

## CHAPTER 2

# WHAT ARE TURNING POINTS IN HISTORY, AND WHAT WERE THEY FOR THE SPACE AGE?<sup>1</sup>

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Debates over “turning points” in history have sometimes become quite difficult and controversial among observers of the past. At sum they signify, represent, and define lasting changes in the climate of the times. The definition of turning points is exceptionally idiosyncratic, and their delineation also shifts over time as perspectives change and events become more distant. For most people who look back on the twentieth century, 1929 and 1941 demonstrated turning points as the nation changed in fundamental ways in response to the beginning of the Great Depression and as the United States entered World War II. On the other hand, 1963 and 1987 were probably not turning points despite the Kennedy assassination and the stock market crash, respectively. Therefore, to a very real extent turning points reflect the sea change that follows an event rather than the event itself. Additionally, not all turning points need be marked by a dramatic event. For instance, no one event marked the shift from the conformist 1950s to the radical 1960s and 1970s, although many observers agree that these decades were indeed turning points.

In the context of spaceflight, what are the turning points? Most would probably agree that the launch of Sputnik in 1957 represented a turning point, although later in this essay I will make a case in opposition to this belief. But what about the Kennedy decision to go to the Moon, the Moon landings themselves, the first flight of the Space Shuttle, the losses of *Challenger* and *Columbia*, and the rise of China as a player in human spaceflight? This list might be expanded indefinitely. This essay explores what constitutes a turning point in history and examines some turning points in the history of the Space Age.

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## DEFINING A TURNING POINT

In a recent search of Amazon.com for the words “turning point” in the titles of books, I found 1,134 relevant titles. These ranged from *The Turning Point: Jefferson’s Battle for the Presidency* by Frank van der Linden to *The Higher Freedom: A New Turning Point in Jewish History* by David Polish, to *The Right Moment: Ronald Reagan’s First Victory and the Decisive Turning Point in American Politics* by Matthew Dallek.<sup>2</sup> And the term is hardly new. Hoffman Nickerson used it in 1928 to describe the battle of Saratoga during the American Revolution.<sup>3</sup> Postmodern scholars such as Fritjof Capra have employed it as well.<sup>4</sup> It appears in historical work of all types and varieties, schools and subjects, and grade levels and sophistication. Indeed, the concept of a turning point is ubiquitous in the literature of history. And not just in the written word—professors, pundits, politicians, and plebeians all use it in all manner of settings and circumstances. Many course offerings at the nation’s colleges and universities include “turning point(s)” in their titles.

At a core level, a turning point may be defined as an event or set of events that, had it not happened as it did, would have prompted a different course in history. Dictionaries define it as “a point at which a significant change occurs.”<sup>5</sup> The classic youngster’s encyclopedia, *World Book*, defines it as “a point at which a notable or decisive change takes place; critical point; crisis: The Battle of Gettysburg was a turning point in the Civil War.”<sup>6</sup> The use of the term comes up in the most interesting places. *Encyclopædia Britannica* incorporates 560 entries in which the term is used. Not so unusual is the statement that the Battle of Midway “marked the turning point of the military struggle between” the United States and Japan in 1942, and “the year 1206 was a turning point in the history of the Mongols and in world history: the moment when the Mongols were first ready to move out beyond the steppe.”<sup>7</sup> More obtuse are such interpretations as the death of Antiochus in 129 BC marking “a turning point in the history of the eastern Mediterranean: Greco-

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2. Frank van der Linden, *The Turning Point: Jefferson’s Battle for the Presidency* (Golden, CO: Fulcrum Publishers, 2000); David Polish, *The Higher Freedom: A New Turning Point in Jewish History* (Chicago: Quadrangle Books, 1965); Matthew Dallek, *The Right Moment: Ronald Reagan’s First Victory and the Decisive Turning Point in American Politics* (New York: Free Press, 2000).

3. Hoffman Nickerson, *The Turning Point of the Revolution; or, Burgoyne in America* (New York: Houghton Mifflin, 1928).

4. Fritjof Capra, *The Turning Point: Science, Society, and the Rising Culture* (New York: Simon and Schuster, 1982).

5. “Turning Point,” Merriam-Webster Online Dictionary, <http://www.m-w.com/dictionary/turning%20point> (accessed 21 August 2006).

6. World Book Encyclopedia and Learning Sources, <http://www.worldbook.com/wb/dict?lu=turning%20point> (accessed 21 August 2006).

7. “Midway, Battle of,” Encyclopædia Britannica online, <http://search.eb.com/eb/article-9052586?query=turning%20point&ct=eb> (accessed 21 August 2006); “Genghis Khan,” Encyclopædia Britannica online, <http://search.eb.com/eb/article-41207?query=turning%20point&ct=eb> (accessed 21 August 2006).

Macedonian domination received a decisive blow; it would survive for only 46 more years.”<sup>8</sup> Tying the demise of Greek domination nearly two generations later to the death of Antiochus seems tenuous at best.

From a sociological perspective, a turning point represents a lasting shift in the *zeitgeist* or “spirit of the age.” Several ingredients must be present. The shock to the system of civilization is profound and it may be measured in several ways. According to sociologist Ted Goertzel, one of the most reliable indicators is the response of the financiers. “Financial markets are one of the quickest and most sensitive indicators of a country’s mood,” he noted. “Panic can move quickly after a shock . . . and markets can spiral out of control.” Public opinion polls may also take the temperature of the society and its reaction to some major event,<sup>9</sup> but those will work only for recent events where the data and structures that Goertzel understands are available. Clearly, there is no manner in which the Mongol invasions of Genghis Kahn, the death of Antiochus, or even the Battle of Midway can be assessed using financial data and public opinion polls.

Political scientists would employ analytical models such as Frank Baumgartner’s and Bryan Jones’s punctuated equilibrium analysis, which suggests that the policy process is comprised of long periods of stability that are then interrupted by predictable periods of instability which lead to major policy changes. Baumgartner and Jones describe “a political system that displays considerable stability with regard to the manner in which it processes issues, but the stability is punctuated with periods of volatile change.” In times of stability the public is limited in its ability to effect change to the overall system, and most people are not even focused on making changes because they are relatively content with the current situation. Only in times of unique crisis and instability do enough members of society rise up to undertake fundamental change, often from a perceived threat or dramatic event.<sup>10</sup> A turning point, therefore, results from a punctuation in the equilibrium of everyday life. This theory—clinical and sterile as it might actually be—has been applied to all manner of decisive events in history and is consistently reaffirmed in the discipline of political science.

Other social science disciplines approach the issue of marked change in different ways and with differing analytic tools, but all, it seems, recognize a turning point in the stream of time as little more than an artificial construct that facilitates interpreting dramatic changes in society. Indeed, it seems as subjective a term as “scientific revolution” was for Thomas Kuhn, who defined it as a “noncumulative developmental episode in which an older paradigm is replaced in whole or in part

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8. “Iran, Ancient,” Encyclopædia Britannica online, <http://search.eb.com/eb/article-32135?query=turning%20point&ct=eb> (accessed 21 August 2006).

9. Ted Goertzel, “September 11, 2001: A Turning Point for America’s Future?” undated paper in possession of author.

10. Frank R. Baumgartner and Bryan D. Jones, *Agendas and Instability in American Politics* (Chicago: University of Chicago Press, 1993), pp. 3–24; Frank R. Baumgartner and Bryan D. Jones, “Agenda Dynamics and Policy Subsystems,” *The Journal of Politics* 53 (November 1991): pp. 1044–1074.

by an incompatible new one.”<sup>11</sup> As with “scientific revolution,” assigning turning point status to an event is very much up to the individuals analyzing it and its effects. Indeed, people at the time may well not recognize a turning point as such. As historian Erik Rau remarked:

[H]istorians today think of the Battle of Saratoga as a turning point in the history of the American Revolution, but many at the time would have had no reason to believe this. This makes the turning point of Saratoga no less real to us in understanding Saratoga, but it may not have influenced very many people’s behavior on the ground at the time. You can’t see Saratoga as a turning point until after the war is over and you take stock of what happened. A turning point is ultimately a construct of historical reflection, and a historical unit of analysis, rather than an event that reveals itself to the people living through it at the time.<sup>12</sup>

Another analogous term that has gained credence in recent years is the singularity-rooted balance of equations, which is now applied far beyond its original application and is a statement of the power of nomenclature in modern society. Again, there is no firm definition acceptable to all.<sup>13</sup>

Of course, when considering turning points in history we are treading a path well-worn by earlier historians, some of whom were illustrious in their own time and still evoke hushed tones of reverence in seminars on historiography. At sum, the issue of a turning point in history is really about assigning significance to historical events, and many in this profession have pondered this problem. Carl L. Becker, for one, explored this in his seminal paper, “What Are Historical Facts?” first presented at the Research Club of Cornell University on 14 April 1926. Using as an example Julius Caesar’s crossing of the Rubicon in 49 BCE, Becker argues that we have chosen to single this out and assign it significance, indeed marking it as a turning point in Roman history. Why? Many others had crossed the Rubicon at many other times, yet they are unremembered. Why is Caesar’s crossing in the year 49 BCE significant? Only considered in the context of what were the significant results of his entry into Rome may we begin to explore this event. And considered in relation to the web of interconnection, it is actually a symbol standing for the historical record—a convenient shorthand—that allows us to explain significance. Becker reasoned that any “historical fact is not the past event, but a symbol which enables us to recreate it imaginatively.”<sup>14</sup>

11. Thomas H. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962), p. 92.

12. Erik P. Rau e-mail to author, “Turning Points in History,” 17 August 2006, copy in possession of author.

13. A noncosmological use of this term may be found in Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Viking, 2005).

14. Carl L. Becker, “What Are Historical Facts?” in *Detachment and the Writing of History: Essays and Letters of Carl L. Becker*, ed. Phil L. Snyder (Ithaca, NY: Cornell University Press, 1958), pp. 41–64; quotes from pp. 45–46.

Becker traveled into similar territory in his presidential address before the American Historical Association in 1931, where he declared “Everyman his own Historian.” He asserted that history is an artificial extension of memory and “in this sense is story, in aim always a true story; a story that employs all the devices of literary art (statement and generalization, narration and description, comparison and comment and analogy) to present the succession of events in the life of man, and from the succession of events thus presented to derive a satisfactory meaning.” He added that “in every age history is taken to be a story of actual events from which a significant meaning may be derived.”<sup>15</sup> Turning points in history are all about assigning significance to events of the past, and they are exceptionally slippery and idiosyncratic to the individuals assigning that significance. At the same time, some historians handle this issue with style and grace and aplomb.

One example of the difficult task of assigning significance to events will suffice, and the process will conjure an image of a turning point. At the five-year anniversary of the 11 September 2001 attacks on the World Trade Center and the Pentagon, most people would probably consider this instance as a clear point of demarcation in which the trajectory of the world as we understood it shifted appreciably. In the aftermath of 9/11, feelings of insecurity at home and hysteria in Washington abounded. Major changes in governmental policies and partisan politics resulted. A sense that the nation as a superpower might be at risk abounded and the response needed to be swift and decisive. Military action resulted, some of it taking a course unanticipated by those planning it. There were hearings and finger-pointing, and floodgates of government funding opened for all manner of presumed security-enhancing programs and intelligence specialists. Additionally, President George W. Bush was criticized for the 9/11 attacks and his failure to prepare for such an eventuality.<sup>16</sup>

But is it appropriate to view 9/11 as a turning point?” At one level, perhaps, but some have argued that this event was simply one chapter of a much longer story. As Cambridge University historian Brendan Simms recently commented:

Without the attacks on the World Trade Center and the Pentagon, we may say with a reasonable degree of confidence that airline travel would have been easier. But beyond that, it becomes difficult to speculate. Some sort of attempt to topple Hussein was brewing in any case. Oil prices would still have risen given the increase in global, particularly Chinese and Indian, demand. The Iranian nuclear issue would be equally acute. And needless to say, the issue of Palestine would still be with us.

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15. Carl L. Becker, “Everyman His Own Historian,” *American Historical Review*, 37 (January 1932): pp. 221–236, quote from 231–232.

16. This includes everything from such polemics as Gore Vidal, “The Enemy Within,” *The Observer* (London), 27 October 2002, to more the reasoned analysis of The National Commission on Terrorist Attacks Upon the United States, *The 9/11 Commission Report* (Washington, DC: U.S. Government Printing Office, 22 July 2004).

Simms agrees with former Chinese Premier Zhou En-lai's quip about the significance of the French Revolution: it is too early to tell.<sup>17</sup>

Likewise, Rutgers University sociologist Ted Goertzel questions 9/11 as a turning point in history. He cites polls suggesting that U.S. attitudes were mostly unchanged by the attacks and that efforts to return to normalcy motivated many people affected. He found that "the stock market recovered quickly from the shock of 9/11" and that the "domestic political climate does not seem to have shifted." In only one major area did Goertzel find a significant shift in national perspective, noting that the "country's foreign policy mood has shifted from introverted to extroverted." Indeed, he found that the following major elements remained firm both before and after 9/11:

- American military hegemony is strong;
- The stock market recovered from its initial shock;
- America is firmly in an extroverted foreign policy mood; and
- Western "sensate" popular culture seems irresistible.

For Goertzel, 9/11 as a turning point is more nuanced and not nearly as straightforward as many have suggested.<sup>18</sup>

With the foregoing discussion, it appears that turning points in history resemble so many other constructs in history, such as periodization, dialectic, causation, and significance, in their lack of firm definition. Undoubtedly, however, they are part of the toolbox used by historians and they appear throughout the master narrative of human history. Since turning points in history seem remarkably similar to beauty (that is, they exist in the eye of the beholder, thereby demonstrating the need for sagacious historians), do they still offer useful frames of reference for historical study? I asked several friends, colleagues, fellow travelers, and critics to offer their thoughts on turning points in space history, and what I received was a remarkable set of broad observations. Many of the ideas presented proved remarkably reflective and some were profound. As Dick Myers observed, "Like so many things in our existence, the definition depends upon the context . . . I think that one defines it in the concrete, not the abstract." In considering the histories of the space age, historians working in this arena have the power to define turning points however they wish. They will "be unique to that topic . . . [and] are defined by the context in which they occur or are said to occur—the context in which historians, etc. are explaining and analyzing and trying to understand."<sup>19</sup>

17. Brendan Simms, "9/11: Historic Turning Point, or Bump in the Road?" *Los Angeles Times*, 10 September 2006.

18. Adam Clymer, "U.S. Attitudes Altered Little by Sept. 11, Pollsters Say," *New York Times*, 20 May 2002; Ted Goertzel, "9/11 As a Turning Point in History," undated PowerPoint presentation in possession of author.

19. Dick Myers e-mail to author, "Turning Points in History," 16 August 2006, copy in possession of author.

Historian Philip Scranton carried this line of thinking a bit further. He suggested that there might be multiple framings of historical turning points:

[F]irst from the perspective of contemporary actors (then refracted through the longer term assessments of historians—hence Sputnik was a major break for those working in the world of 1957–58, but not so big a deal fifty years on) and alternatively, the turning points historians construct in their narratives and periodizations, years or events which may not have seemed such a big deal to the folks at the time. Once in a while (I'd try 1968) both actors and historians agree that there's a major shift that's been launched. That frames a third, probably pretty small, category.<sup>20</sup>

Art historian David Ward offered an additional thought on this subject. He noted that the concept of turning points had value for political, diplomatic, military, and economic history, but was much less useful in social and other types of history. As Ward commented, it would be “rather hard to pin down the moment when modernism [in art] arrived.”<sup>21</sup>

Deborah G. Douglas criticized the concept of turning points in history and suggested that they represent

[ . . . ] the spaces/places in time that the historical community feels it has some fundamental understanding of and can therefore use in analysis and, more importantly, in our narratives. Depending on your disciplinary point of view, you may find yourself attracted or repelled by the particular term turning point but I suspect that has more to do with the time scale of your study and your literary tastes.<sup>22</sup>

She allowed that “the concept is popular but it is also formulaic and didactic—too amateurish, really—for good writers and readers.”

Turning points are also representative of the dominant culture in which they are situated. For example, how would noted Marxist historian Howard Zinn interpret the turning points usually associated with the twentieth century? His warning is apropos in this context: “There is an underside to every Age about which history does not often speak, because history is written from records left by the privileged. We learn . . . about the thinking of an age from its intellectual elite.”<sup>23</sup> Moreover, how would a Vietnamese scholar approach a history of the

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20. Philip Scranton e-mail to author, “Turning Points in History,” 17 August 2006, copy in possession of author.

21. David Ward e-mail to author, “Turning Points in History,” 21 August 2006, copy in possession of author.

22. Deborah G. Douglas e-mail to author, “Turning Points in History,” 16 August 2006, copy in possession of author.

23. Howard Zinn, *The Politics of History* (Boston: Beacon Press, 1970), p. 102.

1960s or, more to the point, a how would a Chinese scholar focusing on aerospace history? The reality is that turning points lack clear cohesion across a broad spectrum. Graphically demonstrating the lack of clear definition and meaning of a turning point, Douglas suggested a game:

Assemble on cards a large number of events that might be considered turning points in space history. Shuffle the deck, pick 10 at random, and spend 5 minutes making up a story. Do it again a couple of times and compare your stories. Are you fitting your ‘turning points’ into your preconceived narrative or do you have vastly different stories?<sup>24</sup>

This approach might yield really interesting results and is grist at least for a session at one of the major historical conferences.

Despite the ease with which we might appropriately dispense with turning points as a useful analytical tool in history, they are everywhere in the national discourse. In twentieth-century America, events commonly assigned turning point status include the following, ranked by opinion leaders in a poll conducted in 1999.

<b>TOP 25 NEWS STORIES OF THE TWENTIETH CENTURY<sup>25</sup></b>		
1	U.S. drops atomic bomb	1945
2	Men first walk on the Moon	1969
3	Japan bombs Pearl Harbor	1941
4	Wrights fly first airplane	1903
5	U.S. women win the right to vote	1920
6	JFK assassinated in Dallas	1963
7	Nazi Holocaust exposed	1945
8	World War I begins	1914
9	Court ends “separate but equal”	1954
10	U.S. stock market crashes	1929
11	Antibiotic penicillin discovered	1928
12	DNA’s structure discovered	1953
13	Soviet Union dissolves	1991
14	President Nixon resigns	1974
15	Germany invades Poland	1939
16	Communists take over Russia	1917
17	Ford creates assembly line	1913
18	Soviets launch first satellite	1957
19	Einstein conceives relativity	1905
20	Birth control pill OK’d by FDA	1960
21	New polio vaccine works	1953
22	Hitler named chancellor	1933
23	M. L. King, Jr., assassinated	1968
24	Allies invade France on D-Day	1944
25	Deadly AIDS disease identified	1981

24. Douglas e-mail to author, “Turning Points in History,” 16 August 2006.

25. “Stories of the Century, 1900-2000,” Newseum, <http://www.newseum.org/century/finalresults.htm> (accessed 13 September 2006).

For the period since 2000, almost certainly the 2001 terrorist attacks on the World Trade Center and the Pentagon and the 2003 invasion of Iraq would be assigned important status as turning points in history.

The reality is that accepting all of these events, as significant as many are, as turning points demonstrates the less than useful nature of the term. Certain events are immediately considered turning points, such as Pearl Harbor and the atomic bomb, whereas others are assigned this status only in retrospect, such as the stock market crash and the oil embargo. Turning points of national significance probably take place less often than this list suggests, and the probability that any individual would witness more than a handful of them during his or her lifetime is small. Instead, the 25 events listed here are within the memory of many people still alive, and even those of us a little younger can remember more than dozen of them.

## CONSTRUCTING TURNING POINTS IN SPACE HISTORY

Rather than playing the game as outlined by Debbie Douglas, let me suggest some turning points in the history of spaceflight. I will then analyze three of them, “turning” the concept on its “pointed” head: 1) a recognized turning point which I will argue might not be one after all; 2) an event not usually thought of as a turning point but which I will assert is appropriately considered one; and 3) an event that was immediately labeled a turning point at the time it took place but, as time passes, appears much less so than previously thought.

Based on inputs from several close observers of the history of spaceflight, major turning points in the field may include the following:

1. Robert Goddard’s first liquid-fueled rocket (1926).
2. Development of ballistic missiles (1944).
3. Launch of Sputnik (1957).
4. Flight of Yuri Gagarin (1961).
5. JFK’s announcement of Apollo landing decision (1961).
6. Launch of the first operational applications satellites (1962).
7. Apollo 11 lunar landing (1969).
8. Nixon’s Space Shuttle decision (1972).
9. First flight of the Space Shuttle (1981).
10. *Challenger* accident (1986).
11. Demise of the Soviet Union as competitor in space (1991).
12. Decision to turn the Space Station into a multinational program involving Russia (1992).
13. *Columbia* accident (2003).
14. Bush’s announcement of the Vision for Space Exploration (2004).
15. Flight of SpaceShipOne (2004).

What is most interesting about this list, compiled from inputs from many sources, is the lack any mention of planetary exploration or Earth science, and only a passing reference to applications satellites. Most are also political turning points, a few are technological, and none is social or scientific in focus. What is included (and especially what is excluded) in this list represents a fascinating avenue for further exploration, but I must leave that for another time and place.

### Sputnik

Virtually everyone would agree that the launch of Sputnik 1 on 4 October 1957, represented an undisputed turning point in space history. Most observers chart the beginning of the Space Age from that date. Indulge me while I argue an alternative position—that it did not represent a turning point at all but, rather, a continuation of the events that had been moving along the same path from at least World War II. In the summer of 1957, six months into Dwight D. Eisenhower’s second term and before the Sputnik turning point in history, the president asked the National Security Council (NSC) to review the U.S. space program to ensure that the level of investment and progress being made was adequate. He intended to field the first intercontinental ballistic missiles (ICBMs) and reconnaissance satellites by the time he left office. These capabilities in the new high ground of space would



Figure 2.1— The launch of Sputnik 1 is usually viewed as the beginning of the space age and a critical turning point in history. Is it conceivable that it was less pivotal than usually thought? (NASA photo no. GPN-2002-000166).

ensure that the United States could compete effectively with the Soviet Union in the cold war rivalry that gripped the world. Eisenhower learned that between 1953 and 1957 the nation had spent \$11.8 billion on military space activities, mostly on ballistic missile and reconnaissance satellite development. "The cost of continuing these programs from FY 1957 through FY 1963," the NCS reported, "would amount to approximately \$36.1 billion, for a grand total of \$47 billion."<sup>26</sup>

By any measure, this should be considered a significant investment on the part of the Eisenhower administration, and it suggests that Eisenhower had developed a strategy for ensuring U.S. technological comparability, and eventual superiority, in the global game of one-upmanship and rivalry that was the cold war. When adjusted for inflation, only Presidents Ronald Reagan and Bill Clinton, surprisingly, made similar investments in space technology.<sup>27</sup> Those assets also found use on both the military and civilian sides of the space program during subsequent years.<sup>28</sup> In an irony of proportions too great to ignore, in 1 October 1957, after the launch of Sputnik 1, Eisenhower found himself branded by the Democrats as an incompetent for allowing the Soviet Union to beat the U.S. into orbit by launching the first satellite. For example, Eisenhower argued that "I am always a little bit amazed about this business of catching up. What you want is enough, a thing that is adequate. A deterrent has no added power, once it has become completely adequate, for compelling the respect of any potential opponent for your deterrent and, therefore, to make him act prudently."<sup>29</sup>

Moreover, Eisenhower had long followed a path toward the development of launch vehicles for use in the ICBM program; satellite technology for reconnaissance and communications; infrastructure required to support these activities such as tracking and launch facilities; and utilitarian science that either directly supported those missions or was a natural byproduct of them. An example of such a byproduct was when, early in the military rocket research program, scientists won the opportunity to place on some of the test vehicles instruments that provided data about the upper atmosphere, solar and stellar ultraviolet radiation, and the aurora. This became a very successful scientific program that was carried out with limited

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26. S. Everett Gleason, "Discussion at the 329th Meeting of the National Security Council, Wednesday, July 3, 1957," 5 July 1957, NSC Records, Dwight D. Eisenhower Presidential Papers, Eisenhower Library, Abilene, KS, p. 2.

27. Reagan spent \$233.02 billion on space issues in his eight years in office. Clinton spent \$230.14 billion during his eight years in office. In contrast, Eisenhower's spending was \$183.69 billion. All of these are in inflation-adjusted dollars. Calculated using data in Appendix E-1A, "Space Activities of the U.S. Government," *Aeronautics and Space Report of the President, Fiscal Year 2003 Activities* (Washington, DC: NASA NP-2004-17-389-HQ, 2004), p. 140.

28. Much has been made of dual-use technology over the years, and space access has been an especially important part of this capability. On space access, see *To Reach the High Frontier: A History of U.S. Launch Vehicles*, ed. Roger D. Launius and Dennis R. Jenkins (Lexington: University Press of Kentucky, 2002).

29. "The President's News Conference of 3 February 1960," *Public Papers of the Presidents of the United States: Dwight D. Eisenhower, 1960* 61 (Washington, DC: U.S. Government Printing Office, 1964), p. 24.

fanfare and funding. As a result, scientists taking part in this program used all the military's captured V 2s, persuaded the Department of Defense (DOD) to develop new sounding rockets to replace them, and continued to use the nation's rocket development program for scientific research throughout the 1950s.<sup>30</sup>

Eisenhower's space program also placed considerable emphasis on satellite technology. During the mid-1950s, the president was preoccupied with the need to conduct surveillance of Soviet Union activities and its growing nuclear capability. This led to the development of both surveillance aircraft and satellites on an aggressive basis in the 1950s. As the 1960 downing of the U-2 reconnaissance airplane revealed, however, aircraft overflights had severe shortcomings. A spacecraft was much less vulnerable. Eisenhower authorized the Vanguard satellite program in part because he wanted to establish the principle of overflight (namely, that a satellite did not intrude upon a nation's airspace when crossing its territory and was not subject to interception), and an internationally supported scientific satellite served this purpose better than any military launch.<sup>31</sup>

Nothing summarizes this balanced, measured approach toward space activities better than a statement Eisenhower made in 1959 at a meeting with top advisors. He outlined three major goals that had to be accomplished:

The first is that we must get what Defense really needs in space; this is mandatory. The second is that we should make a real advance in space so that the United States does not have to be ashamed no matter what other countries do; this is where the super booster is needed. The third is that we should have an orderly, progressive scientific program, well balanced with other scientific endeavors.<sup>32</sup>

Within the context of this philosophy, Eisenhower was willing to expend resources sufficient to meet major objectives, but not to open the floodgates of government expenditures for activities that he believed did not have a viable component.

30. The military created the V 2 Upper Atmosphere Panel in 1946 to oversee this activity. In 1948 it became the Upper Atmosphere Rocket Research Panel, and in 1957 the Rocket and Satellite Research Panel. See Lyman Spitzer Jr., "Astronomical Advantages of an Extra-Terrestrial Observatory," *The Astronomy Quarterly* 7 (September 1946): pp. 19–20; James A. Van Allen, *Origins of Magnetospheric Physics* (Washington, DC: Smithsonian Institution Press, 1983); Homer E. Newell, *Beyond the Atmosphere: Early Years of Space Science* (Washington, DC: NASA SP 4211, 1980); George K. Megerian, "Minutes of V-2 Upper Atmosphere Research Panel Meeting," V-2 Report No. 13, 29 December 1947; George K. Megerian, "Minutes of Meeting of Upper Atmosphere Rocket Research Panel," Panel Report No. 35, 29 April 1953, both in NASA Historical Reference Collection.

31. R. Cargill Hall, "The Origins of U.S. Space Policy: Eisenhower, Open Skies, and Freedom of Space," *Colloquy*, 14, no. 3 (December 1993); R. Cargill Hall, "Origins of U.S. Space Policy: Eisenhower, Open Skies, and Freedom of Space," in *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program*, Vol. I, gen. ed. John M. Logsdon (Washington, DC: NASA SP-4407, 1995), chapter 2.

32. Brig. Gen. A. J. Goodpaster, "Memorandum of Conference with the President, October 12, 1959," 23 October 1959, Records of the White House Office of Science and Technology, Box 12, Eisenhower Library, Abilene, KS.

Eisenhower was also not unreceptive to increases in funding for space activities purely to further scientific understanding. The experience of approval of the International Geophysical Year (IGY) satellite effort is instructive on this score. As early as 1950, a small group of scientists in the United States began discussing among themselves the possibility of using Earth-circling satellites to obtain scientific information about the planet.<sup>33</sup> In 1952, urged on by these same American scientists, the International Council of Scientific Unions (ICSU) proposed the IGY, a cooperative scientific endeavor to study solar-terrestrial relations during a period of maximum solar activity. Some 67 nations agreed to conduct cooperative experiments to study solar-terrestrial relations during a period of maximum solar activity in 1957-1958.

In October 1954, at the behest of essentially this same group of U.S. scientists, the ICSU challenged nations to use their missiles being developed for war to launch scientific satellites to support the IGY research program. In July 1955, largely the same enclave of American scientists convinced Eisenhower that the United States should respond to the ICSU call for participation in the IGY by launching a scientific satellite. Eisenhower's decision called for existing organizations within the DOD to develop and launch a small scientific satellite, "under international auspices, such as the International Geophysical Year, in order to emphasize its peaceful purposes[.] . . . considerable prestige and psychological benefits will accrue to the nation which first is successful in launching a satellite . . . especially if the USSR were to be the first to establish a satellite." The result was Project Vanguard, carried out under the supervision of the Naval Research Laboratory. Eisenhower also approved a budget of \$23.5 million, modest but considered adequate for the effort by scientific and technical personnel consulted by the administration.<sup>34</sup>

Although some have asserted that Sputnik represented the "shock of the century," there did not seem to be much shock immediately after the launch of Sputnik 1. Most recognized that it did not pose a threat to the United States and

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33. This group included Lloyd Berkner, Joseph Kaplan, Fred Singer, James Van Allen, and Homer Newell. The fingerprints of these core leaders are all over every decision relative to the IGY satellite program and the U.S. decision by Eisenhower to sponsor a satellite. See the discussion of this effort in Constance McLaughlin Green and Milton Lomask, *Vanguard: A History* (Washington, DC: Smithsonian Institution Press, 1971), pp. 6-39; Rip Bulkeley, *The Sputniks Crisis and Early United States Space Policy: A Critique of the Historiography of Space* (Bloomington, IN: Indiana University Press, 1991), pp. 89-122; R. Cargill Hall, "Origins and Early Development of the Vanguard and Explorer Satellite Programs," *Airpower Historian* 9 (October 1964): pp. 102-108.

34. National Security Council, NSC 5520 "Draft Statement of Policy on U.S. Scientific Satellite Program," 20 May 1955; United States National Committee for the International Geophysical Year 1957-1958, "Minutes of the First Meeting, Technical Panel on Earth Satellite Program, 20 October 1955," both in NASA Historical Reference Collection; Don Irwin to Mr. Rockefeller and General Parker, "Pentagon Briefing on Earth Satellite Program," 12 October 1955; Richard Hirsch to Elmer B. Staats, "Pentagon Meeting on Earth Satellite Program," 13 October 1955, both in White House Office of Special Assistant for National Security Affairs, NSC, OCB Central Files, Box 11, "OCB 000.9 (National & Physical Sciences)," Eisenhower Library, Abilene, KS.

thus no one took immediate action to respond to it. Instead, congratulations ensued and people were excited by the Soviet success. At the same time, Eisenhower acknowledged the need to “take all feasible measures to accelerate missile and satellite programs.”<sup>35</sup> He also moved to assure the American public that all was well, accepting the findings of representatives of the International Affairs Seminars of Washington who reported on 15–16 October 1957:

If there was any trauma following the Russian sputnik [sic], it occurred in Washington and not among the general public. Washington, for its part, took its cue from the newspapers and other issue makers. The misevaluation by leadership of the extent of public interest, as measured by the amount of news, coverage and the words of the issue makers, led to words and actions which further confused the issue. This situation points up the general problem for a democracy of: who is the ‘public’ to which leadership attends and who in fact do the issue makers represent?<sup>36</sup>

As it turned out, failure to appreciate the ability of Eisenhower’s political enemies to use Sputnik as a wedge issue in the 1958 campaign hurt his administration.

In his first press conference after the launch of Sputnik 1, on October 9 Eisenhower calmed speculation and said it did not raise his apprehension “[...] one iota. I see nothing at this moment, at this stage of development, that is significant in that development as far as security is concerned.”<sup>37</sup> Others in the administration did the same.<sup>38</sup> *The New York Times* disparaged the Soviet “attempt to persuade people, especially in Asia and Africa, that Moscow has taken over world leadership in science.”

*Life* magazine was no less derogatory, warning that, at best, the “Sputniks give this old Communist swindle a new lease of plausibility.”<sup>39</sup> What concerns that the public might have had about Sputnik 1 died down in the latter part of October 1957. For instance, there was little discussion of the satellite issue in the popular press during the latter part of the month and it did not come up in the president’s press conference of 30 October 1957.<sup>40</sup>

While advocates of more aggressive space activities and political opponents of the White House still criticized, public confidence in the nation’s leadership did not

35. Dwight D. Eisenhower, *The White House Years: Waging Peace* (Garden City, NY: Doubleday, 1965), p. 211.

36. International Affairs Seminars of Washington, “American Reactions to Crisis,” 15–16 October 1958, NASA Historical Reference Collection.

37. *Facts on File*, XVII, no. 884, p. 330.

38. *Ibid.*, p. 331; Richard M. Nixon, *The Memoirs of Richard Nixon* (New York: Grosset & Dunlap, 1978), p. 111.

39. “Soviet Claiming Lead in Science,” *New York Times*, 5 October 1957: p. A2; “A Proposal for a ‘Giant Leap,’” *Life*, 16 November 1957: p. 53.

40. *Public Papers of the Presidents of the United States: Dwight D. Eisenhower, 1957* (Washington, DC: U.S. Government Printing Office, 1958), pp. 774–787; NASA clippings file, “October 1957,” NASA Historical Reference Collection.

seem to suffer appreciably until Sputnik 2 was launched on 3 November 1957. This time the Soviet Union counted coup on the United States with an impressive 1,121 pound spacecraft that included a dog named Laika. If anything, the turning point in history came following the 6 December 1957 failure of the Vanguard launch. After the two successful Soviet Sputniks, and this rather spectacular failure on national television, dramatic actions appeared necessary. Accordingly, it seems that Sputnik may not have been such a significant turning point in history as many have thought. It represented one stage of a succession of activities in the history that we all understand, nothing more.

What would have been different had there not been a Sputnik? The U.S. rocketry programs were well in hand in 1957 and there is every reason to believe they would have continued on as they did.<sup>41</sup> The same is true of the satellite reconnaissance effort.<sup>42</sup> Space science was being pursued expeditiously through a variety of avenues; even with efforts to send probes to the Moon, and except for an acceleration of effort probably would have been continued along pretty much the path that came with this turning point.<sup>43</sup> Communications satellites were being pursued by AT&T and might have even achieved success earlier had there been less government involvement.<sup>44</sup> In all, Sputnik has been assigned significance far beyond what it truly deserves.<sup>45</sup>

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41. See Eugene M. Emme, ed., *The History of Rocket Technology: Essays on Research, Development, and Utility* (Detroit, MI: Wayne State University Press, 1964); Richard P. Hallion, "The Development of American Launch Vehicles Since 1945," in *Space Science Comes of Age: Perspectives in the History of the Space Sciences*, Paul A. Hanle and Von Del Chamberlain, ed. (Washington, DC: Smithsonian Institution Press, 1981), pp. 115–134; Roger D. Launius, "Between a Rocket and a Hard Place: The Challenge of Space Access," in *Space Policy in the 21st Century*, W. Henry Lambright, ed. (Baltimore, MD: Johns Hopkins University Press, 2002), pp. 15–54.
42. Three important books on the early satellite reconnaissance program have been published: Dwayne A. Day, John M. Logsdon, and Brian Latell, ed., *Eye in the Sky: The Story of the Corona Spy Satellite* (Washington, DC: Smithsonian Institution Press, 1998); Robert A. McDonald, *Corona Between the Sun and the Earth: The First NRO Reconnaissance Eye in Space* (Bethesda, MD: ASPRS Publications, 1997); Curtis Peebles, *The Corona Project: America's First Spy Satellites* (Annapolis, MD: Naval Institute Press, 1997). See also William E. Burrows, *Deep Black: Space Espionage and National Security* (New York: Random House, 1987); Jeffrey T. Richelson, *America's Secret Eyes in Space: The U.S. Keyhole Spy Satellite Program* (New York: Harper and Row, 1990).
43. The early history of this effort is well told in Homer E. Newell, *High Altitude Rocket Research* (New York: Academic Press, 1953); R. Cargill Hall, "Early U.S. Satellite Proposals," *Technology and Culture* 4 (Fall 1961): pp. 410–434; R. Cargill Hall, "Origins and Development of the Vanguard and Explorer Satellite Programs," *Airpower Historian* 11 (October 1964): pp. 101–112; R. Cargill Hall, *Lunar Impact: A History of Project Ranger* (Washington, DC: NASA SP 4210, 1977); David H. DeVorkin, *Science with a Vengeance: How the Military Created the US Space Sciences After World War II* (New York: Springer-Verlag, 1992).
44. This is the thesis of David J. Whalen, *The Origins of Satellite Communications, 1945–1965* (Washington, DC: Smithsonian Institution Press, 2002).
45. One could make the case that considerable resources were spent on useful activities such as science and technology, education, and retraining of workforces. Even so, some scholars minimize its long-term effect. See Herbert Kliebard, *The Struggle for the American Curriculum*, 2nd ed. (New York: Routledge, 1995); Andrew Fraknoi, "Space Science Education in the U.S.: The Good, the Bad, and the Ugly;" contained in this collection; "The Nationalization of U.S. Science," *Fortune* (September 1976): p. 158.

## Kennedy's Role

What about an event that is not considered a turning point in space history, but perhaps should be? The assassination of John F. Kennedy looms large in the history of the United States during the middle part of the twentieth century, no doubt, but what role did it play in the unfolding of the history of spaceflight? If Kennedy had not been assassinated, would anything relative to Apollo have changed? Few refer to this event as something of significance in the history of Apollo, but it may well be that Kennedy's death solidified support for the Moon landings. Despite public support for Apollo, we know that Kennedy had expressed concerns about the program and the funds that it sucked out of the treasury. In late May 1961, his budget director had warned JFK of the large price tag of Apollo and, when he met Nikita Khrushchev in Vienna the following month, Kennedy suggested that the United States and the Soviet Union explore the Moon as a joint project. The Soviet leader reportedly first said "No," then replied, "Why not?" and then changed his mind again, saying that disarmament was a prerequisite for U.S.-USSR cooperation in space.<sup>46</sup> In the fall of 1963, in what might be considered an American version of glasnost more than 20 years before the term became famous, JFK aggressively pursued a venture to turn the Apollo program into a joint effort. He privately met with NASA Administrator James Webb on 18 September and told him to prepare for a joint program. As Webb recalled, "He didn't ask me if he should do it; he told me he thought he should do it and wanted to do it and that he wanted some assurance from me as to whether he would be undercut at NASA." On 20 September 1963, Kennedy made a well-known speech before the United Nations, in which he again proposed a joint human mission to the Moon. He closed by urging, "Let us do the big things together." Publicly, the Soviet Union was noncommittal. *Pravda*, for example, dismissed the 1963 proposal as premature. Some have suggested that Khrushchev viewed the American offer as a ploy to open up Soviet society and compromise Soviet technology. Whatever the case Kennedy was assassinated in November, 1963 and Khrushchev was deposed the next year, and nothing came of the offer.<sup>47</sup> Thereafter Lyndon B. Johnson and NASA Administrator James E. Webb constantly defended the Apollo program as the dying wish of this slain president.

46. Dodd L. Harvey and Linda C. Ciccoritti, *U.S.-Soviet Cooperation in Space* (Miami, FL: University of Miami Center for Advanced International Studies, 1974), pp. 78–79. A State Department memo covering the two leaders' discussion in Vienna does not mention Khrushchev's fleeting acquiescence, instead focusing on Khrushchev's desire to have progress in disarmament before consenting to a joint lunar landing program. See 6/4/61 Memcon between JFK and Khrushchev, 6/4/61, Luncheon, Soviet Embassy, Vienna in the Kennedy Presidential Library, Box 126, NASA Historical Reference Collection.

47. *Public Papers of the Presidents of the United States, John F. Kennedy, 1963*, p. 695, cited in Harvey and Ciccoritti, *U.S.-Soviet Cooperation in Space*, p. 123; "Text of President Kennedy's Address on Peace Issues a U.N. General Assembly," *New York Times*, 21 September 1963: C6; Yuri Karash, "The Price of Rivalry in Space," *Baltimore Sun*, 19 July 1994: p. 11A; Walter A. McDougall, . . . *the Heavens and the Earth: A Political History of the Space Age* (New York: Basic Books, 1985), p. 395.

That was a very powerful argument to be made in the political arena and they achieved success in protecting the program, even as everything else at NASA began to suffer budget cuts from the mid-1960s onward.

Had Kennedy served two full terms, it is quite easy to envision a point in the mid-1960s, probably near the time that Project Gemini was successfully underway, in which he might have decided that the international situation that sparked announcement of a lunar landing by the “end of the decade” had passed and he could have safely turned off the landing clock. Had he done so, Apollo might have stretched out for many more years, and perhaps have ultimately been successful; but, just as likely, it could have become something akin to the current, open-ended Space Station program without clear objectives and no time frame for completion. JFK’s assassination, therefore, could be interpreted as a turning point in the history of spaceflight although it is not usually accepted as such.



Figure 2.2—The decision of John F. Kennedy to land Americans on the Moon by the end of the decade is viewed as a pivotal event in the history of the Space Age. But evidence suggests that he was reconsidering this decision at the time of his assassination in November 1963. Had his death not occurred and he been allowed to serve a full term or perhaps two terms in the White House, how might the Moon landing program have unfolded? Accordingly, the Kennedy assassination may be an unrecognized turning point in the history of the space program. Here Kennedy is depicted in a motorcade with Mercury astronaut John Glenn, the first American to orbit Earth in February 1962. (NASA photo no. GPN-2002-000050).

## Apollo

Finally, there are events that were hailed at the time as turning points in history and accepted as such by virtually everyone, but which now invite reconsideration. The most obvious that I would point to is the Apollo 11 landing on the Moon on 20 July 1969. Immediately thereafter, President Richard Nixon told an assembled audience that the dates encompassing the flight of Apollo 11 represented the most significant week in the history of Earth since the creation.<sup>48</sup> Perhaps he was caught up in the moment, but at least at that time the president expressed the view that this was both a path-breaking and permanent endeavor, a legacy of accomplishment that future generations would reflect upon as they plied intergalactic space and colonized planets throughout the galaxy. Undoubtedly, he believed it a turning point in history. Others did as well. Apollo suggested that America had both the capability and the wherewithal to accomplish truly astounding peaceful goals. All it needed was the will.<sup>49</sup>

Now, more than a generation removed from the last of the Apollo missions to visit the Moon in December 1972, that turning point appears far less significant than it did during the time of Apollo. Advocates of human exploration have tended to view the astronauts who landed on the Moon as people akin to fifteenth-century voyagers of discovery such as Christopher Columbus—the vanguards of sustained human exploration and migration. But as time progresses, those first space ventures may well prove to be more like Leif Erickson’s voyages from Scandinavia several hundred years earlier—an exploratory dead end.

## MAXIMS OF TURNING POINTS IN SPACE HISTORY

I would close this essay by offering 10 maxims for anyone considering the place of turning points in the history of spaceflight.<sup>50</sup>

1. Turning points signify a critical juncture in the coalescence of a set of events that signal a shift in the stream of history.
2. Turning points most often represent attempts by observers to assign significance to events, either at the time or thereafter. Depending on perspective, countervailing issues, and subsequent developments, they may shift or become meaningless or meaningful. They are also subject to “political spin” and the vicissitudes of the “master narrative.”

48. *CBS Evening News Transcript*, 10:56:20 PM EDT, 7/20/69 (New York: CBS News, 1969), p. 159.

49. *Congressional Quarterly* (25 July 1969): p. 1311; *The Futurist* (October 1969): p. 123. On the possibilities raised by Apollo, see Roger D. Launius, “Perfect Worlds, Perfect Societies: The Persistent Goal of Utopia in Human Spaceflight,” *Journal of the British Interplanetary Society* 56 (September/October 2003): pp. 338–349.

50. The following is based on the comments of Richard P. Hallion, “Turning Points in Aerospace History: Some Thoughts,” 16 August 2006, copy in possession of author.



Figure 2.3—Astronaut Buzz Aldrin, lunar module pilot of the first lunar landing mission, poses for a photograph beside the deployed United States flag during an Apollo 11 extravehicular activity (EVA) on the lunar surface. The first Moon landing is universally viewed as a pivotal event in history. With the passage of time, and the failure to continue lunar exploration beyond the Apollo program, it seems less a turning point and more a “blip” in the flow of history. How should it be interpreted in the future? (NASA photo no. GPN-2001-000012).

3. Turning points provide a short-hand of analysis that may be used effectively, but too often they mash hackneyed and amateurish analysis. They are like George W. Pierson’s characterization of the “Frontier Thesis” of Frederick Jackson Turner: “too optimistic, too romantic, too provincial, and too nationalistic” to be of great utility for the historian’s task.<sup>51</sup>
4. Turning points adhere to the standard of definition employed by Justice Potter Stewart when confronted with defining pornography: “I shall not today attempt further to define the kinds of material . . . but I know it when I see it.”<sup>52</sup> They defy definition, and one person’s turning point might conceivably be another person’s stasis. It might be appropriate to apply something like the Saffir-Simpson Hurricane Scale to identify importance and severity of turning points on a 1 to 5 scale.

51. Quoted in Richard Hofstadter, *The Progressive Historians: Turner, Beard, Parrington* (New York: Alfred A. Knopf, 1969), p. 149.

52. *Jacobellis v. Ohio*, 378 U.S. 184 (1964).

5. Turning points are often vague and imprecise. Their very elasticity offers a clue to their attraction as well as a core reason for using them with care. They may be invoked to argue for or against virtually anything, and accordingly they represent a form of historical mirage and incoherence.
6. Turning points of the most useful variety are those used in the most simple, concrete situations.
7. Turning points do not necessarily provide useful indicators of subsequent success or failure for the actors involved in their story.
8. Turning points most often signify a linear conception of history that rarely represents the reality of a complex, parallel, multicausal evolution of history.
9. Turning points are often psychological in focus, firing those experiencing them to undertake a different approach to what had previously been the norm. These are appropriately considered the fault lines in the stream of history. It might goad them to action, or it might lull them to complacency. It never fosters the status quo.
10. Turning points too often lead those invoking them into accepting a progressive interpretation of the past in which ideas of exceptionalism and advancement reign.<sup>53</sup>

This last maxim is especially significant. American history has been dominated by a vision of progress, of moving from nothing to something—essentially the opposite of the law of entropy in physics. As historian Richard P. Hallion recently remarked, repeated acceptance of the turning point concept

[ . . . ] implies a teleological, linear, sequential ‘achievement of events’ leading inexorably in a certain direction, usually defined as ‘progress.’ In fact, this ignores the inherently disordered nature of the historical progress, which reflects chance, national circumstance, individual action (and we must remember that, at heart, all history is the working of people through time), and which results in a typically simultaneous and parallel pattern of development, one in which exploitation and innovation is at least equally as important as invention.<sup>54</sup>

With the overburdening dominance of American exceptionalism as a guiding principle of American historiography, it behooves historians to weigh carefully the usefulness—versus the possible confusions—of the use of the term turning point in historical explanation. This is especially the case for space historians as we enter a season of significant anniversaries of major events in the history of the space age, such as the 2007 50th-anniversary of the launch of Sputnik 1.

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53. On American exceptionalism, see Kerwin Lee Klein, *Frontiers of Historical Imagination: Narrating the European Conquest of Native America, 1890–1990* (Berkeley, CA: University of California Press, 1997); Richard T. Hughes, *Myths America Lives By* (Urbana, IL: University of Illinois Press, 2003).

54. Hallion, “Turning Points in Aerospace History: Some Thoughts,” p. 4.

Or perhaps I am obsessing over this issue; Debbie Douglas has suggested to me that this might be the case. In a note, she suggested that we might consider several questions when thinking about turning points as we travel along the river that we call the history of the Space Age. I close with these questions about the study of space history, admitting that I have few answers and those that I do possess may be satisfactory only to myself. When considering the Space Age:

1. Is space a “major river” (e.g., the Mississippi, the Yangtze, or the Amazon) or something a little less (e.g., the Columbia or the Rhine)?
2. What are the things I need to “know before I go” and what are the “must sees” once I arrive?
3. How will I see and understand the world differently because of this “experience?”<sup>55</sup>

This last question stands at the center of the historical discipline. Our answers could have profound implications for those studying this subject.<sup>55</sup>

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55. Douglas e-mail to author, “Turning Points in History,” 16 August 2006.

