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THE APOLLO DECISION
AND ITS LESSONS FOR POLICY-MAKERS

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Introduction¹

The significance of the first manned voyage to the moon is likely to be debated for some time to come. To some observers, the lunar landing "marks the emergence of man from the confines of the earth, and can be compared with the original emergence of life from the primordial ocean; it sets a new stage for evolution."² To others, the lunar landing "will have a bad effect. It will give us the feeling, and the perfectly justified feeling, that our world has finally closed in. This is forever the end of the mortal frontier."³

Whatever the resolution of this debate (and the outcome will obviously take decades, even centuries), one persistent theme has run through almost every commentary on the first lunar landing. "The basic contribution that the moon mission has made is in establishing the simple fact that national goals can be reached and commitments kept of the most monumental kind--where there is a will to do so,"⁴ wrote one journalist. Two others

¹This paper is extracted almost entirely from my forthcoming book The Moon Decision: Project Apollo and the National Interest (Cambridge: The M.I.T. Press, 1970, in press).

²J.G. Crowther, "Beyond the Pillars of Hercules," New Scientist, July 17, 1969, p. 144.

³C.P. Snow, "The Moon Landing," Look, August 26, 1969, p. 68.

⁴James Clayton in the Washington Post, July 25, 1969, p. A26.

suggested that "the greatest by-product--perhaps the primary value--of the manned flight to the moon is moral and mental stimulus. It's evidence that anything man can think of he can do." ⁵ A distinguished New York Times columnist concluded that what "set the moon program apart from all other national efforts of the post-war era, what finally assured its success, was concentration of effort and control . . . If the same concentration of effort and control were applied to some useful earthly project, a similar success might be obtained."⁶

The assumptions underlying statements like these go to the core of Western liberal philosophy. That man can do whatever he chooses, given only the will to do it and the techniques required, is a belief which reflects motivations and characteristics basic to Western and especially to American civilization--a will to action, confidence in man's mastery over nature, a sense of mission.⁷ The Promethean achievement of Apollo 11 will be cited as validating these assumptions for some time to come.

If this is so, then an understanding of how the decision to go to the moon was made, and why it was made, is part of the understanding of the strength of Western political and social institutions. By discovering how the United States decided to do this remarkable and ultimately very human thing, we may be able to find the key to how other such enterprises can be begun and successfully sustained.

⁵Peter and Roscoe Drummond in the Houston Chronicle, July 21, 1969, p. 6.

⁶Tom Wicker in the New York Times, July 22, 1969, p. 32.

⁷Theodore Geiger, The Conflicted Relationship: The West and the Transformation of Asia, Africa, and Latin America (New York: McGraw-Hill, for the Council on Foreign Relations, 1967), Chapter ii.

Or perhaps we will find that the lunar landing decision was a unique occurrence, a once-in-a-generation phenomenon in which a heterogeneous mixture of factors almost coincidentally converged to create a national commitment and enough momentum to support that commitment through to its fulfillment. If this should turn out to be the case, then an analysis of the lunar landing decision would be interesting as history, but of little positive value in understanding how to set other national goals and to initiate programs aimed at achieving them. Such an analysis, of course, would have the negative value of highlighting the limitations on the belief that "anything man can think of he can do."

Leaders of nation-states set goals and choose policies to implement those goals because they decide that such goals and policies are in the national interest. This statement is almost tautological. It suggests that the national interest is nothing more than what the leaders of a nation say it is. In a sense this is true, for there is no other way to give operational content to the concept of national interest than to define it in terms of what those charged with governing a state conceive it to be. But this does not necessarily mean that the national interest is only the sum of the particular interests of a group of decision-makers; decision-makers are also members of the society they govern, and through them the values and aspirations characteristic of that society can find expression in state action.

To understand the way in which a manned lunar landing before 1970 was set as a national goal requires an understanding of the specific conception of the American national interest which impelled President John F.

Kennedy to select that goal. This concept arose, first of all, out of a political process extending from the beginning of the Space Age in 1957 to May 1961. This paper contains a short history of that process. The lunar landing decision was a dramatic manifestation of a more basic decision by Kennedy to reverse the existing national space policy developed early in that period while Dwight Eisenhower was President. It was made in the crisis atmosphere that followed the first successful manned space flight by Soviet cosmonaut Yuri Gagarin and the American failure at the Bay of Pigs.

However, the national interest is also based on notions transcending the outcome of a particular political process. This paper also examines the lasting content of the concept of American national interest which was the basis of Kennedy's decision. The security of the United States, its institutions, and its culture were elements here, but factors beyond security were involved. These included an almost Messianic, expansive drive, one resulting in a sense of destiny and mission which has for a long time been part of the American world view. This definition of the American national interest is also at the basis of such national undertakings as the Vietnamese war, and thus this paper can be placed in the context of the ongoing examination of and debate over an appropriate American national purpose in world politics.⁸

⁸This paper does not evaluate the values underlying this concept of the American national interest. Such an evaluation is another, perhaps more basic, task in understanding the nature of American society and its political system. The purpose of this paper is limited to providing an empirical description and analysis of this concept.

Once the process by which the lunar landing decision was made has been sketched and the American aspirations underlying that decision identified, it may be possible to isolate the circumstances in which this nation and its leaders can undertake other such "great new American enterprises." The final section of this paper contains some suggestions in this direction.

How the Decision was Made⁹

The early months of 1961 were sobering for the new administration of President John F. Kennedy. Kennedy and his associates came to Washington pledged to get the country moving after eight years of the Eisenhower presidency, but they seemed unable to make any substantial changes in government structures or activities. Late in March, after a month of intense deliberations, President Kennedy almost had decided to send American troops to fight the Communists in Laos; he rejected intervention only after learning that 60,000 troops would be needed. In Congress the ambitious New Frontier legislative program seemed bogged down.

Early on the morning of April 12, even more galling news reached the White House. It was not unexpected. When Kennedy went to bed on the 11th his science adviser, Jerome Wiesner, told him that the Soviet Union would probably attempt to launch a man into space the next day. Wiesner was right; before dawn in Washington, the Soviets announced that astronaut Yuri Gagarin

⁹This condensed narrative of the decision was originally published in the Long Island daily newspaper, Newsday, July 17, 1969.

had successfully orbited the earth in his Vostok spaceship. The Russians, first to launch a satellite in 1957, now had become the first nation to achieve manned space flight.

The Soviet Union was quick to capitalize on the propaganda significance of Gagarin's flight. Nikita Krushchev, talking to Gagarin while he was still in orbit, boasted, "Let the capitalist countries catch up with our country!" The Communist Central Committee claimed that the flight "embodied the genius of the Soviet people and the powerful force of socialism."

Self-congratulation was not particularly necessary. The world was almost unanimous in admiration. Even the Vatican newspaper called the flight "a universal good."

Within a few hours, questioning and criticism began. Rep. Victor Anfuso (D-Brooklyn) called for a full-scale congressional investigation and suggested that the U.S. be "mobilized to a wartime basis" in order to beat the Soviets to the moon. A Washington newspaper called the Gagarin flight "a psychological victory of the first magnitude for the Soviet Union." Kennedy told a late-afternoon press conference April 12 that "no one is more tired than I am" of being second to the Soviets in space, but that he hoped to find "other areas where we can be first and which will bring more long-range benefits to mankind."

However much Kennedy might have wanted to find some other arena of competition, within a few days he became convinced that the U.S. had to enter the space race in earnest. Wiesner remembers that "we talked a lot about whether we had to do this. He said to me, 'If you had a scientific

spectacular on this earth that would be more useful or something that is just as dramatic and convincing as space, then we would do it.' " But, says Wiesner, Kennedy "became convinced that space was the symbol of the 20th Century. It was a decision he made cold-bloodedly. He thought it was right for the country."¹⁰

On the evening of April 14, Kennedy called a meeting to learn how to win the space race. Assembled in the cabinet room were Wiesner; Kennedy's closest aide, Ted Sorenson; Budget Director David Bell; NASA Administrator James E. Webb; and his deputy, Hugh Dryden. Kennedy wanted to know, "Is there any place we can catch them?" He got no clear answer. Dryden suggested a crash lunar landing program, but Webb and Wiesner were cautious, and Bell warned that the cost of such an undertaking could exceed \$40 billion. At the end of the meeting Kennedy thought aloud: "When we know more, I can decide if it is worth it or not. If somebody can just tell me how to catch up." Then he turned to the others, adding, "There is nothing more important."¹¹

Kennedy's willingness to respond to the Soviet challenge was predictable, given the new President's views on the nature of his job and of the international and domestic political setting in which the challenge was placed. He believed in an activist presidency and thought that he could couple his own forceful personality to the inherent power of the office in order to move the nation in the direction he chose. Kennedy, of course, came from a fiercely competitive family, and he was not accustomed to avoiding challenges.

¹⁰ My interview with Jerome B. Wiesner, Cambridge, Massachusetts, September 11, 1967.

¹¹ Hugh Sidey, John F. Kennedy, President (New York: Atheneum Press, 1964), p. 122.

He held to the prevailing anti-Communist view of American foreign policy, one which saw the Soviet Union as a real threat to American security and to a democratic way of life. And Kennedy was an expert politician. He could sense public sentiment on an issue, and Ted Sorenson says that "the Gagarin flight and the reaction to it around the world and in this country and in Congress demonstrated to the President the importance of going ahead with an all-out space effort and the willingness of the country and the Congress to back such an effort."¹²

Sorenson also suggests that Kennedy had both "affirmative and negative" reasons for choosing to accelerate the space program. They were "affirmative in the sense that the United States intended to maintain its position of world leadership, its position of eminence in commerce, in science, in foreign policy and in whatever else might develop from space exploration," Sorenson said. "The negative side was that we did not want to have the Soviets dominating space to a point where, at some future time, it could be a military threat to our security."¹³ Wiesner says Kennedy was concerned with the feeling that "the rest of the world had been led to believe by Soviet space accomplishments, and particularly by the U.S. reaction to them, that the scientifically and technologically most competent nation now was the Soviet Union, not the United States. We were paying a price all kinds of ways--internationally, politically--and that was the issue the President was dealing with. Not was it time to go to the moon, but how could you get yourself out of this?"¹⁴

¹²My interview with Theodore C. Sorenson, New York, October 5, 1967.

¹³Ibid.

¹⁴Wiesner interview.

Then came the Bay of Pigs. On April 17 United States-trained Cuban refugees attempted to invade Cuba and overthrow the Castro government. By the 19th Castro had crushed the invasion as the United States stood by, unwilling to intervene on behalf of its protégés. Pierre Salinger, Kennedy's press secretary, described these three days as the "grimmiest" of Kennedy's time in the White House.

How much Kennedy's state of mind resulting from the Cuban fiasco influenced or reinforced his resolve to proceed rapidly in space is not completely clear. The Bay of Pigs was never explicitly linked to changes in the space program during any of the meetings on space held at this time. But Wiesner says of the Bay of Pigs, "I don't think anyone can measure it, but I am sure it had an impact. I think the President felt some pressure to get something else in the foreground. It wasn't his primary motivation, but I think the Bay of Pigs put him into a mood to run harder than he might have."¹⁵ Sorenson says that Kennedy's attitude was influenced by the fact that "the Soviets had gained tremendous worldwide prestige from the Gagarin flight at the same time we had suffered a loss of prestige from the Bay of Pigs. It pointed up the fact that prestige was a real, and not simply a public relations, factor in world affairs."¹⁶ McGeorge Bundy adds that "It is quite possible that, if the Bay of Pigs had been a resounding success, the President might have dawdled a little longer on the space decision."¹⁷

¹⁵ Ibid.

¹⁶ Sorenson interview.

¹⁷ My interview with McGeorge Bundy, New York, October 4, 1967.

Even though Kennedy seems to have decided as early as April 14 that he would approve an accelerated space program aimed at winning some firsts in the space race, he knew very little of the details of the space program. Kennedy needed more information before he could make a definitive decision. The day after the Bay of Pigs invasion collapsed, he acted to get that information.

Kennedy's Vice President, Lyndon Johnson, did know a great deal about the space program. On the night that Sputnik I went into orbit in 1957, Johnson had set the wheels moving to begin a congressional investigation of America's missile and space program by a subcommittee on preparedness that he chaired. He was the chief congressional architect of the bill establishing NASA in 1958. Then he became the chairman of the Senate Aeronautical and Space Sciences Committee. After the 1960 election, Kennedy named Johnson to head the National Aeronautics and Space Council, the President's advisory body for space policy.

On April 20 Kennedy asked Johnson, as chairman of the Space Council, to make "an overall survey of where we stand in space" and especially to get the information the President needed: "Do we have a chance of beating the Soviets by putting a laboratory in space, or by a trip around the moon, or by a rocket to land on the moon, or by a rocket to go to the moon and back with a man? Is there any other space program which promises dramatic results in which we could win?"¹⁸

For the three years since Sputnik, Johnson had been an advocate of a more aggressive, politically-oriented space program. He knew those in and

¹⁸ Memorandum from John F. Kennedy to Lyndon B. Johnson, April 20, 1961.

out of government who shared his views well. While Dwight Eisenhower was President, they had been unable to gain approval for space projects as ambitious as they thought were needed. After Sputnik the Eisenhower administration adopted a conservative space policy and stuck to that policy through the rest of Ike's second term. The policy ruled out a space race between the U.S. and the U.S.S.R. Now Kennedy had decided to reverse the Eisenhower policy, to enter the space race, and to approve space projects justified in political terms. Johnson called on his fellow space enthusiasts to help him prepare a new space program.

Given the presidential directive, Johnson quickly organized a series of meetings. It did not take long to find that there was a consensus on the project that gave the best chance of a U.S. first. Johnson's top staff assistant for space was Edward Welsh, who remembers that "running through the discussions was the theme, could we go to the moon, should we if we could, how much would it cost, what else did we need to do if we decided to go?"¹⁹ Answers to these questions were available, for much thought had already been given to the feasibility of a manned lunar landing program.

Both the Air Force and the Army had developed plans for an ambitious military space program in the post-Sputnik rivalry for control of the nation's space efforts. Each of these programs had featured a manned lunar landing as a goal; the services had thus developed detailed analyses of what such an undertaking would require. One Army plan, prepared by Wernher von Braun's

¹⁹ Quoted in Edwin Diamond, The Rise and Fall of the Space Age (Garden City, New Jersey: Doubleday and Company, 1964), p. 34.

team of German rocket experts (who worked under Army direction until 1959), called for establishing a 12-man lunar outpost by the end of 1966.

In 1959 NASA planners also had chosen a lunar landing as the most valid technological goal of an advanced manned space flight program. Throughout 1959 and 1960, they studied ways of accomplishing this feat. By 1960 their planning was advanced enough for NASA's leaders to give the project a name--Apollo--and to ask for White House permission to begin building a spacecraft for the initial steps toward a lunar landing: long-duration flight in earth orbit and flight around the moon.

President Eisenhower refused to approve this request. He believed that allocating the funds needed for such projects was not justified. His science advisers told him that the cost of a lunar landing would run from \$34 to \$46 billion, and that this much money for space would not produce enough scientific knowledge to justify that great an investment of funds. In December, just before leaving office, Eisenhower told NASA that he would not approve any project aimed at a lunar landing.

NASA did not abandon its plans; a new President would soon be in office. Meanwhile, a task force chaired by George Low (who in December 1969 became Deputy Administrator of NASA) made a quick but thorough assessment of all available material related to the lunar landing project. By the end of February Low's group concluded that a lunar landing by 1967 was feasible. In late March NASA asked President Kennedy to approve Project Apollo plans, but he deferred his decision. NASA had yet to launch a man into space, and the President preferred to wait for a few successful flights in Project Mercury before committing himself to a second-generation manned flight program.

The events of April altered the political climate, and Kennedy no longer was willing to wait. The planning that NASA had already done, which had convinced the agency's officials that a manned lunar landing was a technologically and scientifically worthwhile goal, now was to be the basis for a decision to use the space program as an instrument of American national strategy. On April 22 Webb told Johnson that "there is a chance for the U.S. to be the first to land a man on the moon and return him to earth if a determined national effort is made. A possible target date for a manned lunar landing is 1967."²⁰

Two days later Johnson consulted space experts from the Air Force and Navy and others whose judgment he trusted. Among those Johnson consulted, there was unanimous agreement that the lunar landing objective made sense. Wernher von Braun told the Vice President that the U.S. had "an excellent chance of beating the Soviets to the first landing of a crew on the moon." He believed that "a performance jump by a factor of 10 over their present rockets is necessary to accomplish this feat" and "therefore, we would not have to enter the race toward this obvious next goal in space exploration against hopeless odds favoring the Soviets." Von Braun thought that "with an all-out crash program" the U.S. could achieve a lunar landing by 1967 or 1968.²¹

The next week was spent gaining assurances that the accelerated program would receive congressional support. Finally, on Friday, May 5, Johnson asked

²⁰Memorandum from NASA to Vice President Lyndon B. Johnson, April 22, 1961.

²¹Memorandum from Wernher von Braun to Vice President Lyndon B. Johnson, April 29, 1961.

NASA and the Department of Defense to meet over the weekend to prepare a detailed set of recommendations incorporating the results of his consultations. Johnson wanted to present these to the President the following Monday before leaving on a two-week tour of Asia. That same Friday, Alan Shepard completed a 15-minute suborbital flight, thus becoming the first American in space. A wave of national relief and pride over this American success swept the country, removing whatever obstacles may have remained in the path of Kennedy's space decision.

Webb, Secretary of Defense McNamara, and their staffs met at the Pentagon May 6. After an all-day session, they concluded that the manned lunar landing project did indeed provide the best chance of beating the Soviets to a spectacular space first. They thought that this project should be made a national goal in order to have both the international and domestic impact desired. A memorandum incorporating this recommendation and others concerned with every aspect of the space program was prepared the following day and given to the Vice President at noon Monday. Johnson approved the memorandum and gave it to Kennedy later that afternoon. Kennedy ratified the new space program without changing anything.

On May 25 Kennedy announced his decision to a joint session of Congress in a speech labeled "Urgent National Needs." He said that:

Now is the time to take longer strides--time for a great new American enterprise--time for this nation to take a clearly leading role in space achievement, which in many ways may hold the key to our future on earth.

I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to earth.

I believe we should go to the moon.

Space and the National Interest

John Kennedy made the lunar landing decision because his definition of the national interest led him to conclude, under the stimulus of the Gagarin flight, that a prestige-oriented space program was an appropriate, even though very costly, instrument of American foreign policy. Kennedy's view of the national interest included the general notion that the United States should be superior in power to any other nation; in the context of 1961, this meant especially superior in power to the Soviet Union.

One element in the lunar landing decision was therefore straightforward balance-of-power politics. Since World War II, "a supreme purpose of American power in world politics" has been "destroying, transforming, or at least containing Soviet strength."²² The policy derived from this purpose is containment, which in its original formulation postulated that "Soviet pressure against the free institutions of the Western world is something that can be contained by the adroit and vigilant application of counter-force at a series of constantly shifting geographical and political points . . ."²³ The notion that the United States should enter a contest with the Soviet Union for the prestige accruing from space success was based on the rationale that this prestige was an element in the Cold War competition for national power and international influence. Such a competition was, from the U.S. point of view, part of an effort to contain the expansion of Soviet power.

²² Paul Seabury, Power, Freedom, and Diplomacy (New York: Random House, 1963), p. 357.

²³ George Kennan, American Diplomacy: 1900-1950 (New York: New American Library, 1952), p. 99.

The choice of space technology as an instrument of America's global strategy was also a reflection of the American national style. Stanley Hoffmann has defined national style as the "common features displayed by policy-makers and interested elites,"²⁴ features which become evident in responses to crises. In these situations, says Hoffmann:

What is action and what is reaction, what is spontaneous reflex and what is rational response to external pressures are never really separable . . . However, the tensions manifest when an individual or a nation is forced to absorb and adjust to unwelcome necessities, the joys and hopes (and boasts) displayed when a challenge is precisely of the kind which the person or country is best equipped to handle, . . . all the perceptions and responses to the outside world are very much the "stuff" of the national style. ²⁵

America's national style is based on an "experience, from the Puritans to the space age" which has primarily been one of mastery over nature. "The kind of contest for the mastery of man characteristic of other societies has not been a permanent or dominant feature of American life." This experience, in which American energies were aimed not at control of men but at control of nature, might be characterized as "a pure triumph of technology."²⁶ For this reason, concludes Hoffmann, "the basic elements of the American style . . . give an eminent position and legitimacy to technological anti-communism."²⁷ The lunar landing program, aimed at beating

²⁴ Stanley Hoffmann, Gulliver's Troubles or the Setting of American Foreign Policy (New York: McGraw-Hill for the Council on Foreign Relations, 1968), p. 88.

²⁵ Ibid., p. 90.

²⁶ Ibid., p. 147.

²⁷ Ibid., p. 93.

the Soviets to the moon, is perhaps an ultimate expression of "technological anti-communism," in which the competition is conducted in terms of which way of life can best master nature, not control men.

There is another sense in which the use of space technology as an instrument of national strategy reflected particularly American characteristics. For America, science and technology have become "the enterprise of the nation." Since World War II, the United States has "placed itself at the head of the scientific competition of nations. More than twenty years of history already forbid it to lose that place." This enterprise "is indissolubly linked to the goals of American society, which is trying to build its future on the progress of science and technology." Thus "scientific and technological research appears as the main way of access to this future in which the drive and the ambitions shown by a whole nation will be expressed."²⁸

The drives and ambitions of the American nation were reflected in the lunar landing decision not only by the choice of technological means to achieve a national goal, but also by the goal itself. For there was more involved in the lunar landing decision than balance of power politics in the Realpolitik mode. The definition of the American national interest which guided Kennedy's actions was not limited to maintaining a Eurasian balance of power which would guarantee America's physical security. By 1961, already, the thermonuclear "balance of terror" had created a situation in which the physical security of the United States was no longer dependent

²⁸ Organization for Economic Cooperation and Development, Reviews of National Science Policy: The United States (Paris: OECD, 1968), pp. 346-47.

"on time-honored calculations of a balance of power."²⁹ There was clear realization that a lunar landing program would not contribute directly or significantly to the nation's military defense; the reasons for enhancing national prestige were political, not military. These reasons implied goals for American foreign policy beyond physical security, goals reflected in a peculiarly American concept of national interest.

The concept of the American national interest which Kennedy held included "protecting not only the nation's territory but also its basic values as a society . . ."³⁰ From this definition followed the conclusion that not only was it in the American interest to prevent, using the techniques of the balance of power, the formation of a militarily superior Eurasian coalition, but also that it was "equally in the American interest that the societies of Eurasia develop along lines broadly consistent with the nation's own ideology; for under modern conditions it is difficult to envisage the survival of a democratic American society as an island in a totalitarian sea."³¹ This definition of American national interest resulted in American security being identified not only with protection from external attack, but with "a purpose or mission that encompasses all humanity, a purpose that gives to the nation's existence, hence its security, a potentially limitless dimension."³²

²⁹ Robert W. Tucker, Nation or Empire? The Debate Over American Foreign Policy (Baltimore: The Johns Hopkins Press, 1968), p. 33.

³⁰ Walt W. Rostow, The United States in the World Arena: An Essay in Recent History (New York: Harper & Row, 1960), p. 544.

³¹ Ibid.

³² Tucker, p. 37.

What Kennedy sought in deciding as he did was to maintain American preeminence in all aspects of national power; this quest for preeminence followed logically from his definition of national interest. Thus, in the last analysis, understanding the lunar landing decision requires one to realize that it reflected a conception of America's interests which assigns primacy to foreign over domestic goals, and that the foreign policy goals included not just protection from external attack, or close relationships with other nations with complementary cultures or interests, but rather extended to an expansive American mission of spreading its way of life to all corners of the globe.

The many criticisms of the lunar landing decision which suggest that the resources which have been allocated to manned space flight could better have been used for other national purposes can be evaluated in light of this conclusion. Such criticisms result in dramatic statements like Warren Weaver's listing of what could be accomplished by the \$30 billion he estimated the lunar landing program would cost: (1) give every teacher in the United States a ten percent raise each year for two years; (2) endow 200 colleges with \$10 million each; (3) finance the education of 50,000 scientists through college and graduate school at \$4,000 per year; (4) build ten new medical schools at \$200 million each; (5) build and endow complete universities for the fifty-three countries added to the United Nations between 1945 and 1962; and (6) create three new Rockefeller Foundations worth \$500 million each.³³ More restrained is Alvin Weinberg's opposition

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Warren Weaver, "What a Moon Ticket Will Buy," Saturday Review of Literature, August 4, 1962, pp. 38-39.

to the lunar program because of what he judges to be its "remoteness from human affairs."³⁴

The easy response to these criticisms is to divert attention from the space program by pointing out the immense amounts spent on alcohol, cigarettes, some other luxury, or especially on national defense, and then asking whether these expenditures are not better sources of resources for added social and economic welfare spending. But this response, it seems to me, begs the question, and I believe a more adequate response exists.

One needs to ask here: "What human affairs are in fact remote from spending on the moon program?" Weinberg assumes that they are those so dramatically spelled out by Weaver: education, science, health, economic development, and the like. But certainly these do not constitute the totality of the concerns of man and his state. The Weaver-Weinberg criticisms imply that U.S. domestic goals should have priority over external goals, or at least those external goals beyond the basic one of providing for national security. Once this premise is understood, the debate over the wisdom of the lunar landing decision rises to a broader level of generality, for the decision, as I have just suggested, emerged from priorities assigning higher importance in the American decision-making process to the broad foreign policy goal of global preeminence than to the domestic goal of improving the quality of our national life. These priorities derive from an expansive concept of American national interest in which American

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Alvin K. Weinberg, "Criteria for Scientific Choice," in Sanford A. Lakoff, ed., Knowledge and Power: Essays on Science and Government (New York: The Free Press, 1966), p. 417.

security becomes synonymous with a particular conception of world order and which implies a mission involving the use of all national resources necessary to ensure that this form of world order is attained. The issue then becomes whether this is an appropriate purpose for the American nation.

Criticism of the lunar landing decision was relatively muted in 1961 and 1962; only in 1963 did such criticism take on nation-wide dimensions, occupy the attention of the mass media, and surface on the floors of Congress. This criticism may have been the first manifestation of a great debate over national priorities which is still going on and which, since 1965, has centered on the issues of the Vietnam war and continued investment in military technology.

The ongoing debate over existing national priorities is a real debate because there are cogent arguments on many sides. The stimulus to the debate, and the reason why it did not begin until 1963, was probably the 1962 Cuban missile crisis, which dramatized the inherent dangers of an expansive foreign policy in the thermonuclear era. The "long, hot summers" of racial discontent the nation has experienced in the mid-1960s have made equally dramatic the need for increased attention to America's domestic problems. The debate has lasted until now because the conception of American national interest which gives priority to foreign policy goals is not just a product of the Cold War, but rather has deep roots in the American experience and mentality. To suggest that these priorities are wrong and should be changed is to go against a great amount of societal inertia, at least, and perhaps also societal wisdom.

Yet the critics of our current national priorities may well be correct, for it appears that, in the contemporary world, following these priorities will require more Vietnam-like interventions in the affairs of other societies and continued investments in maintaining superior military forces in order that the kind of world order defined as necessary for America's purpose be at all possible. Such interventions and continued military spending, however, may undermine the way of life they seek to preserve and spread, if the Vietnamese experience is any lesson for the future.

There is a crucial difference between the Vietnamese intervention and continued buildup of military force on one hand, and the lunar landing decision on the other. All three derive from the same conception of American national interest, but the two military means of achieving that interest go against our traditional distaste for the use of force in foreign relations. The choice of space competition as an arena for demonstrating American power is a characteristic manifestation of the American national style. For most of our national history, we have attempted to spread our way of life by demonstrating the economic and social success it has produced. Only after World War II was this technique of our foreign policy replaced by primary dependence on the use of military power to achieve our national objectives in world politics. Part of the current national debate involves questioning the continued relevance of military means as instruments of national power in an international political system where the thermonuclear balance of terror makes the use of nuclear weapons irrational and where the techniques of insurgency movements makes the attempts to use military means of halting them seem like falling into a pool of quicksand.

By contrast, the decision to send men to the moon was a return to the earlier technique of demonstrating the continued dynamism and power of American society through example, not coercion. In a world in which economic and social change increasingly results from scientific and technological developments, such a demonstration of the superiority of American technology and the ability to use that superiority to achieve an announced national goal is likely to have significant international political effects. For

it is corollary that any nation with the power to . . . undertake voyages to the moon must have the power to do much more. Any nation with this kind of wealth to devote to such adventures must have even greater surpluses available for even more basic investments. Any nation capable of harnessing its industrial, scientific and technological talents on so vast a scale for so long a time must surely be capable of harnessing these means and the necessary public consensus to the solutions of problems even more challenging, problems even more important to the welfare of our society and of the future world.³⁵

In the final account, critics of the social utility of the lunar landing decision are really calling for a different kind of world and a different kind of America, ones in which the "necessary public consensus" to support enterprises of the scope of the lunar landing program is available to support other large-scale undertakings. If this should occur, the experience of the nation in choosing a difficult goal and in mobilizing the resources to accomplish it may well be relevant.

³⁵ John Rubel, "Advanced Space Technology and the Future Political Economy," in Impact of Space Exploration on Society, ed. by W.E. Frye (Washington, D.C.: American Astronautical Society, 1966), p. 363.

The Lessons of Apollo

James Reston has suggested that "one of the lessons of the . . . voyage to the moon is that the American mind and the American political system seem to need great challenges and clear goals to work at their best." Reston suggests that "the moon project may have given us the key" to solving other national problems, because it had "imagination, it mobilized intelligence. It had a specific goal within a specific time . . . The whole idea of America was to create a society nobody had ever created before, and it could be that the moon-men, with their concentration, purpose, and timetable have shown us the way."³⁶

To evaluate this suggestion requires deciding whether the way in which Project Apollo was conceived and initiated has any relevance to an understanding of how other such large-scale undertakings can be begun and successfully sustained. There has been, in the wake of the Apollo 11 mission, a plethora of discussion about using for other purposes the techniques for organizing and directing "the massed endeavors of scores of thousands of minds in a close-knit, mutually enhanceive combination of government, university, and private industry," techniques which some suggest constitute "potentially the most powerful tool in man's history."³⁷ Before such a transfer of techniques can be effected, a decision on whether they can be used, and for what purposes, must be made. This analysis of

³⁶ James Reston in the New York Times, July 18, 1969, p. 30.

³⁷ Tom Alexander, "The Unexpected Payoff of Project Apollo," Fortune, July, 1969, p. 114.

the lunar landing decision indicates conditions under which such a decision is possible, if that decision is to initiate an undertaking which has a high chance of being successful.

One important element of the legitimacy of a government is its record of success in achieving objectives to which it becomes committed. In selecting specific objectives for governmental action (as opposed to enunciating very broad goals such as racial equality or world peace), political leaders must be concerned about the likelihood of their being successful in the actions they initiate. In the case of the lunar landing decision, this type of consideration was of central importance to those considering possible new programs in space. After President Kennedy had first tentatively decided that the United States should enter a space race with the Soviet Union with the aim of coming out ahead, his next concern was whether such an outcome was feasible. He asked Vice President Johnson to find a space program "which promises dramatic results in which we could win." Johnson's consultations with space experts established that a project aimed at a manned lunar landing was technologically feasible. No "technological breakthroughs" were required for its accomplishment; what was needed was an extension of the basic technological capabilities already under development or study in 1961.

When Kennedy asked whether there was a feasible way of winning the space race, he could expect an answer with a high probability of its being correct. This was because he was dealing with an engineering problem, the question of whether a particular technological feat could be accomplished. If Kennedy had asked whether something that involved control over human behavior, rather than control over things, could be accomplished, he would

likely not have been able to get nearly as precise an answer. He thus would have had to run much more of a risk of failure in committing his administration and the United States to accomplishing this "softer" kind of objective than he did in committing himself to the lunar landing goal.

This suggests that "Apollo-like" undertakings, ones committing the nation to achieving a challenging objective on a specific timetable, should be begun only when the feasibility of the objective sought can be determined with some degree of confidence at the time the decision to seek it is made.

Obviously, the kinds of undertakings most susceptible to this type of judgment are technological, i.e., ones in which the basic principles upon which action is to be based are established and the problem is applying these principles to specific ends. This need not be a severely limiting qualification. Alvin Weinberg agrees that "many problems that are traditionally viewed as being primarily social possess stronger technological components than one at first suspects. They therefore may admit to technological palliatives, or even 'fixes,' which hopefully can buy the time necessary to get at the cause of the social problem."³⁸ Among the candidates that Weinberg lists for such "technological fixes" are many of the "great and pressing questions, upon whose resolution the future stability of our society depends . . .," such as poverty, all-out war, air pollution, water supply, food, population control, and transportation.³⁹ I would add

³⁸ Alvin M. Weinberg, "Social Problems and National Socio-Technical Institutes," in U.S., Congress, House, Committee on Science and Astronautics, Applied Science and Technological Progress (Washington: U.S. Government Printing Office, 1967), p. 416.

³⁹ Ibid., pp. 416-27.

to the list aspects of health, education, and housing. Solutions to these problems involve breaking them down into identifiable and feasible tasks, and deciding to allocate the resources needed to accomplish them. But the basic requirement for such a decision is the knowledge that these tasks are feasible.

This raises a further point. How is it possible to know whether in fact a particular technological task can be done successfully? At what point and on what basis can the government commit resources to a specific project?

The post-World-War-II response of the American government to these questions has been continuing investment of significant national resources in supporting scientific research and preliminary development. This investment has been justified on the basis of a number of rationales, but a primary justification has been the "utility of basic research as the foundation of all technological development."⁴⁰ The leaders of American politics have realized that many of the activities which the government undertakes cannot be sustained in the contemporary world without a healthy basic science base upon which to draw. This has of course been particularly so for national defense purposes, but also holds true for other aspects of government activity. The lunar landing decision could be made in 1961 because for several years previously space scientists and engineers in government service, in universities, and in industry had been examining the problems of such an undertaking, had isolated the areas in which further research

⁴⁰ Michael D. Reagan, Science and the Federal Patron (New York: Oxford University Press, 1969), p. 36. Reagan discusses the various criteria advanced for federal support of science in pp. 34-70 of his book.

was required, and had done enough exploratory work to conclude that there were no knowledge barriers to carrying out a lunar mission.

Similar reservoirs of knowledge exist, largely as a result of continued governmental support, in other areas of potential governmental action. This is especially true with respect to the "harder" physical sciences and life sciences, but is also coming to be so with respect to many of the social sciences. A recent report recommended that the government increase its support of behavioral science research in order that "the knowledge and methods of the behavioral sciences, devoted as they are to an understanding of human behavior and social institutions" can be applied "as effectively as possible to the programs and policy process of the federal government."⁴¹ If such an investment were to prove successful, then the level of confidence in decisions involving "social engineering" might be raised nearer to that involved in non-human engineering operations.

"Apollo-like" decisions are thus in the first account likely to be feasible only when those making the decision can confidently expect success in its outcome. This qualification eliminates a wide variety of undertakings. For example, the United States has found that, at least in Viet Nam, it does not know how to achieve the outcome it desires in an insurgency situation. The elimination of racial prejudice, as deeply-seated in human emotions as it is, is another unlikely candidate for a "technological fix." So is the

⁴¹National Academy of Sciences, Advisory Committee on Government Programs in the Behavioral Sciences, The Behavioral Sciences and the Federal Government (Washington: National Academy of Sciences, 1968), p. 17.

replacement of the nation-state by some other form of political organization. Other examples could be added to this list, but these should suffice to make my point, that the "Apollo approach" will not work when the end desired requires significant changes in deep-seated behavior patterns.

The range of undertakings which are susceptible to engineering solutions remains, however, certainly wide enough to absorb the energies and resources of the United States. Finding objectives with high social utility which can be achieved by a specific time using technologies, either physical or social, which are based on existing knowledge is not difficult. What is difficult is creating a base within the political system which makes it possible for the system's leaders, while they are considering whether or not to act, to determine if they can obtain and keep the support necessary for a given program to be accomplished.

To create such a base within the American political system is an exceedingly difficult task. Because of the pluralism of American society and of its republican political institutions, it involves combining and keeping together individuals and groups with a wide variety of interests and perspectives. Without assurance that such a combination can be created, political leaders will hesitate to make a long-range but specific commitment, even though they have identified a desirable and feasible objective. A corresponding strength of our system is that such a base of support, made up as it is of diverse elements, provides a flexible and powerful means of getting things accomplished on a large scale. The various institutions of modern American society--government, industry, and the universities, especially--

have become so interwoven that they together form a single reserve of skill and resources which, if it can be channeled by the society's leaders toward a common goal, can achieve much.

The arena in which the separate interests comprising American society interact is the political process. This nation does not have, and probably never will have, a single, agreed-upon set of priorities for governmental action. Instead we have a representative political system through which the range of interests concerned with a specific issue-area can obtain access to and a hearing before those few individuals in leadership positions who must make the actual decisions which determine national priorities. The Apollo experience suggests that, for the successful adoption of a significantly new policy, this process must go on long enough prior to a top-level commitment to a particular course of action so that the sectors of society interested in the specific issue can be identified, their views heard and evaluated, and potential sources of support solicited. For example, the relationship between space achievement and the national interest had been debated for over three years prior to Kennedy's decision. The alignment of forces favoring and opposing a politically-oriented space program was clear, as was their relative political strengths. The issue had already been pushed up to the President for decision twice prior to April 1961, in the last months of the Eisenhower administration and in March 1961.

There may be an analogy here between the notion of "technological sweetness," i.e., a technological possibility in which the plans for its accomplishment are so attractive that a decision to act on it is hard

not to make, and some concept of "political sweetness." There may be an identifiable period of time in the life history of an issue in the political process during which the leadership, if it so decides, can seize upon the issue and transform it into government policy. Examples which come to mind are civil rights legislation in 1964 and perhaps draft reform, control of environmental pollution, and tax reform in the near future, as well as space policy in 1961.

A crucial environmental factor determining whether the time is ripe for action in a particular issue-area is the "occasion for decision," especially with respect to presence of or lack of a crisis atmosphere. Successful new policies are seldom conceived in a crisis setting, but often a crisis serves to terminate a political process and to produce a policy outcome. An almost coincidental juxtaposition of a crisis setting and the political maturity of an issue, however, seems required to create a viable political base of support for a very ambitious government enterprise like the moon project. The centrifugal forces of pluralism are so strong that some clear challenge, either from the external world or from the domestic sector outside the political system, is needed to allow the political leadership to choose among contending positions and groups on an issue and adopt goals representing significant changes in national policy. Without a challenge and subsequent crisis atmosphere, the American political system usually makes only incremental, adaptive shifts in policy.⁴²

⁴² One could be Machiavellian here and suggest that, if a crisis is lacking at a time when an issue is ripe for decision, the political leadership can fairly easily create one. This may well be true, given the nature of the government-media relationship today. I am not sure that a manufactured crisis would be as effective as an actual one in bringing together diverse interests in support of a common objective, but there is room for further examination of this hypothesis.

It is thus clear that the timing of an "Apollo-like" decision is vitally important. The political environment within which such a decision can be made with some confidence that it will be supported by influential political elements is conditioned by two factors: the political maturity of the issue under consideration and the presence of some challenge which dramatizes the need for action and removes political obstacles to its initiation. When these two factors are present, new enterprises can be successfully begun; when they are not, a decision to act runs a high risk of eventual failure. In 1961, both of these conditions were fully met. There had been enough debate to identify the lunar landing project as the likely candidate for the central feature of any politically-motivated space program, and the Gagarin flight and the Bay of Pigs demonstrated to the political leadership that such a program was in the American national interest.

Finally, an "Apollo approach" to the solution of national problems requires the kind of leadership which is able to combine broad vision with an expert political sense. The preceding discussion suggests that decision-makers must be able to identify and seize upon brief opportunities when the technological feasibility and the political feasibility of a particular undertaking are in optimum balance. To do this, the leader must be able to convince influential individuals and groups in the political system that it is in their interest to support a program he believes is needed. Equally, he must be able to select an objective and a program which serves interests broader than those of specific interests and groups. This objective must represent more than a limited response to a specific challenge,

a response which does not have long-term benefits to society at least equal to the societal resources the program to achieve it will consume.

This type of leadership was present when the lunar landing decision was made. It was not limited to President John Kennedy. Lyndon Johnson and James Webb both labored through several weeks of intense effort to ensure that the new space program for Kennedy's approval had merit beyond being a response to the political challenge symbolized by Gagarin's orbital flight. They made sure that the program would result in developing a pre-eminent capability for space operations of all kinds and in all areas of outer space, a capability they believed would constitute a national asset for years to come. They also made sure that this program would be structured so that it would receive the continuing support of an already-existing aerospace constituency and would also create the larger constituency which would provide a continuing basis of political support.

However, the final choice was Kennedy's. Many of his advisers, such as Budget Director David Bell and economic adviser Walter Heller, told him that money spent on a large manned space flight program would not produce benefits for the United States as great as other possible uses of the same resources. Kennedy considered this advice, but ultimately decided that the power and pride of the American nation and its state required a program to establish the United States as the leading spacefaring country. He committed himself to that objective, and came to view it as representative of some of the most basic motivations and aspirations of the people who had chosen him as their leader.

The circumstances under which other decisions like the one to send Americans to the moon can be made and carried out seem, on the basis of the preceding analysis, to be these:

1. The objective sought must be known to be technologically feasible, with a high degree of probability, at the time the decision to seek it is made.
2. The objective must have been the subject of sufficient political debate so that the groups interested in it and opposed to it can be identified, their positions and relative strengths evaluated, and potential sources of support have time to develop.
3. Some dramatic "occasion for decision," such as a crisis resulting from an external or domestic challenge, must occur to create an environment in which the objective and the policies to achieve it become politically feasible.
4. There must be in leadership positions in the political system individuals whose personalities and political philosophies support the initiation of new large-scale government activities aimed at long-term payoffs and who have the political skill to choose the situations in which such activities can be initiated successfully.

The lunar landing decision reflected a belief basic to liberal philosophy which is the core of the American world view. The idea that men can cooperate in a common endeavor to better their individual conditions is based on assumptions about human nature and society which, as I remarked earlier, are at the core of liberal thought. The "Apollo approach" to the achievement of social objectives can only be adopted in a society where this belief is held both by the general population and by the society's leadership. It may turn out that this approach can in fact only be used in the United States, where both confidence in our ability to attack and solve major problems and a preference for technological "engineering" means to achieve our objectives are deeply ingrained. In this sense, the decision to go to the

moon may have been a uniquely American phenomenon. If this is so, then the United States may also be uniquely able to decide to use the techniques of organizing and directing energy which were so successful in Project Apollo for other worthwhile societal objectives. But this potential for achievement carries with it the danger of subverting the democratic principles upon which American society is based.

The essence of the "Apollo approach" is concentration of effort and corresponding concentration of control. There is a constant tension between this concentration of control, which seems required if objectives of the scope of the lunar landing are to be chosen and implemented successfully, and the democratic ethic, which distrusts such a concentration of control and power. The final lesson of Apollo may be that such a tension can be maintained without either destroying democratic values or making concentrated government efforts impossible. To do this requires a watchful caution on the part of those called upon to support large-scale government-initiated enterprises which require central control over significant societal resources and activities. The purpose of government is to do things for a society which cannot be done by individual or combined private efforts. Sending men to the moon was one such thing. There are many others which are worth doing. But the organized energy which government can command must be applied in the interests of the whole society and ultimately of each individual in it. To make sure that this happens is a challenging assignment for each of us, for

modern organization makes demands on the individual to learn something he has never been able to do before: to use organization intelligently, purposefully, deliberately, responsibly. If he runs away from this task and his

decisions, organizations will indeed become the master. If the individual accepts this responsibility, he will be free and in control. ⁴³

The experience of Project Apollo shows it is indeed possible to organize other "great new American enterprises," intended to achieve objectives equal or greater in human significance than landing on the moon. It is up to us as citizens of this country to make sure that such enterprises do not in seeking their objectives destroy or diminish the values or beliefs they are intended to foster.

⁴³ Peter Drucker, The Age of Discontinuity: Guidelines to Our Changing Society (New York: Harper and Row, 1969), p. 259.