term, “Moon hoax,” will yield no fewer than 5,000 sites containing information of one type or another relating to this subject.

being disengaged from history, as has been routinely thought because of their detachment from national themes, most people have supplanted interest in these broader themes to the history of family and locale. Indeed, Rosenzweig and Thelen insist that Americans “pursue the past actively and make it part of everyday life.”⁸¹ They found that no more than 24 percent of their sample answered that the history of the United States was the past they felt was “most important” to them, as opposed to the 50–60 percent who identified a more intimate past as central to their lives.⁸²

Less immediate but still resonating with Americans is a sphere of history that is not intimate to the individual but related by members of the family, by close friends, and by mentors. While the person may have no individual sense of history about World War II, for instance, they have heard stories about it and its effects on families and loved ones. It has a reverberation of meaning because of this connection. There are dark areas in this sphere of historical understanding that may be further illuminated through public presentations of the past, in whatever those forms of presentation might take, but they will never enjoy the salience reserved for personal experience in most people’s minds.

The third sphere encompassing all humans is the past that has no special connection through loved ones or personal experience. In that context events, epochs, themes, and the like discussed throughout the broad expanse of history have essentially an equal importance. The Crusades, the Ming Dynasty, the English/French/American/Russian/or other revolutions all essentially stand at the same level for most of those who have no intimate connection to them. Difficulties in creating resonance with those events of the past abound, and always perspectives are obscure as this past is digested. It also has considerably more dark spaces than more immediate past events. An important challenge for all historians is how to breach that truly lost and forgotten past and offer its meaning to most people. This is done through many processes, especially rituals, public representations, reenactments, museums and historic sites, and a range of other possibilities for constructing and reinforcing meaning. There are numerous examples of this basic fact across a broad spectrum of American life, as master narratives of American history are reinforced rather than reinterpreted.⁸³

For the younger members of society, the recollection of Apollo is distant to begin with and receding into the background quickly as time progresses.

81. Roy Rosenzweig and David Thelen, *The Presence of the Past: Popular Uses of History in American Life* (New York, NY: Columbia University Press, 1998), pp. 11–13, quote from p. 18.

82. *Ibid.*, p. 237.

83. Jane Adams, “Melting Pot, Stew Pot, or Salad,” available online at http://mccoy.lib.siu.edu/~jadams/introduction_text.html (accessed October 28, 2005). Sociologist Robert Bellah calls these “communities of memory.” See Robert N. Bellah, et al., *Habits of the Heart: Individualism and Commitment in American Life* (New York, NY: Harper and Row, 1985).

Commemoration and ritual help to preserve these events for society as a whole, but if they are not taking place is the case for Apollo, then events dim.

Indeed, post-modernism suggests that reality is more a suggestion of meaning rather than an absolute. It blurs the line between fact and fiction, between realism and poetry, between the unrecoverable past and our memory of it.⁸⁴ This raising of the inexact character of historical "truth," as well as its relationship to myth and memory and the reality of the dim and unrecoverable past, has foreshadowed deep fissures in the landscape of identity and what it means to be American. Truth, it seems, has differed from time to time and place to place with reckless abandon and enormous variety. Choice between them is present everywhere both in the past and the present; my truth dissolves into your myth and your truth into my myth almost as soon as it is articulated. We see this reinforced everywhere about us today, and mostly we shake our heads and misunderstand the versions of truth espoused by various groups about themselves and about those excluded from their fellowship. They have given and continue to give meaning and value to individual human lives and to create a focal point for explaining the sufferings and triumphs of the group.

At some level there is no absolute; instead everything is constructed. If so, what might be the case of the Moon landings? Might this be, in essence, an issue of agreeing that something was true but could also be agreed that it never happened. If enough doubt could be cast on some particular narrative might it be overcome and obliterated? This has happened in history repeatedly, as versions of the past have replaced earlier versions that seemed so true. For more than a half-century, for example, the Frontier Thesis as enunciated by Frederick Jackson Turner reigned supreme as a critical explanation offered for the manner in which the U.S. character emerged. It was dismantled and destroyed and all but forgotten in the last quarter of the 20th century.⁸⁵

The denials of the Moon landings excite the response of crank and crackpot from most who hear them. Indeed, those conspiracy ideas deserve disdain. But so to, do many other conspiracy theories that are now major elements of the

84. See the fascinating discussion of myth and history in Hayden White, *Metahistory: The Historical Imagination in Nineteenth-Century Europe* (Baltimore, MD: Johns Hopkins University Press, 1973); and Roland Barthes, "The Discourse of History," trans. Stephen Bann, *Comparative Criticism: A Yearbook* 3 (1981): 3-20; Dominick LaCapra, *Rethinking Intellectual History* (Ithaca, NY: Cornell University Press, 1983); Brook Thomas, *The New Historicism: And Other Old-Fashioned Topics* (Princeton, NJ: Princeton University Press, 1991).

85. Frederick Jackson Turner, "The Significance of the Frontier in American History," *The Frontier in American History* (New York, NY: Holt, Rinehart, and Winston, 1920), pp. 1-38; Richard Slotkin, *Gunfighter Nation: The Myth of the Frontier in Twentieth-Century America* (New York, NY: Atheneum, 1992); John Mack Faragher, *Rereading Frederick Jackson Turner: The Significance of the Frontier in American History, and Other Essays* (New York, NY: Henry Holt, 1994); Allan G. Bogue, *Frederick Jackson Turner: Strange Roads Going Down* (Norman, OK: University of Oklahoma Press, 1998); Ray Allen Billington, *America's Frontier Heritage* (Albuquerque, NM: University of New Mexico Press, 1974).

memory of the nation. For example, how many Americans believe that John F. Kennedy was assassinated by means of a massive conspiracy that involved the national security establishment? More than 45 years of a persistent churning over the data, near data, and wishful thinking has forced massive fissures in the conclusions of the Warren Commission. Might this happen in the future in relation to the Moon landings?

CONCLUSION

Finally, who has the right—not to mention the power—to interpret the past? It seems obvious that the fierceness of the discourse over the possible narratives of the past has arisen from the desire to secure a national identity of one nation, one people, coupled with a concern that the bulwarks of appropriate conceptions may be crumbling. Viewing history as largely a lesson in civics and a means of instilling in the nation's citizenry a sense of awe and reverence for the nation state and its system of governance ensures that this debate over narratives will be vicious and longstanding. The dominant master narrative of spaceflight fits beautifully into this approach to seeing the past. It is one of an initial shock to the system, surprise, and ultimately recovery with success after success following across a broad spectrum of activities. It offers general comfort to the American public as a whole and an exceptionalistic, nationalistic, and triumphant model for understanding the nation's past.⁸⁶ Small wonder that this story of spaceflight emerged as the narrative so dominant from the earliest days of the space program. It offered a subtle, usable past for the nation as a whole.

But that master narrative of both spaceflight and the larger American history began to break down with the rise of the new social history of the 1960s.⁸⁷ By the 1980s the consensus, exceptionalistic perspective on the American past had crumbled throughout academia, but it had not done so among the broader public and in the cultural institutions that sought to speak to the public.⁸⁸ In this setting it would seem that the alternative spaceflight

86. On American exceptionalism see Seymour Martin Lipset, *American Exceptionalism: A Double-Edged Sword* (New York, NY: W. W. Norton & Company, 1997); Charles Lockhart, *The Roots of American Exceptionalism: Institutions, Culture and Policies* (New York, NY: Palgrave Macmillan, 2003); Deborah L. Madsen, *American Exceptionalism* (Oxford, MS: State University of Mississippi Press, 1998); David W. Noble, *Death of a Nation: American Culture and the End of Exceptionalism* (Minneapolis, MN: University of Minnesota Press, 2002).

87. Peter Charles Hoffer, *Past Imperfect: Facts, Fictions, Fraud—American History from Bancroft and Parkman to Ambrose, Bellesiles, Ellis, and Goodwin* (New York, NY: Public Affairs, 2004), p. 63.

88. Frances Fitzgerald, *America Revised* (Boston, MA: Little, Brown, 1979), pp. 53–58; Michael Kammen, *In the Past Lane: Historical Perspectives on American Culture* (New York, NY: Oxford University Press, 1997), pp. 64–68; Neil Jumonville, *Henry Steele Commager: Midcentury Liberalism and the History of the Present* (Chapel Hill, NC: University of North Carolina Press, 1999), pp. 232–235.

narratives could emerge to challenge the master narrative, creating for their individual and individualistic followings a uniquely boutique but satisfactory interpretation of space exploration's history.

In the context of spaceflight, the duels between these four narratives have represented a battle for control of the national memory concerning this one area of the "lifeworld" of Americans. Would it be one that is unified—one people, one nation—or one that was fragmented and personal? This is an important issue and fully worthy of consideration by all in the marketplace of ideas. By taking action to fashion and champion alternative narratives, individuals reasserted a fundamental direction over meaning whether for good or ill. Political scientist Jürgen Habermas has suggested that when the "instrumental rationality" of the state intrudes too precipitously into the lifeworld of its citizenry, they rise up in some form to correct its course or to cast it off altogether. The lifeworld is evident in the ways in which language creates the contexts of interpretations of everyday circumstances, decisions, and actions. He argues that the lifeworld is "represented by a culturally transmitted and linguistically organized stock of interpretive patterns."⁸⁹ For a not inconsequential proportion of Americans the interpretation of space exploration that dominated the discourse has intruded into their lifeworld, as their alternative narratives certainly suggest. Accordingly, they have taken direct action to alter this perspective. Over time, their alternative narratives have come to challenge the master perspective invoked routinely.

This leads back to the question posed above, who has the authority to decide what the history says? An old baseball joke is apropos here. Three umpires were discussing how they call balls and strikes behind the plate. The first said, "I call them as they are," a pre-modern, absolutist position. The second said, "I call them as I see them," a position reflecting rationality and modernity. The third opined in a fit of post-modern existential angst, "They ain't nothin' til I call them." It seems that this last perspective is the critical element in considering these various narratives about the history of the Space Age. Perhaps the reality of what happened does not matter all that much; the only thing that is truly important is the decision about its meaning. That may well be an intensely personal decision predicated on many idiosyncrasies and perspectives. When will historians begin to explore the process whereby this has taken place and seek to document and understand its evolution?

89. Jürgen Habermas, *The Theory of Communicative Action, Volume 2: Lifeworld and System, A Critique of Functionalist Reason* (Boston, MA: Beacon Press, 1987), p. 124.

