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Project Vista, Caltech, and the dilemmas of Lee DuBridge

“In the groves of their academy, at the end of every vista, you see nothing but the gallows.” Edmund Burke, *Reflections on the Revolution in France*, 1790.

IN THE SUMMER of 1951, more than one hundred scientists and other academics participated in a secret study hosted by the California Institute of Technology. The purpose of Project Vista was to determine how existing technologies as well as ones soon to be available—tactical nuclear weapons, in particular—could offset NATO’s weaker conventional forces and repel a massive Soviet invasion of Europe, many perceived as likely if not imminent. Lee A. DuBridge, a former physicist and Caltech’s first president, convinced the school’s trustees and administration to carry out the project for several reasons—among others, it brought an lucrative government contract to the school while it performed a national service at a time of great international tension.

The early 1950s were the golden era of “summer studies,” so-called as they coincided more or less with the academic summer recess. Vista was an example of these specialized, goal-oriented endeavors, typically done using newly emerging concepts such as systems engineering and operations research, of defense-related

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The following abbreviations are used: *BAS*, *Bulletin of the atomic scientists*; “A study of ground and air tactical warfare with especial reference to the defense of Western Europe,” Vista Report; CBM/CITA, Clark B. Millikan Papers at Caltech Archives; CCL/CITA, Charles C. Lauritsen Papers at Caltech Archives; HF/CITA, Historical Files at Caltech Archives; HV/LOC, Gen. Hoyt Vandenberg Papers at the Library of Congress; JRO/LOC, J. Robert Oppenheimer Papers at the Library of Congress; LAD/CITA, Lee A. DuBridge Papers at the Archives of the California Institute of Technology; NARA, National Archives and Records Administration in Washington, D.C. and College Park, MD; NBL/AIP, Niels Bohr Library at the American Institute of Physics; RAM/CITA, Robert A. Millikan Papers at Caltech Archives; RPF/CITA, Richard P. Feynman Papers at Caltech Archives; TMM/CIT, Trustees’ Meeting Minutes at the President’s Office of the California Institute of Technology; WAF/CITA, William A. Fowler Papers at Caltech Archives.

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problems.¹ These projects helped generate new research opportunities (both classified and unclassified) and forged beneficial military and industrial connections that universities used to their advantage. They also helped create a “social reality in which working on military problems was an accepted norm,” if not indeed a sign that one was truly a well-connected, top-notch researcher.² Summer studies often left behind a legacy of well-funded, university-managed follow-up projects or even laboratories where classified research continued to be pursued; this was a prize and responsibility Caltech chose not to pursue after Vista.³

For Caltech, an elite yet relatively small institution which prided itself on its basic research and close faculty-student interactions, the Vista study was a major commitment. Over a quarter of its full-time faculty took part; the number grows to over 120 if one counts scientists visiting from other institutions, military liaisons, secretarial, and security staff. The entire project consumed some 7,800 days of effort and disrupted campus teaching and research for months. In return for its participation, Caltech received almost \$750,000 in compensation.

Vista was much larger and more expensive than previous summer studies. MIT, for example, carried out Project Hartwell between March and December 1950, which cost \$124,000 and employed only twenty-one scientists.⁴ Vista drew upon people from industry and the military played an active part, as did scholars from fields other than the physical sciences.

From its inception, the leaders of Vista counseled the military not to be disappointed that their report did not suggest specific ways to make weapons lighter, more reliable, or more efficient.⁵ William A. Fowler, a nuclear physicist from Caltech and Vista’s Scientific Director, emphasized that the military should not expect new gadgets. Instead, Vista endeavored to advise the military on how best to use tools at its disposal, whether nuclear-tipped rockets or sympathetic partisans armed with Molotov cocktails, to resist a Soviet incursion into Europe.

1. J.R. Marvin and F.J. Weyl, “The summer study,” *Naval research reviews*, 19 (1966), 1-7, 24-28.

2. Silvan S. Schewber, “The mutual embrace of science and the military: ONR and the growth of physics in the United States after World War II,” E. Mendelsohn, M.R. Smith and P. Weingart, eds., *Science, technology, and the military* (Amsterdam, 1988), 33.

3. For example, Project Michael led to the establishment of Hudson Laboratories at Columbia University, while MIT’s participation in Project Charles resulted in the formation of Lincoln Laboratories; Marvin and Weyl (ref. 1).

4. Daniel J. Kevles, “K1S2: Korea, science, and the state,” in Peter Galison and Bruce Hevly, eds., *Big science: The growth of large-scale research* (Stanford, 1992), 316.

5. “Letter of Transmittal” (vii) in the final report of Project Vista, entitled “A study of ground and air tactical warfare with especial reference to the defense of Western Europe,” Feb 1952, Section Y (War Activities), Box Y3, HF/CITA. The Vista Report was published in two volumes; the first volume contains the monographs which comprise the actual report while the second is a collection of technical appendices and supporting information. The Vista Report was classified until 1980 when a redacted version of it was made available for study. Since then, several documents pertaining to the report in the National Archives and Records Administration have been reclassified.

A roster of postwar science luminaries contributed to Project Vista in some way (both J. Robert Oppenheimer and Edward Teller served as consultants) as well as people not normally associated with classified defense studies like filmmaker Frank Capra. Their recommendations manifested a conviction that a technological solution existed to what was essentially a complex crisis of foreign relations, military strategy, and geopolitics. This was a commonly held belief shared by scientists and military officers alike, the result of confidence gained through new military technologies—the proximity fuse, radar, and the atomic bomb. While its authors presented it as an objective scientific study, the Vista report supported a controversial view advocated by members of the military, political, and academic communities who opposed the nuclear bombing of Soviet cities.⁶

The final Vista report recommended bringing “the battle back to the battlefield,” an idea which ran counter to prevailing ideas advocated by the U.S. Air Force, especially Curtis LeMay’s Strategic Air Command.⁷ Furious at the report’s suggestions to strengthen U.S. tactical air power and develop smaller and less powerful atomic weapons, the Air Force suppressed the report—it was only declassified in 1980—and Caltech never did another such study.⁸

Just as Vista offered the military a way to bring the battle back to the battlefield, I am interested in bringing Vista back to Caltech. In this article, I pursue three primary goals. First, I consider Vista as a chapter in Caltech’s history at the time when it was adapting to the political and social circumstances of the early Cold War. Understanding how Vista came to Caltech in the first place provides insight into the relations between DuBridge and the school’s influential trustees and alumni. These interactions were especially important at a small institution like Caltech whose success was based on its close-knit and cooperative research and social environment.⁹ Besides helping to illuminate the relatively unexamined topic of Caltech’s history after 1945, I examine how DuBridge’s reluctant acquiescence to Caltech’s conscription in Project Vista during a state of national emergency conflicted with his initial goals for Caltech as the school adjusted to the postwar environment.¹⁰

6. This included people such as J. Robert Oppenheimer, James Conant, and Vannevar Bush as well as military officers such as James M. Gavin and politicians like Sen. Brien McMahon. Vannevar Bush, “The weapons we need for freedom,” *Reader’s digest*, Jan 1951, 48-51; James M. Gavin, “The tactical use of the atomic bomb,” *BAS*, 7 (1951), 46-47, 50; and Sen. Brien E. McMahon, “Atomic weapons and defense,” *BAS*, 7 (1951), 297-301. See also chapt. 7 in Gregg Herken, *Counsels of war* (New York, 1987).

7. A phrase from the Vista report used in Charles V. Murphy’s article “The hidden struggle for the H-bomb,” *Fortune magazine*, May 1953, 109-110, 230.

8. Vista Report, xi.

9. A tradition whose origins are discussed in Robert H. Kargon, “Temple to science: Cooperative research and the birth of the California Institute of Technology,” *HSPS*, 8:1 (1977), 3-32. Also see John Servos, “The industrial relations of science: Chemical engineering at MIT, 1900-39,” *Isis*, 71 (1980), 531-549.

10. Compared with other Cold War universities, Caltech has received little attention. See Judith R. Goodstein, *Millikan’s school: A history of the California Institute of Technology*.

Second, I continue to keep the focus on the local level by offering a detailed examination of how people were recruited to Project Vista, how their work was organized and managed, and how Vista's recommendations were presented to the study's patrons. This focus on the local institutional environment complements previous examinations of Vista that have been broader in scope and provides a window onto scientists' experiences and responsibilities as they attempted to apply their expertise to the relatively unfamiliar world of tactics and warfare.¹¹

Finally, this paper contributes to the growing literature on the history of post-war universities as they struggled to adapt to the Cold War environment.¹² This was a task made especially challenging by an obligation to contribute to national defense that institutions like Caltech, MIT, and Princeton perceived during the profound international and domestic crises of 1949-1952. Project Vista was an unrewarding experiment for most participants. While some professors consulted on defense matters at their personal discretion and the institute's federal and industrial patrons kept it tied to the military-industrial complex, Caltech's administration, faculty, and trustees were unenthusiastic about the wholesale integration of classified laboratories and research directly into the postwar campus infrastructure and curricula.

1. CALTECH'S "GREAT INSTAURATION"

In May 1955, *Time magazine* showcased Caltech's prowess as one of the world's premiere schools for science and engineering. Much credit for this accomplishment went to the man on the magazine's cover, Lee A. DuBridge. A "pleasant, slightly rumped...Mr. Anybody," DuBridge was hailed as America's "Senior States-

(New York, 1991) which devotes a final chapter to the DuBridge era at Caltech while Clayton R. Koppes, *JPL and the American space program: A history of the Jet Propulsion Laboratory* (New Haven, 1982) discusses the relation between the school and JPL.

11. The most in-depth study of Vista as it relates to nuclear strategy is David C. Elliot's "Project Vista and nuclear weapons in Europe," *International security*, 11 (1986), 163-183. Many other writers concerned with the broader treatment of nuclear thinking have examined Vista: Matthew Evangelista, *Innovation and the arms race: How the United States and the Soviet Union develop new military technologies* (Ithaca, 1988), Lawrence Freedman, *The evolution of nuclear strategy* (New York, 2003), David Alan Rosenberg, "The origins of overkill: Nuclear weapons and American strategy, 1945-1960," *International security*, 7 (1983), 3-71. Gregg Herken refers to Vista and Oppenheimer in chaps. 13 and 15 in his book *Brotherhood of the bomb: The tangled lives and loyalties of Robert Oppenheimer, Ernest Lawrence, and Edward Teller* (New York, 2002). A more personal view is in chapter 12 of Freeman Dyson, *Weapons and hope* (New York, 1984). Detailed information about Oppenheimer's participation in Vista is available in U.S. Atomic Energy Commission's *In the matter of J. Robert Oppenheimer: Transcript of hearing before Personnel Security Board, Washington D.C., April 12, 1954, through May 6, 1954* (Cambridge, MA, 1970); referred to *ITMOJRO* hereafter.

12. Stuart Leslie, *The Cold War and American science: The military-industrial complex at M.I.T and Stanford* (New York, 1993) and Rebecca S. Lowen, *Creating the Cold War uni-*

man of Science” after nearly a decade at Caltech.¹³ Closely connected to people like Oppenheimer, James Conant, and Vannevar Bush, DuBridge was part of the interlocking system of boards and committees that shaped postwar science. As a member of the National Science Board and the Atomic Energy Commission’s General Advisory Committee, he was, in the eyes of some, the person best suited to be Truman’s personal science advisor.¹⁴

Caltech’s history can be divided into two periods separated by World War II. From 1941 to 1945, Caltech was an institution mobilized for war, efforts which thoroughly disrupted its laboriously tended research programs. As one participant recalled, during the war “a large part of Caltech became a branch of the Bureau of Ordnance,” receiving over \$80 million in government contracts during the conflict, an amount second only to MIT.¹⁵ These funds employed thousands of people who manufactured over one million artillery rockets for the war effort and enabled Caltech’s Jet Propulsion Laboratory (JPL) to develop solid-propellant rocket engines and conduct exploratory studies of guided missile technology.¹⁶

DuBridge arrived in Pasadena as Caltech’s first president in the summer of 1946 after serving as the wartime director of the Radiation Laboratory at MIT where radar technologies were developed. Making the transition back to a world-class research institute in the new postwar political economy meant that DuBridge had to tactfully revise and often dispense with Robert A. Millikan’s policies that opposed supporting Caltech with federal money. Unlike Frederick Terman at Stanford and Julius Stratton and Charles Stark Draper at MIT, DuBridge professed ambivalence about wholesale reliance on federal support, especially from the military. When one high profile faculty member queried him about raising outside funds, DuBridge acknowledged that the “probable government or industrial support of research poses many difficult questions for universities.” Acceptance of federal support, “must be entered into with our eyes wide open and the whole problem must be carefully studied before commitments are made in the wrong direction.”¹⁷ Publicly, DuBridge cautioned that a respected science institution like Caltech should not nurture itself with the “crumbs that fall from the table of a weapons development program...even though the crumbs themselves should provide more than adequate nourishment.”¹⁸

versity: The transformation of Stanford (Berkeley, 1997). Amy Sue Bix offers a different view of the Cold War University in her article “Backing into sponsored research: Physics and engineering at Princeton University, 1945-1970,” *History of higher education annual*, 13 (1993), 9-52.

13. “The Purists,” *Time*, 16 May 1955, 68-76.

14. William A. Blanpied, ed. *Impacts of the early Cold War on the formulation of U.S. science policy: Selected memoranda of William T. Golden* (Washington, D.C., 1995).

15. “Caltech Associates’ talk,” 3 May 1950, Box 143, Folder 13, WAF/CITA papers.

16. See chapt. 13 of Goodstein (ref. 10) and Koppes (ref. 10).

17. DuBridge to Linus Pauling, 10 Jul 1946, Folder 8, Box 128, LAD/CITA.

18. Lee A. DuBridge, “Science and national security,” *Bulletin of the California Institute of Technology*, 58 (1949), 1-19, on 4.

Under Millikan's watchful eye, Caltech had risen to prominence as a world center for basic science research. Funded by private sources made accessible through Millikan's extensive personal and professional connections, Caltech became a modern research institute that served as a model for MIT and other Depression-era schools. Through his long tenure as Chairman of Caltech's Executive Council, Millikan exercised great authority over the school and commanded respect from the institute's trustees. Unlike DuBridge, Millikan was the social equal of Caltech's trustees. The trustees themselves were mostly prominent businessmen from the Los Angeles community of conservative elites who expressed great interest and responsibility in Caltech's management. As Caltech's first president, the ability of DuBridge to determine Caltech's policies was more circumscribed than Millikan's.¹⁹ Early in his tenure, DuBridge had to cautiously navigate the political terrain of Caltech's administration and patrons, create consensus, and win the support of Caltech's trustees for his policies, some of which ran counter to those of Millikan.

DuBridge's strong desire to rebuild the school's preeminence in research, to expand into new areas, to improve the institution's infrastructure, and achieve a balance between new federal monies and the Caltech's traditional funding from alumni, corporations, and philanthropists marked his first few years as Caltech's president. During this time, science leaders like DuBridge were still determining the resources and rules associated with funding basic science before they became codified as accepted practice. Consequently, DuBridge and his administration adopted a pluralistic strategy to obtain funding, rebuild, and expand the school's infrastructure after the neglect of the war years, and establish itself at the forefront of national research. Money was aggressively sought from Caltech boosters, local and national industrial corporations, and federal patrons.

Despite efforts to diversify funding, federal support for research at Caltech rapidly grew in the immediate postwar era. By 1951, over half of the school's revenue and research support came from government grants and contracts, a fact that DuBridge frequently discussed with trustees uncomfortable to rely fully on Caltech's new patrons.²⁰ Caltech's postwar management of JPL for the Army was an example of federal patronage that was especially controversial. Elements of the debates that occurred among faculty, trustees, and DuBridge about the Caltech-JPL relation—the receipt of military money for classified work, the appropriate contribution of the school to national service, and the question of whether to have classified projects on campus—all reappeared when Caltech was considering whether to host Project Vista.

19. In contrasting DuBridge's authority with that enjoyed previously by Millikan, one Caltech trustee quipped that the "Chairman of the Executive Council [Millikan] is just like a College President only more so." This was attributed to Caltech physicist Richard Tolman by trustee William Munro in a letter to DuBridge, 11 Mar 1954, Folder 6, Box 126, LAD/CITA.

20. A sampling of DuBridge discussions with trustees over federal funding for Caltech are: John E. Barber to DuBridge, 15 Sep 1947, Folder 2, Box 124; Reese Taylor to DuBridge, 14 Feb 1952, Folder 3, Box 123; DuBridge to John McCone, 23 Oct 1953, Folder 2, Box 126, all from LAD/CITA.

Unlike MIT, Stanford, and Princeton (which all hosted federally-funded laboratories as sites for classified research during the Cold War), Caltech's relation with JPL was a direct legacy from World War II. It proved to be a lucrative yet troublesome inheritance as the circumstances of the Cold War rapidly changed Caltech's relation with JPL. The lab's management broke its promise to do mostly unclassified basic research in the postwar era. By 1950, the facility had become essentially a weapons laboratory whose primary activity was the development of guided missiles.

With the decline in importance of basic, unclassified research, relations between the Caltech faculty and JPL, located several miles away from campus, withered until only a few professors or students had anything to do with the lab.²¹ The lab neither contributed substantially to Caltech's educational mission nor did many campus faculty look favorably upon the work performed there.²² In comparison, Caltech's administration and faculty went to great lengths to tout their affiliation with off-campus facilities like Palomar Observatory which were world-renowned centers for basic science.

JPL's increasing irrelevance to the research and teaching program on Caltech's campus coupled with its continued expansion presented DuBridge with a persistent dilemma. Despite his antipathy to the facility, Caltech's management fee for JPL was its largest single source of federal money.²³ Given his eagerness to improve the school's financial strength and campus research programs, DuBridge equivocated in his support for the lab: JPL's research, while perhaps of "some interest to military agencies," was not to be condemned "for who can tell what the applications of basic research may be?"²⁴ The statement suggests DuBridge's quixotic belief that the increasingly weaponized JPL was still doing basic research in the national interest. It also suggests the willingness of Caltech's administration to parse the difference between having classified work done on campus versus it being off-campus, out of sight, and out of mind.²⁵ Ultimately, like Caltech's relation with JPL, the choice to participate in Project Vista was something DuBridge would partly rationalize due to the general state of national emergency.

21. These events, and JPL's growing irrelevance to Caltech, are described in chaps. 2 and 3 of Koppes (ref. 10).

22. A situation very different from military-funded facilities at MIT and Stanford where there were close and symbiotic interactions between lab personnel and faculty and the labs' missions were integrated into and contributed to the development of university instruction; Leslie (ref. 12).

23. In 1948, for example, Caltech received \$358,000 for managing JPL, the equivalent of the earnings on a \$7 million endowment. By 1951, the lab's monthly budget was \$400,000 and it employed over 700 people. Koppes (ref. 10), 33, 47.

24. *Bulletin of the California Institute of Technology*, 58 (1949), 11-12.

25. The exclusion of classified work on Caltech's campus is a feature DuBridge frequently referred to in later interviews. See DuBridge, interview with Walter Sullivan, 13 Dec 1968, 45 (NBL/AIP) and DuBridge, interview with Judith Goodstein, 20 Feb 1981, 67-68 (CITA).

As Cold War tensions ratcheted up, the question of communist-friendly faculty at Caltech became another controversial issue between DuBridge and the trustees. DuBridge came under pressure from a number of directions—from shrill alumni and Pasadena citizens worried about the Red Menace, from faculty concerned about their intellectual and personal freedoms, and, perhaps most importantly, from Caltech's Board of Trustees.

The trustees of Caltech were mostly Republican bankers, businessmen, and industrialists. Prominent in Southern California society, they were, in many cases, the grandsons of the powerbrokers and boosters who engineered the rise of Los Angeles in the late 19th century. The trustees knew each other socially, ties that in some cases went back to their teenage years, and were “anti-communist, conservative, content” men whose beliefs celebrated the Republican ideal of the “American way.”²⁶ In 1950, they included men like Norman Chandler, the publisher of the right-wing *Los Angeles Times*, and Reese Taylor, Union Oil's president and “hard working union buster.”²⁷ Another trustee, John A. McCone, would soon step off the board temporarily to become the Undersecretary of the Air Force from 1950 to 1951. The trustees' political leanings also reflected the relative conservatism of Caltech's student body and alumni. For example, in 1952, only half of the alumni polled believed the federal government should subsidize research in the sciences.²⁸

Like all academic leaders in the early Cold War, DuBridge was concerned about the politics of domestic anti-communism. As early as 1948, DuBridge began to field inquiries from trustees about whether there were communists at Caltech. He endeavored not to alienate them but instead tried to educate them about the importance of academic freedoms.²⁹ The issue, however, became a growing concern for DuBridge and the trustees, especially after Joseph McCarthy fueled public fears of domestic communism.³⁰ Consequently, DuBridge found himself obliged to prepare reports for the school's trustees, patrons, and alumni. DuBridge asserted Caltech's loyalty, highlighted its past contribution to the war effort, and its willingness to serve its country in the future. This opportunity, DuBridge hoped, would not be “prejudiced by unfounded suspicions” of disloyal elements on campus.³¹

26. The depiction given in part III of Robert Gottlieb and Irene Wolt, *Thinking big: The story of the Los Angeles Times, its publishers, and their influence on southern California* (New York, 1977), 247.

27. 15 Nov 1948 issue of *CIO news*.

28. The same survey of 3,800 Caltech alumni, also showed that 56 percent were Republicans and 62 percent were “anti-New Deal.” “1952 Caltech Alumni Survey,” Folder 1, Box D1, HF/CITA.

29. DuBridge to Reese Taylor, 24 Mar 1948, Folder 7, Box 123; DuBridge to Chandler, 8 Jun 1949, Folder 6, Box 124, both LAD/CITA.

30. After the University of California's Board of Regents imposed a controversial new loyalty oath in 1949 on university employees (with scientists' behavior of particular concern), some trustees suggested Caltech follow suit, a request on which DuBridge demurred. John McCone to DuBridge, 24 Apr 1950, Folder 2, Box 126, LAD/CITA.

31. “Communism at Caltech,” draft dated 15 Sep 1950, Folder 4, Box 123, LAD/CITA.

Nevertheless, apprehension over communism on Caltech's campus persisted among the trustees.³² Their anxiety was, of course, magnified by the very real crises of 1949/50—the fall of mainland China to the communists, the first Soviet atomic bomb, and, especially, the invasion of South Korea. In late 1950, when the military approached Caltech about the possibility of carrying out Project Vista, the trustees—despite their objections to Caltech's management of JPL and the flood of federal patronage—were primed to do what they could to demonstrate their school's loyalty and patriotism by helping confront the threat of Soviet expansionism.

2. A NEW VISTA

The Project arrives

North Korea's sudden invasion of its southern neighbor in the summer of 1950, done with Stalin's tacit support, stunned Americans. Many believed North Korea's incursion was the harbinger of an even greater geopolitical and military crisis—the invasion of western Europe by an emboldened Soviet army backed by swarms of tanks, artillery, and jet aircraft. For many in the government and those who followed world events closely, a Soviet invasion of Europe was not only possible but quite likely, and something NATO's outnumbered conventional forces appeared all but powerless to prevent.³³ It was this specific threat that Project Vista addressed.

In the fall of 1950, Charles C. Lauritsen, a Caltech nuclear physicist who was highly regarded as a military advisor, took an extended tour of Korea's battlefields. During World War II, Lauritsen had a prominent role in developing many of the conflict's key military technologies. He helped persuade the military that rocket technology and proximity fuses could serve as practical weaponry and had participated in the Manhattan Project at Los Alamos. He had also helped establish the Naval Ordnance Test Station at China Lake, California. Lauritsen was accompa-

DuBridge's statement, however, sidestepped the highly visible controversy surrounding the political activities of Caltech chemist Linus Pauling. Pauling's left-leaning involvements were seen by DuBridge and the Caltech trustees as a liability and public relations disaster in the making. DuBridge recalled several trustees who "disliked Pauling intensely" and wanted DuBridge to help "pin his ears back" even before becoming Caltech's president. Judith R. Goodstein, "A conversation with Lee Alvin DuBridge." *Physics in perspective*, 5 (2003), 174-205, on 184 and 194. See also Harvey Mudd to DuBridge, 8 Jun 1949, Folder 5, Box 123, LAD/CITA. James Page to DuBridge, 5 Dec 1950 Folder 8, Box 128, LAD/CITA. "Minutes – September 5, 1950 Minutes of the Trustees' Board," TMM/CIT.

32. See "Correspondence with a Caltech alumnus" (series of letters from 1951-52) with attached letter to Caltech alumni and trustees, 1 Feb 1952, Folder 3, Box 123, LAD/CITA.

33. American politicians and policy makers' fear of Soviet intentions was crystallized when President Truman approved NSC-68 in April 1950 after it was presented to the National Security Council. A profound influence on American thinking and strategy in the early stages of the Cold War, NSC-68 predicted that the 1950-1953 would be years of maximum peril. Ernest R. May, ed., *American Cold War strategy: Interpreting NSC-68* (New York, 1993).

nied on his trip by other members of the Weapons Systems Evaluation Group, a Defense Department advisory committee.³⁴ They arrived in Korea on the heels of General Douglas MacArthur's stunning amphibious assault at Inchon and were escorted by General James M. Gavin, an outspoken proponent of using tactical nuclear weapons against North Korean troops.³⁵

Lauritsen briefed the Institute's trustees on his return from Korea. He explained that the U.S. military needed to greatly improve its tactical air support of ground troops.³⁶ Lauritsen also told the trustees about his recent participation in an MIT-managed summer study. Project Hartwell examined how the Navy could protect shipping from attacks by Soviet forces in the event of a major war and questioned the prevailing military view that all nuclear arms should be high-yield weapons delivered from big bombers.³⁷

The idea that nuclear weapons could be used for purposes other than incinerating Soviet cities was gaining currency among some scientists and military leaders who were beginning to take the case for tactical nuclear weapons to the public. Prominent scientist-advisors like Robert Oppenheimer, Vannevar Bush, and James Conant recommended that the military diversify its atomic arsenal and develop tactical nuclear weapons, opinions that naturally found opposition in the Air Force's Strategic Air Command.³⁸ DuBridge himself had opposed the hydrogen bomb while several Caltech scientists, including Charles Lauritsen and William Fowler, shared reservations about the dangers of nuclear testing and America's emphasis on the large-scale nuclear bombing of Soviet cities.³⁹

In the wake of the Korean invasion, the revelation of Soviet nuclear capability, and Truman's decision to undertake a crash program to build the hydrogen bomb, the Air Force decided that it needed further input from university scientists. It was at this time that representatives of the Research and Development Division of the

34. This group included Edward Bowles of MIT and William Shockley of Bell Labs.

35. Gavin's views and a recounting of Lauritsen's visit to Korea are in his book *War and peace in the space age* (New York, 1958).

36. "Undated Presentation [likely November 1950]," Folder 10, Box 11, CCL/CITA; "Minutes – November 6, 1950 Meeting of the Trustees," TMM/CIT.

37. Project Hartwell is described in a number of articles including: Daniel Kevles, "Cold War and hot physics: Science, security, and the American state," *HSPS*, 20:2 (1990), 239-264 and Schweber (ref. 2).

38. For example, Bush (ref. 6). Oppenheimer gave a public speech in January 1951 to the New York Bar Association which criticized strategic bombing. It was later reprinted in the Feb 1951 issue of the *BAS*. In the same issue, there also appeared James M. Gavin's article "The tactical use of the atomic bomb," *BAS*, 7 (1951), 46-47, 50 which gave a military perspective. Excellent presentations of scientists' lobbying against strategic nuclear bombing and in favor of tactical weapons are found in chapt. 7 of Gregg Herken, *Counsels of war* (New York, 1987) and in 116-118 of Matthew Evangelista (ref. 11).

39. William Fowler, for instance, gave public speeches presenting the case against building the hydrogen bomb such as a 23 Mar 1950 talk to the Altadena-Pasadena Young Democrats. Folders 12 and 13, Box 142, WAF/CITA.

Air Force began to talk informally with DuBridge, Lauritsen, and Robert F. Bacher (the head of Caltech's Physics and Astronomy Division and a former AEC commissioner) about a possible summer study at Caltech.⁴⁰

While not enthusiastic, DuBridge recognized that Caltech would be unlikely to avoid conscription of some sort. In January 1951, he warned Caltech's faculty and trustees that escalating international crises made it "probable that in the year to come the Institute will be called upon to render services of many sorts to the nation and to the government in this time of need."⁴¹ Consequently, "in view of the fact that projects of military importance and carrying secrecy classification may soon have to be considered," DuBridge suggested that Caltech's trustees apply for security clearances.⁴²

Originally, the Air Force wanted Caltech to undertake a project related to the use of strategic air power, a topic Caltech's staff was "not qualified or greatly interested in."⁴³ Air Force representatives continued to canvass DuBridge, Lauritsen, Bacher, and other prominent scientists at the institute about a more suitable subject. Caltech's wartime experience in rocket artillery made the close tactical support of ground troops a logical alternative that "was more nearly in line with [Caltech's] interests."⁴⁴ Furthermore, the Army had recently contracted with the Caltech-managed JPL to develop the United States' first tactical guided missile system, which would be designed to carry a nuclear-armed payload.⁴⁵

Caltech's inclination to focus the study on tactical warfare reflected the institute's legacy from its wartime rocket program and its on-going affiliation with JPL. Other factors played a role in the Pentagon's desire to place a summer study at the school as well. By the end of 1950, many major American educational institutions were already participating in military-related studies which were taxing the limits of their faculty.⁴⁶ Given the escalating Cold War tensions, the military was eager to have as many scientists as possible "on tap" and the expertise of Caltech's faculty was clearly a desirable commodity.

40. Lauritsen had been considering the possibility of some type of study "to analyze the overall American position and to make specific proposals of the general course to follow including military plans" early in 1950 as noted in Lauritsen to Frederick Seitz, 15 Mar 1950, Folder 3, Box 3, CCL/CITA. Actual meetings for what became Vista began even while Lauritsen was still in Korea; Ivan Getting to Robert Bacher, 26 Sep 1950, Folder 2, Box 3, WAF/CITA.

41. Lee A. DuBridge, "The President's report," *Bulletin of the California Institute of Technology*, 60 (1951), 1.

42. DuBridge to Trustees, 11 Sep 1950, Folder 12, Box 130, LAD/CITA. The clearances came through in July 1951 when Vista was underway.

43. DuBridge to Fowler, 27 Mar 195, Folder 1, Box 116, WAF/CITA.

44. *Ibid.*

45. Koppes (ref. 10), chapt. 4.

46. Staff at the University of Chicago were carrying out Project Chore, a study of air-to-air combat, Harvard had agreed to host Project Metcalf (infrared detection), Columbia had Project Michael (undersea warfare), and several summer studies at MIT were underway or in planning stages.

Nevertheless, Air Force's interest in Caltech as a host for a summer study might, at first blush, appear inexplicable. Lauritsen, like DuBridge, had opposed the development of the hydrogen bomb and both men were longtime friends of Robert Oppenheimer, a dubious connection for those in the Air Force who questioned his loyalty and judgment. In fact, in late 1950, both Lauritsen and Bacher served on a Defense Department panel chaired by Oppenheimer which made recommendations on the long-range planning and production of atomic weapons.⁴⁷ The panel's report, issued in January 1951, presaged some of Vista's controversial recommendations in its emphasis on the military utility of small yield atomic weapons.

The Air Force's dogged courtship of Caltech can be traced to two people closely associated with DuBridge. Louis N. Ridenour, the Air Force's first chief scientist, studied nuclear physics with Charles Lauritsen and earned his Ph.D. from Caltech in 1936. During the war, Ridenour worked on radar technology at MIT's Radiation Laboratory that DuBridge directed.⁴⁸ Throughout 1950, Ridenour and Ivan A. Getting, another physicist employed by the Air Force, negotiated with scientists and administrators at MIT to establish Project Charles and Project Lincoln. These examined the problem of the air defense of the United States against a Soviet bomber attack. This accomplished, Ridenour and Getting turned their attention to the problem of tactical air warfare, a field Getting later said was "woefully neglected and desperately needed help."⁴⁹

Ridenour received support in presenting his case to DuBridge from Caltech trustee John A. McCone. Trained as a mechanical engineer at Berkeley, McCone had owned large shipping and construction firms during the war. After the war, by now a wealthy industrialist active in Republican politics, McCone turned his attention toward government and civic service and remained an advocate for Southern California defense firms. In 1947, a year after McCone became a Caltech trustee, Thomas K. Finletter, a Washington lawyer and future Secretary of the Air Force, invited him to serve on a small panel established by President Truman to create a national policy for strengthening military and civilian aviation.⁵⁰ In June 1950, McCone briefly resigned from Caltech's Board of Trustees to become an undersecretary for the Air Force under Finletter.

McCone was well situated to steer Caltech toward participation in Project Vista. As a trustee, he understood how Caltech functioned as an organization and was acquainted with the particular strengths of its scientists. He was also privy to the Air Force's immediate needs, priorities, and concerns while his government ser-

47. This was "Long Range Objectives Panel," an *ad hoc* committee set up by the Defense Department's Research and Development Board.

48. Dwayne A. Day, *Lightning rod: A history of the Air Force's Chief Scientist's Office* (Washington, D.C., 2000).

49. Getting quote, p. 41, *ibid.*

50. The President's Air Policy Commission, *Survival in the air age: A report by the President's Air Policy Commission* (Washington, D.C., 1948).

vice exposed him to broader issues associated with national security. Finally, McCone was a staunch anti-communist who strongly believed in strengthening the United States' military. Throughout late 1950 and into 1951, McCone made "urgent requests" for Caltech to undertake the project.⁵¹

Despite these entreaties, DuBridge was not persuaded to commit Caltech to a major classified study. As of mid-January 1951, Getting recalled that Caltech's president believed "the particular project under discussion might better be undertaken at another institution [likely MIT] where similar work was in progress."⁵² Ridenour, still interested in having Caltech do a tactical air warfare study, concluded that the Army might have better luck persuading DuBridge.⁵³

In mid-February, DuBridge met with Frank K. Pace, the Secretary of the Army, who asked if Caltech would carry out a study which examined how Army troops might receive better air support. Behind the scenes, the Army's General James Gavin was also maneuvering to get the support of his service behind a Caltech study.⁵⁴ DuBridge told Pace of the Air Force's continuing interest in a similar study—McCone persisted in asking DuBridge to commit Caltech to study a "research problem" for the Air Force—and suggested that all service branches present a joint request to Caltech.⁵⁵ At this point, negotiations at this point were largely between military leaders, DuBridge, and a few Caltech faculty like Bacher and Lauritsen. Unlike traditional postwar research arrangements in which faculty took the initiative to bring federally funded research to their institutions, the military courted Caltech mainly through DuBridge while most faculty were unaware of the negotiations.

Back in Washington less than a month later, DuBridge was surprised at the airport by Ridenour. The Air Force scientist alerted him that the Pentagon planned to ask Caltech to undertake "a study of ground-air tactical operations under an Army contract with close collaboration of the Air Force and with Navy participation to be invited."⁵⁶ A few weeks later, DuBridge, bowing to the inevitable, met with Ridenour and an entourage of Air Force and Army generals to finalize arrangements for what became Project Vista.

With the plan for Vista set, DuBridge's next task was to secure formal approval for the project from Caltech's trustees. Strained relations with Caltech's trustees in early 1951 made DuBridge's task more difficult.⁵⁷ Despite the right-

51. DuBridge to the Caltech Trustees, 5 Apr 1951, Folder 2, Box 116, WAF/CITA.

52. Day (ref. 48), 42. "Minutes – January 16, 1951 Meeting of Trustees' Executive Committee," TMM/CIT.

53. "Proposed study of tactical warfare," Ridenour to General Gordon P. Saville, 20 Feb 1951, Box 9, "360.3 Tactical Air Warfare," RG 341, NARA.

54. Gavin to Charles Lauritsen, 19 Feb 1951, Folder 11, Box 3, CCL/CITA.

55. "Minutes – February 5, 1951 Minutes of the Trustees' Board," TMM/CIT. DuBridge to Fowler, 27 Mar 1951, Folder 1, Box 116, WAF/CITA.

56. DuBridge to Fowler, 27 Mar 1951, Folder 1, Box 116, WAF/CITA.

57. While the exact reasons are unclear, the delicate state of DuBridge's relations with Caltech's trustees is noted in at least two of the memoranda prepared by William T. Golden

wing views of most board members, several expressed skepticism about Caltech's committing itself to a summer study.⁵⁸ Overcoming his initial reluctance, DuBridge marshaled several persuasive arguments to convince the board. First, DuBridge pointed out Caltech's record of service in times of national emergency. Even the "President of the Institute," DuBridge modestly noted, had ample experience in advising on national security matters and helping run a large-scale military project. On the basis of Caltech's experience in areas such as using rockets for tactical warfare (and despite its efforts to steer Vista to another institution), the institute had "been 'drafted' for this job." Moreover, given the pervading atmosphere of international crisis, many Caltech faculty wanted to "make a contribution to the nation's defense effort" and Vista offered an opportunity.⁵⁹

Institutional interests also provided motivation for Caltech to accept Project Vista. Because the military was simultaneously funding several other defense studies at other universities, DuBridge worried that many of Caltech's faculty might feel "very great pressures" to work on defense projects elsewhere. Project Vista would provide a "mechanism for keeping the Institute staff together."⁶⁰ Similar concerns among Princeton University's administrators and faculty in the fall of 1950 had encouraged the acceptance of classified projects at a new off-campus research facility.⁶¹ Unlike some of Princeton's scientists, especially those in physics and aeronautical engineering, Caltech's faculty did not see the national emergency as an opportunity to strengthen their programs.

DuBridge also discerned some financial incentives for Caltech to undertake Project Vista. Earlier that year, he had warned the trustees that he expected undergraduate enrollment to drop off during the conflict in Korea and military conscription.⁶² The expected 25% drop in enrollment, DuBridge predicted, would cause Caltech to lose as much as \$150,000 in tuition. Taking on Vista might "well mean the difference between a deficit and breaking even on the budget."⁶³

DuBridge also had considered the broader implications of universities doing summer studies in general. He suspected that if schools like Caltech refused to take on defense studies, the military would in turn award these to private industry with "the probable result that numerous nonprofit industrial research laboratories

as he investigated the feasibility of DuBridge serving as Presidential Science Advisor in late 1950 and 1951. See Golden's 3 Feb 1951 and 8 Feb 1951 notes of a phone conversation between Golden and Bacher in William A. Blanpied (ref. 14).

58. Lee A. DuBridge, interview with Finn Aaserud, 14 Feb 1986, 17-18 (NBL/AIP).

59. DuBridge to the Caltech Trustees, 5 Apr 1951, Folder 2, Box 116, WAF/CITA.

60. Ibid.

61. Bix (ref. 12).

62. "Minutes – February 5, 1951 Trustees' Meeting Minutes," TMM/CIT. According to the Selective Service Agency, from 1949 to 1951, the number of inductees in the U.S. rose from less than 10,000 to over half a million, the highest level in the last half of the 20th century, the Vietnam conflict notwithstanding.

63. DuBridge to the Caltech Trustees, 5 Apr 1951, Folder 2, Box 116, WAF/CITA. Scientific manpower was a topic DuBridge was familiar with not solely through his service on the National Security Resources Board's Scientific Manpower Advisory Committee in 1950 and 1951.

will be set up with government support.” In time, he envisioned these labs overwhelming university facilities as they would be able to pay more and offer “patriotic incentives,” eventually causing “permanent damage” to university infrastructure as a whole. As a charter member of RAND’s board of trustees, DuBridge appreciated this possibility. The only choice available, he explained to the trustees, was for universities to administer such studies so as to fulfill the project’s goals while not crippling their “fundamental research programs” at the same time.⁶⁴

Not since World War II, DuBridge concluded, had so much “detailed consideration” been given by “so many individuals on the campus” to a government project. Moved by appeals to patriotism, financial prudence, and institutional preservation, the trustees approved Project Vista on April 2, 1951. For an initial contract worth \$600,000, Caltech agreed to undertake a broad study “of ground and air tactical warfare” for nine months ending on December 31, 1951.⁶⁵ The value of the Vista contract—equivalent to revenue from a \$12 million endowment in 1951—surpassed what the institute earned annually from tuition receipts. For a small school like Caltech, which had a student population only one-fifth the size of MIT, Vista was a major commitment. DuBridge and his colleagues originally estimated that only about 50 scientists would be needed, half of them supplied by Caltech.⁶⁶ When Vista ended, more than 100 researchers had contributed to it, including more than a quarter of Caltech’s entire faculty.

Compensating Caltech’s faculty for their work on Vista presented DuBridge with a knotty question. Vista occurred when many universities and federal agencies were establishing formal policies for overhead and other financial arrangements. On April 17, DuBridge gave the Executive Committee a draft copy of a new policy for working on government contracts, the preparation of which had been explicitly motivated by the impending arrival of the summer study.⁶⁷

The new policy was prepared after investigating arrangements devised for MIT and other schools that took on similar summer studies.⁶⁸ It recommended that classified military research should be done strictly on a non-profit basis and, like the classified work being undertaken at Princeton, be located off-campus in so far as possible. Vista was to be done not for money but for “the importance and necessity of the work.” Nevertheless, some salary incentives were needed to attract the best staff. Work on Vista would be classified and not for publication in the open

64. “Policies and procedures governing contracts undertaken at the request of governmental agencies,” 15 Apr 1951. Included as part of the 17 Apr 1951 meeting minutes of the Executive Committee of Trustees, TMM/CIT.

65. Project Vista proposal dated 7 Apr 1951, Folder 14, Box 116, WAF/CITA. Of this \$600,000, half was for salary, \$120,000 was for Caltech’s overhead, and \$180,000 was for direct costs.

66. “Project Vista Record,” n.d. but probably early Apr 1951, Folder 1, Box 116, WAF/CITA.

67. “Policies and Procedures” (ref. 64).

68. Caltech staff, for instance, looked at how MIT had managed Project Charles, an air defense project started in Feb 1951 and also the policies of the Association of American

literature. Recruitment would be further hindered because Vista was not expected to create new technologies or produce knowledge “fundamental in character;” hence contributions would not enhance a person’s “professional reputation” in science.⁶⁹ As compensation, faculty taking part in Vista received a monthly bonus of \$200, a figure established using information provided by scientists and administrators at MIT. DuBridge, who still harbored doubts about the wisdom of Caltech’s participation in Vista, concluded his short but intense campaign to sell Vista by expressing confidence that experts like Lauritsen believed in its value. “We can do some good on this project,” DuBridge noted, “[which] will clear my conscience for having undertaken it.”⁷⁰

The “scientifically neglected doughboy”

As soon as Caltech had committed itself to Project Vista, organizational efforts for the summer study moved into high gear. One of the first tasks was to appoint a manager for the project. DuBridge asked William Fowler, a 40-year old experimental nuclear physicist at Caltech, to be Scientific Director.

Fowler came to Caltech in 1933 and earned his Ph.D. in 1936 under Lauritsen. Fowler developed a close friendship with Lauritsen and his son Thomas, also an experimental physicist, and the three formed a long-lasting research collaboration.⁷¹ During World War II, when Lauritsen directed Caltech’s rocket weaponry program, Fowler suspended his own studies to do war research and development. In 1944, Fowler, a civilian with military rank, spent several months in the Pacific theater observing Caltech’s rockets in action. He also witnessed what future atomic warfare might look when he observed the Trinity explosion.⁷²

When the war ended, Fowler resumed work with the Lauritsens on nuclear physics at Caltech’s Kellogg Radiation Laboratory. Fowler was not an ardent cold warrior and shared the moderate views held by influential scientist-statesmen like Oppenheimer and DuBridge. In public speeches he argued for a more open discussion of nuclear weapons and did not favor classified research in general. Fowler’s notes for a speech opposing development of the hydrogen bomb, made before the Korean conflict began, include: “Peace in Our Time argument. Once belittled. Radioactivity answers this. We must have peace in our time if future is not to be radioactive.”⁷³ Unlike some of his contemporaries, he was also not attracted to

Universities. William Fowler to Lee DuBridge, 7 Apr 1951, Folder 2, Box 117; James Killian to DuBridge, 10 Apr 1951, Folder 6, Box 117; DuBridge to Fowler, 10 Apr 1951, Folder 9, Box 8. All WAF/CITA.

69. “Policies and Procedures” (ref. 64).

70. DuBridge to Fowler, 10 Apr 1951, Folder 9, Box 8, WAF/CITA.

71. William A. Fowler, “From steam to stars to the early universe,” *Annual reviews of astronomy and astrophysics*, 30 (1992), 1-9, on 3.

72. Interestingly, Fowler helped write a report for Caltech’s Rocket Project during the war on “Rocket borne atomic bombs,” undated, Folder 2, Box 113, WAF/CITA.

73. Notes for a speech entitled “The case against nuclear weapons,” 23 Mar 1950, Folder

research directly relevant to national security for its own sake.⁷⁴ When DuBridg asked him to direct the daily work of Project Vista, Fowler was not pleased to have to put his research plans on hold once again.⁷⁵

Neither his correspondence from the Vista period nor later interviews hint at Fowler's personal reaction to taking charge of a major defense study in which nuclear weapons would figure prominently.⁷⁶ Nonetheless, Fowler quickly plunged into his new work. With assistance from DuBridg and Lauritsen, Fowler commandeered the imposing Vista del Arroyo Hotel in Pasadena as headquarters for the project from which Project Vista received its moniker.⁷⁷

While classified studies took place off-campus at the Vista Hotel, the project's business management was carried out on campus. In addition, Fowler and the Lauritsens made space available on the second floor of the Kellogg Radiation Lab for a classified reading room. Over the next several weeks, the military provided hundreds of defense-related books on everything from reports on psychological warfare in Korea to the history of the tank, while Caltech hired librarians to monitor the collection that Vista participants used for their research.

With the basic logistics of Project Vista established, Fowler and Charles Lauritsen went east for a three-week fact-finding trip. Using Air Force transportation, Fowler traveled all over the eastern United States to establish contacts with the project's military sponsors and to arrange for documents to be made available for Vista's growing library.⁷⁸ Recording his thoughts and on-the-spot observations during his trip, Fowler sought to understand the military and political complexities Vista was to tackle: "Has [General Curtis] LeMay made any substantial improvements in his method of delivery?...CCL [Charles Lauritsen] afraid we will shoot our wad in 30 days....We will be approached by many people trying to sell us something....Vista must answer whether A-bombs really have tactical use. Whether they will stop Russian army from taking Europe."⁷⁹

Once back in Pasadena, Fowler confronted what would become a major challenge for Project Vista—recruiting competent scientists and engineers to take part

12, Box 142, WAF/CITA.

74. When Fowler proposed possible postwar research topics to the Navy, he explicitly noted that he wished to carry out unclassified basic research in which "possibility of applications is of secondary importance." "Proposal for research project with the Navy Office of Research and Inventions," 19 Jun 1946, Folder 1, Box 42, WAF/CITA.

75. Fowler to Edwin Salpeter of Cornell, explaining that DuBridg had tapped him to lead a "defense project" and that Salpeter, while still welcome at Caltech, would have to work with other researchers there, 24 Apr 1951, Folder 3, Box 20, WAF/CITA.

76. Fowler to DuBridg, 31 Mar 1951, Folder 2, Box 117, WAF/CITA.

77. However, rumors on the Caltech campus speculated that Vista actually stood for "Very Important Strategic and Tactical Analysis," an idea which Fowler later joked was 80 percent correct, ix, Vista Report.

78. Fowler's trip report, dated 30 Apr 1951, Folder 11, Box 117, WAF/CITA.

79. Various notes, typically undated, from Fowler's personal notebooks from 1951; Box 123 of WAF/CITA.

in the study. With encouragement from DuBridge, dozens of selected Caltech faculty agreed to participate. Some, like Fowler, were full-time, others, like Robert Bacher, part time.⁸⁰ In a memo to the Caltech faculty, DuBridge explained that “certain members of the staff” would be asked to participate in Vista while other faculty would “assist in carrying extra teaching and research programs.” In this manner, Vista affected everyone at Caltech.⁸¹ Project Vista did not formally call upon staff at JPL, perhaps to enforce the premise that Caltech and JPL were distinctly separate organizations linked together mainly through administrative ties and management fees.

Assembling a broad coalition of participants from outside Caltech required extensive campaigning and cajoling. Fowler and DuBridge called upon their network of personal and professional contacts to lure contributors to Project Vista. As DuBridge told one alumnus from his Rad Lab days, “It looks as though the time has again come when ‘all good men must come to the aid, etc...’ In other words, defense efforts are coming to the fore.”⁸² These many defense efforts competed for the qualified scientists not already engaged in defense work and willing to put aside their personal research.⁸³ And also willing to abandon hope of bringing defense studies to their own institutions. While courting physicist James Van Allen to Vista, DuBridge offered the enticement that “it might be to your advantage to join this enterprise in the hope that your team could take a problem home to continue work there next year.”⁸⁴

Some scientists rejected such overtures because they thought studies like Project Vista neither wise or useful. Merle A. Tuve was no stranger to defense work, having taken a lead role in developing the proximity fuse, a wartime project on which Fowler had also worked. Fowler tried to win Tuve with the possibility that the project would suggest some “technological developments which will be of concrete help to the heretofore scientifically neglected doughboy.” Unconvinced, Tuve replied that the world situation was not yet dire enough for scientists to “lay down our tools for research and pick up other tools to begin fighting.” Moreover, Tuve deprecated Vista and other “expert kibitzing projects,” suggesting that the scientific community “cannot take on any more of this arm chair analysis and advising.”⁸⁵

80. The average for Caltech faculty was about 50% time. Undated memo in Folder 16, Box 116 in WAF/CITA.

81. DuBridge to Caltech faculty, 20 Apr 1951, Folder 134, Box 2, Record Group 200, NARA.

82. DuBridge to Walter F. Dyke, 27 Mar 1951, Folder 10, Box 116, WAF/CITA.

83. A fact noted in 6 Sep 1951 draft of “Scientists and mobilization: General remarks on development of a plan” prepared by the Office of Defense Mobilization-Science Advisory Committee; Folder 7, Box 186, LAD/CITA.

84. DuBridge to Van Allen, 27 Mar 1951, Folder 10, Box 116, WAF/CITA. DuBridge was aware that Van Allen, who had worked on proximity fuse technology during World War II, was interested in getting a defense study underway at the University of Iowa.

85. Fowler to Tuve, 23 Apr 1951 and 7 May 1951, Tuve to Fowler, both Folder 10, Box 116, WAF/CITA.

Gradually, the efforts of DuBridge, Lauritsen, and Fowler produced a migration of scientists to Pasadena and Project Vista. By July 1951, the participants of Vista read like a who's who list for mid-century science—Carl Anderson, Lloyd Berkner, Enrico Fermi, Leland Haworth, Edward Teller, and Jerrold Zacharias were among the eighty-odd participants.⁸⁶

Because of Vista's focus on delivery of small-yield tactical nuclear weapons, its staff included nuclear physicists, aeronautical engineers, rocket experts, and astronomers, who explored applications of astronomical apparatus to aerial photography, infrared detection of troops and tanks, and the use of night-vision equipment.⁸⁷ Vista also included studies of chemical, biological, and radiological warfare that demanded the expertise of chemists and chemical engineers. Experts in the economic and political history of Europe contributed, as did one Caltech faculty member whose specialty was water and sanitation engineering. Industrial representatives from firms such as the Polaroid Corporation acted as consultants. Military officers contributed oversight as well as guidance on weapons systems and tactics. Pentagon officials put in frequent appearances as rumors began to circulate about some of Vista's controversial recommendations.⁸⁸

Like Project Troy, an MIT-based summer study that examined political warfare and propaganda techniques, Vista drew upon the humanities as well as the sciences.⁸⁹ Caltech economist Horace N. Gilbert contributed to at least three different Vista study groups, including ones on psychological warfare (PSYCHON), intelligence (INTELLICON), and the physical, social, political, and economic landscape of Western Europe (WHERON). He was joined as a member of PSYCHON by Heinz E. Ellersieck, a historian at Caltech, and Hallett D. Smith, a Caltech scholar of Elizabethan literature. Saul K. Padover, the dean of the New School of Social Research in New York City and an expert on psychological warfare, advised about "social factors" that might affect a conflict in Europe.⁹⁰

PSYCHON was not limited to members of the academy. Henry Dreyfuss, a Caltech trustee and noted industrial designer contributed as did Hollywood film director Frank Capra, a Caltech graduate of 1918, known for his *Why We Fight* propaganda films that earned him a Congressional citation of honor. Also from

86. Of the many institutions that contributed scientists to Vista, the Cornell Aeronautical Laboratory (CAL) was most generous and provided more than a dozen scientists, some of them on a full-time basis. At the time Vista got underway, CAL was engaged in developing the Lacrosse surface-to-surface guided missile, a complement to JPL's Corporal program.

87. Caltech astronomer Jesse L. Greenstein described his participation in interview with Spencer Weart, 21 Jul 1977, 160-164 (NBL/AIP). Greenstein was the author or contributor to a number of technical reports for Volume 2 of the final Vista Report as well as the chairman of PHOTON, the codename of Vista's panel on reconnaissance techniques.

88. A point made by William Fowler in a later oral history; quoted on p. 179 of Elliot (ref. 11).

89. Allan A. Needell, "Truth is our weapon: Project TROY, political warfare, and government/academic relations in the national security state," *Diplomatic history*, 17 (1993), 399-420.

90. Padover to Earnest Watson, 8 Jun 1951, Folder 7, Box 117, WAF/CITA.

Hollywood came a small study group named MOVION. Led by cinematographer Alfred L. Gilks, who had shot the 1951 Gene Kelly film *An American in Paris*, the group prepared a dozen short, color documentary films that showed weapons demonstrations and military exercises.

Most of Vista study groups were chaired by Caltech faculty. Robert Bacher, for example, led the “Special Weapons” group (SPECON), which examined the role for tactical atomic weapons that made the final Vista report so controversial.⁹¹ The leaders of each study group met once a week and Vista participants traveled frequently, often on Air Force aircraft. One of the biggest events Vista staff attended was a multi-day joint military exercise in August 1951, based on a simulated invasion of the southern United States by the Russian Army, conducted at Fort Bragg in North Carolina. Throughout the study, participants were kept informed of events, security rules, and additions to the library by the publication of the weekly *Vista hopper*.

Security precautions, coupled with the pervasive presence of people from the armed forces and the creation of study groups with code names like PHOTON and PSYCHON, combined to create a highly militarized atmosphere. Representatives of the Army, Air Force, and Navy kept close tabs on the researchers. Robert Bacher recalled that every week a high-ranking military official would appear in Pasadena and try to influence the project in one way or another.⁹² With people from the armed forces, the Atomic Energy Commission, and Congressional committees for military affairs all moving in and out of the Vista del Arroyo Hotel, Alan Thorndike, a nuclear physicist from Brookhaven National Laboratory, griped that “just how all these people arrive at a common decision...is beyond me.”⁹³

Security lapses at the Vista hotel added to the already tense atmosphere Vista’s participants were working in during the summer and fall of 1951.⁹⁴ More seriously, two Vista participants were denied security clearances after they had participated in classified briefings.⁹⁵ Frank Capra’s security clearance was long delayed, much to his embarrassment.⁹⁶ At a Christmas party for Vista staff, an administrative officer for Vista made the presumably cocktail-fueled claim that Fowler,

91. Bacher’s colleagues on SPECON included Robert Christy (Caltech), Leland Haworth (Brookhaven), William Higinbotham (Brookhaven), Charles Lauritsen (Caltech), Robert Oppenheimer, Homer Stewart (Caltech), and Alan Thorndike (Brookhaven); Vista Report, p. 344. Edward Teller also contributed, according to Vista records, fifteen days of effort in July 1951, Folder 7, Box 116, WAF/CITA.

92. In June 1951, Thomas K. Finletter, the Secretary of the Air Force, toured the Vista Project before giving a hawkish commencement address to Caltech’s graduates; *Bulletin of the California Institute of Technology*, 60 (1951). Bacher recalled the military’s persistent oversight of Vista as noted on p. 66 of Herken (ref. 38).

93. Thorndike to Leland Haworth, 16 Jul 1951, Folder 4, Box 117, WAF/CITA.

94. Fowler to Vista staff, 5 Dec 1951, Folder 11, Box 116, WAF/CITA.

95. The two were historian Heinz Ellersieck and physicist Paul Epstein. After protests from Caltech were filed, the clearances were eventually granted.

96. Capra to DuBridge, 16 Jan 1952, Folder 11, Box 116, WAF/CITA.

DuBridge and others should be jailed for security breaches in Vista, charges that he said his brother-in-law, allegedly an FBI agent, was already looking into.⁹⁷ Nevertheless, Vista personnel managed to find some humor in their grim task—Fowler occasionally signed correspondence in the summer of 1951, “Hasta la Vista.”

Project Vista’s management and execution exemplified the “operations research” approach to solving complex military problems that was gaining in popularity and attention in both the military and scientific communities.⁹⁸ Fowler’s foreword to the final Vista Report emphasized how the project’s recommendations when “*taken together*...represent a *program*” that could contribute to the strength and security of the U.S. and Europe and compensate for the West’s shortage of men and matériel.⁹⁹ The activities of Vista’s scientists, engineers, and humanists reflected powerful postwar beliefs in technological solutions and their ability to provide them. Jerome Wiesner, an electrical engineer from MIT who participated in Vista and several other summer studies, traced scientists’ confidence that they could “technically” protect the United States to their wartime successes with the Manhattan Project and the Rad Lab.¹⁰⁰ Whereas summer studies like Project Charles emphasized the security of the United States itself (through a sophisticated air defense system, in this case), Vista extended this vision to the protection of Europe.

Project Vista was a response to a crisis in foreign relations, historical circumstance, military capabilities, and geopolitics. During the execution of Vista and the other summer studies, what Eisenhower later called the “scientific-technological elite” acted as strategists. This role, as Tuve had warned Fowler, went beyond scientists’ expertise. Just as importantly and impertinently, Vista was caught up in the larger debate in the military and in policy circles about how to divide and deliver America’s nuclear arsenal. As the summer of 1951 drew to a close and they began to draft their report, Fowler, Lauritsen, DuBridge, and other leaders of Vista became acutely aware of the powerful political currents circulating beneath Project Vista.

97. 16 Jan 1952 note included in Folder 9, Box 117 of WAF/CITA.

98. During 1951, the Office of Defense Mobilization’s Science Advisory Committee (of which DuBridge was a member and later chair) gave attention to the question of systems-oriented defense studies. See F.B. Llewellyn (Exec. Secretary of SAC), “Systems engineering with reference to its military application” and other related matter, 1 Nov 1951, Folder 7, Box 186, LAD/CITA. Another indication of the systems-oriented milieu in which Vista developed is evidenced by a July 1951 address by Lloyd V. Berkner, president of the Associated Universities, Incorporated, an organization which Berkner hoped might participate in summer studies like Vista. Allan A. Needell, *Science, Cold War, and the American state: Lloyd V. Berkner and the balance of professional ideals* (Washington, D.C., 2000), 207-208. The history of the move toward operations research is discussed in M. Fortun and S.S. Schweber, “Scientists and the legacy of World War II: The case of operations research,” *Social studies of science*, 23 (1993), 595-642.

99. Vista Report, p. xii. Emphasis in the original.

100. Wiesner offers this view, see Herken (ref. 38), 72.

3. MAKING VISTA MATTER

Throughout the summer of 1951, Lee DuBridge continually apprised Caltech's trustees of the progress being made on Project Vista. Meanwhile, William Fowler pondered what would happen at Caltech once the summer study ended. In August 1951, Fowler corresponded with Frederick Seitz, a physicist at the University of Illinois and, later, president of the National Academy of Sciences and NATO's science advisor, regarding Vista's future. Seitz, familiar with the nexus of national defense and science, had recently visited Pasadena to contribute to Vista. Upon his return to Urbana, Seitz sent Fowler his thoughts on the project.

As Seitz saw it, Fowler and the Vista group could simply write a "large and impressive report," an activity already in progress at the Vista del Arroyo Hotel.¹⁰¹ While the report itself would probably be filed away, the "impact of personalities" involved might be useful. A second possibility would be for Caltech to identify several "very specific hardware problems" and tackle these projects with military funding.

A third option interested Seitz the most. He recommended to Fowler that Caltech explore "something in the nature of a 'college'" that would make a "continuing and detailed study of the European problem." As Seitz envisioned it, a permanent organization, perhaps along the lines of what MIT did when it created Lincoln Laboratory, at Caltech with "ten or eleven divisions" would serve as a "national center" to direct research on both tactical and strategic problems. Seitz laid out his plans in great detail, discussing pros and cons, recruitment issues, and the role of the military. He envisioned Caltech faculty remaining in "very close touch with the work for professional as well as patriotic reasons," while a large number of scientists and other researchers from outside institutions would come to Caltech's new "college" on a rotating basis. Optimistic about such a plan, Seitz noted that the "temper of individuals" had changed markedly with respect to defense studies since 1949. Fowler presented Seitz' ideas to DuBridge.

Fowler had also considered the possibility of producing a documentary film that would feature Vista's recommendations and raised the matter with Frank Capra. Like Seitz, Capra warned against preparing an ineffective "Sears and Roebuck catalogue" as a final report.¹⁰² Instead, the director of *Mr. Smith Goes to Washington* suggested that Vista borrow a strategy from the movie industry and present the report as a color film, accompanied by a one-page treatment of the theme and a brief synopsis of the report's findings. Capra proposed that Caltech hire "a handful of Hollywood script writers who are clearable, security wise" to assist Vista. Charts or animation by Walt Disney Productions could enliven the movie and generate support for Vista's findings.¹⁰³ Like Seitz, Capra was upbeat about the possibility

101. Seitz to Fowler, 8 Aug 1951, Folder 8, Box 117, WAF/CITA.

102. Capra to Fowler, 10 Aug 1951, Folder 14, Box 118, WAF/CITA.

103. During World War II, Disney studios produced a series of propaganda and training films. After the war, Disney created nuclear-friendly works like *Donald Duck's atom bomb* (1947) and *Our friend the atom* (1957).

of expanding the summer study: "Point is, if Vista has any recommendations or conclusions worthwhile they may need nursing and selling. The motion picture is your best salesman."

Not a feature-length documentary, but the recommendation to develop tactical nuclear weapons and the participation of Robert Oppenheimer brought notoriety to Project Vista in the fall of 1951.¹⁰⁴ In language that alarmed the Air Force's Strategic Air Command, DuBridge and Fowler, both opponents of the hydrogen bomb, stated that Vista had "found no great new weapons...we believe we can get along with those we have."¹⁰⁵ The Vista report as a whole, and specifically the infamous chapter 5 ("Atomic Warfare") to which Oppenheimer contributed, was essentially an academic ratification of policy positions concerning the defense of Europe and the development of nuclear weapons already expressed publicly by Oppenheimer, Vannevar Bush, and James Conant.¹⁰⁶ It was, in effect a "definite blow to the 'big bomber' school of thinking" that dominated Air Force strategy. The nation's relatively scarce fissionable materials would be better used destroying an invading Soviet army than Russian cities.¹⁰⁷

In the early fall of 1951, Oppenheimer, a former Caltech professor, traveled back to Pasadena to offer advice to Vista. He was already being criticized for his background and policy recommendations, especially about atomic warfare. Oppenheimer helped Vista's "special weapons" panel clarify and organize their ideas about how the nation's nuclear stockpile should be divided between tactical weapons, strategic atomic bombs, and thermonuclear hydrogen bombs (the first prototype had been tested in the South Pacific the previous May) and how these weapons could be used in battle. Oppenheimer spent less time at the Vista del Arroyo Hotel than Edward Teller had earlier in the summer.¹⁰⁸ Yet his involvement drafting the chapter on atomic warfare sparked the concern of high-ranking Air Force leaders.

When word of Oppenheimer's participation in Caltech's study and rumors of Vista's proposed recommendations filtered back to Washington, Air Force Secre-

104. The Vista Report and Oppenheimer's role in preparing it is commonly presented as evidence of his alleged bad judgment. See John Major, *The Oppenheimer hearing* (New York, 1971), chapt. 5; Herken (ref. 38), 66-70.

105. "Letter of Transmittal," Vista Report, p. vi.

106. Conant's views on the defense of Europe are articulated in "The defense of Europe in the atomic age" given to the Chicago Association of Commerce and the Council on Foreign Relations, File: Conant, James B. (correspondence), 17 May 1951, Box 27, JRO/LOC. Also see James G. Hershberg, "'Over my dead body': James B. Conant and the hydrogen bomb," in E. Mendelsohn, M.R. Smith and P. Weingart, eds., *Science, technology, and the military* (Amsterdam, 1988), 379-430.

107. Hanson W. Baldwin. "Experts urge tactical air might; score stress on big atom bomber," *The New York Times*, 5 Jun 1952, p. 13.

108. Vista personnel lists; Folder 7, Box 116, WAF/CITA. According to Air Force scientist David Griggs, Teller's contribution to Vista was to persuade the study that thermonuclear weapons deserved a more prominent role in their report; *ITMOJRO*, 762-763.

tary Thomas Finletter, already eager to keep Oppenheimer away from classified matters, was enraged. Supposedly acting on a suggestion from John McCone (who had recently resigned as undersecretary of the Air Force and was again a Caltech trustee), Finletter dispatched the Air Force's new chief scientist, David T. Griggs, to hear an early presentation of Vista's findings.¹⁰⁹ Unlike his predecessor Ridenour, Griggs was not sympathetic to views on atomic strategy held by people like Oppenheimer, DuBridge, and Lauritsen. In mid-November, Griggs arrived in Pasadena. He expressed satisfaction with the Vista team's efforts though their views on atomic warfare caused "an explosion in the Air Force."¹¹⁰ It is difficult to understand the Air Force reaction to the Vista report. The views of key Vista participants like Lauritsen and DuBridge regarding the hydrogen bomb and the Air Force's lopsided emphasis on the use of atomic weapons for attacking Soviet cities were well known. Informed people in the Pentagon could not have been surprised either by Project Vista's recommendations or the reaction of the Air Force's "big bomber" advocates to them.¹¹¹

After Griggs and his Air Force colleagues left, DuBridge and Lauritsen discussed their options. At this point, according to DuBridge's recollection, McCone intervened again and suggested that Caltech's president present the draft report directly to General Eisenhower and other top leaders of NATO's forces in Europe.¹¹² DuBridge arrived in Paris on December 4, 1951 accompanied by Oppenheimer, Lauritsen, and Walter Whitman, chair of the Pentagon's Research and Development Board.¹¹³ Accounts in *The New York Times* and *The Herald Tribune* connected their visit to recent Buster-Jangle atomic tests in Nevada.¹¹⁴ They lunched with Eisenhower and summarized Vista's activities for him. Overall, DuBridge, Oppenheimer, and Lauritsen described a future war in Europe as something very similar to World War II (something Eisenhower certainly understood) albeit with the added complication of atomic weaponry.¹¹⁵

109. McCone's role is described by Griggs in his testimony at Oppenheimer's hearing; *ITMOJRO*, 758.

110. Murphy (ref. 7), 110.

111. Elliot (ref. 11) rightly notes that the Air Force was not a monolithic entity with a single shared vision or policy and that there were certainly inter-service as well as intra-service debates and rivalries at play, pp. 179-181.

112. McCone's involvement as a go-between between the Vista group and Finletter is described in DuBridge to Oppenheimer, 3 Nov 1951, File: DuBridge, Lee A., Box 31, JRO/LOC.

113. Vista's trip to Europe is discussed in a number of places including Elliot (ref. 11), 174-176 and Evangelista (ref. 11), 136-140.

114. This was not a wild guess as the Buster-Jangle test series was primarily directed toward testing low-yield atomic weapons that could have been suitable for tactical use.

115. Fowler and other Vista participants considered soliciting former German generals for their input on the best way to defend Europe against a Soviet invasion, advice Fowler noted they were uniquely positioned to give. Fowler to Horace Gilbert, 2 May 1951, Folder 14, Box 117, WAF/CITA.

The scientists then met with General Lauris Norstad, the commander of the United States Air Force in Europe. After their first meeting with Norstad, DuBridge and his companions edited parts of the Vista report that the Air Force objected to. When they convened again the next day, Norstad said that his “general impression of the report was favorable.”¹¹⁶ He was impressed by DuBridge and especially by his “willingness to consider modification of the report already written [which] strikes me as evidence of an objective approach.”¹¹⁷

DuBridge himself came away from his trip to Europe with newfound admiration for Eisenhower and wrote him that he hoped their personal meeting in France would make the Vista report “more helpful to you than it otherwise might have been.”¹¹⁸ In February 1952, DuBridge traveled to Washington with Lauritsen and Fowler to give a series of briefings to the Joint Chiefs of Staff and 300 high-ranking Pentagon officers. It was a tough audience.¹¹⁹ Even Clark Millikan, a Caltech aeronautical engineer and frequent defense consultant, “got the shakes” while giving his briefing.¹²⁰ Prepared for a hostile reaction, DuBridge reminded his audience that Vista did not originate at Caltech: “I will not say you rammed the idea down our throats—and yet I know of no more accurate way of describing what happened.”¹²¹

DuBridge outlined Vista’s stress that the project’s task was not “to invent a new weapon” but rather to illustrate how NATO could be “smart...[and] make up for inferiority in numbers by superior intelligence and know-how...to take advantage of the best of American technology.” Besides strengthening the Air Force’s ability to support Army troops with conventional firepower, “tactical employment of our atomic weapons resources holds outstanding promise.”¹²² Not all of Vista’s recommendations were controversial. The report contained recommendations for a lightweight tank destroyer and better reconnaissance and intelligence-gathering techniques. Throughout his talk and those that followed the themes of technological solutions achieved through scientific expertise, rational analysis, and systemic thinking abound.

Nonetheless, the furor accompanying the Vista Report regarding Oppenheimer’s participation and its recommendations for tactical airpower and atomic warfare went unabated. After the briefings, the Air Force moved to suppress the report. Angered at this action, DuBridge urged Finletter to “use your influence to see that

116. Norstad’s comments are from a series of “Red Line” messages between him and General Vandenberg dated 7 and 8 Dec 1951, Security File, Box 86, HV/LOC.

117. Herken (ref. 11), 395, ironically notes how some in the Air Force found the acquiescence of DuBridge, Lauritsen, and Oppenheimer to Norstad’s requests a cause for great concern as well.

118. DuBridge to Eisenhower, 21 Dec 1951, Folder 17, Box 3, CCL/CITA.

119. Hostility described in Dale Corson to Jerrold Zacharias, 26 Aug 1954, Folder 4, Box 187, LAD/CITA.

120. 19 Feb 1952 diary entry; Box 36, CBM/CITA.

121. “Vista briefing,” 13 Feb 1952, Folder 11, Box 117, WAF/CITA.

122. “Summary,” p. xxi of the Vista Report.

the report is promptly reissued while it is still fresh and timely and while there is still keen interest in it.” His attempt to salvage some usefulness from all of Caltech’s efforts was, of course, futile since Finletter himself approved of the censorship.¹²³ Copies of the Vista Report were recalled to Washington and, as Frederick Seitz had predicted (but for different reasons), Vista, after a final cost of almost \$750,000, did indeed end up “somewhere in the back of a file” until its declassification three decades later.

4. THE PATH NOT TAKEN

While the buried Vista report did not entirely vanish, its implications may be considered the perspectives of the broader science community in the United States in the early 1950s of Caltech’s development during the early Cold War, and of Lee DuBridge’s vision for Caltech and science in the service of national security.

At the national level, Vista helped expose growing rifts between scientists and their military sponsors and within the research community itself. Unlike MIT’s Project Hartwell (which the Navy embraced as the bible of undersea warfare) Vista received a limp reception.¹²⁴ Air Force opposition did not stop with its controversial recommendations. The report also stirred up a general resentment in the Pentagon of “theoretical” studies done by supposedly uninformed “long-haired scientists.”¹²⁵ One Army general who criticize the Vista Report complained that the military really did not want “criticism of the work of the fair-haired boys.”¹²⁶ Years after study had ended, DuBridge would still bristle at suggestions that the Vista report was somehow flawed by naivete; its authors, he said, had received a constant stream of advice and input from the military.¹²⁷

The accusation that scientists who carried out summer studies like Vista were operating well outside their area of expertise recurred in the Oppenheimer hearings, Roger Robb, the AEC’s counsel, exhorted Oppenheimer to “tell us why you felt it was your function as a scientist to express views on military strategy and tactics” when this “went beyond the scope of [a scientist’s] function.”¹²⁸ A scandal-mongering article written by an Air Force insider for *Fortune magazine* likewise shrilled that “there was a serious question of scientists’ trying to settle such grave national issues alone, inasmuch as they bear no responsibility” for a successful outcome.¹²⁹ During the earlier debate over international control of atomic

123. DuBridge to Finletter, 11 Mar 1952, Box 3, Folder 174, LAD/CITA.

124. Marvin and Weyl (ref. 1), 7.

125. Baldwin (ref. 106).

126. Brigadier General Henry J.D. Meyer, 25 Apr 1952, File 2, Box 18, RG 381, NARA. Also, Dale Corson to Jerrold Zacharias, 26 Aug 1954, Folder 4, Box 187, LAD/CITA.

127. Judith R. Goodstein, “A conversation with Lee Alvin DuBridge, pt. II,” *Physics in perspective*, 5 (2003), 281-309, 303.

128. *ITMOJRO*, p. 959.

129. Anonymous (ref. 109), 230.

energy, DuBridge had voiced similar sentiments, cautioning his scientist colleagues that there was a point when “we sail off into regions in which we are but laymen.”¹³⁰

While Vista germinated at Caltech, an MIT physicist asked his colleagues “Must we always be gadgeteers?” and argued that scientists should “contribute to the better use of the tools and weapons they have helped make.”¹³¹ Not all agreed with this suggestion. Physicist and H-bomb enthusiast John A. Wheeler, when trying to recruit Richard Feynman from Caltech to work on the hydrogen bomb, argued that the physicists’ task was not to become strategists but to do “primordial design” and remain within their realm of expertise. Wheeler could just as easily have been speaking to any of the scientists involved with Project Vista when he described the “hair-shirt philosophy of many nuclear physicists” who wanted to “tell the admirals and generals how to do tactical and strategic this-and-that.”¹³²

Scientists participated in Vista and other summer studies while still debating among themselves about whether and how to contribute to national security. They took note of how the Air Force squelched the Vista report and the subsequent pillorying of Oppenheimer for his policy views, both good cautionary tales. Dale Corson, a Vista participant and future president of Cornell University, declined to join a subsequent MIT-sponsored summer study. He complained that the national security establishment had been hostile toward unwelcome advice during the Vista briefings at the Pentagon. Similarly, astronomer Albert Whitford, another Vista alumnus, resisted attempts to recruit him for more defense studies, choosing instead to pursue “astronomy-as-usual” where he would be “freer to think my own thoughts.”¹³³ Even Charles Lauritsen, who had long-standing ties to the military, questioned whether scientists’ advice on defense matters would still be welcome after the controversy over Vista and especially the Oppenheimer hearing.¹³⁴

At the local level of Caltech, Vista’s impact can be seen as the dog that did not bark. In August 1951, Fowler informed DuBridge of the various possibilities for enhancing and extending Project Vista.¹³⁵ Fowler intimated that the possibility of a war “college” at Caltech seemed most appealing and reported back to Seitz that the “seed had been planted.” The seed never sprouted and Caltech never institutionalized Project Vista by establishing a “war college” in Pasadena. Nor did Caltech’s leaders parlay their summer study into permanent research facilities on campus devoted to classified research and publications by students and faculty. As

130. Lee A. DuBridge, “Science and national policy,” *American scientist*, 34 (1946), 226-238, 227.

131. Philip Morse, “Must we always be gadgeteers?,” *Physics today*, 3 (1950), 4-5.

132. Wheeler to Feynman, 29 Mar 1951, Folder 10, Box 3, RPF/CITA.

133. Dale Corson to Jerrold Zacharias 26 Aug 1954, and A.E. Whitford to Zacharias, 25 Aug 1954, both Folder 4, Box 184, LAD/CITA.

134. Holbrow, “Charles C. Lauritsen: A reasonable man in an unreasonable world,” *Physics in perspective*, 5 (2003), 419-472, on 464-465.

135. Fowler to DuBridge, 13 Aug 1951, Folder 14, Box 116, WAF/CITA.

DuBridge recalled, “I think at the end of it...we hoped we wouldn’t have to get into this again.”¹³⁶

In contrast, MIT used its participation in summer studies to expand the school’s expertise and experience in research areas related to the military’s needs and substantially develop the school’s infrastructure.¹³⁷ Project Troy eventually became the nucleus for the CIA-funded Center for International Studies (CENIS).¹³⁸ Further-reaching and more influential was Lincoln Laboratory, originally established as an on-campus by-product of Project Charles, a study of continental air-defense as controversial as Vista. Originally on campus, Lincoln Lab quickly grew into a facility with a \$20 million budget and over two thousand employees that developed hardware. Lincoln, CENIS, and similar organizations that performed classified research became closely integrated into MIT’s educational and research programs. They had a substantial impact on the campus as a whole and continued to make a significant contribution to MIT’s educational mission in a way that Caltech never exploited with its own major off-campus endeavor such as JPL or the Naval Ordnance Test Station.¹³⁹

The controversy surrounding Project Vista might have dissuaded the military from commissioning a “college” or another summer school at Caltech had the institution wished to have one. Moreover, the limited relationship between Caltech and JPL suggests that the response to such an idea would not have been favorable. Caltech’s trustees were by nature and political leaning ambivalent. If not opposed to support the institute with federal funds. Their antipathy probably contributed to Caltech’s disinterest in continuing Vista in some form and perhaps even institutionalizing it.¹⁴⁰

Project Vista’s history exemplifies the close attention Caltech’s trustees paid to the school’s management. The trustees were informed of the potential for a major defense study soon after negotiations for Vista began. They received security clearances that enabled them to be kept abreast of Vista’s progress. After *The New York Times* described the controversy Vista had caused in the Pentagon, DuBridge, always eager to keep Caltech’s trustees informed, explained to them that the newspaper “exaggerated certain particular controversial features which we did not regard as the most important parts of the report.”¹⁴¹ While John McCone

136. Goodstein (ref. 126), 302.

137. A point well made in Stuart Leslie, “Profit and loss: The military and MIT in the postwar era,” *HSPS*, 21:1 (1990), 59-85.

138. This was founded in January 1952; its first director was Max Millikan, son and brother of Caltech’s Robert and Clark Millikan.

139. Killian to Lincoln Lab staff, copy to DuBridge, 2 Jan 1953 Folder 2, Box 138, LAD/CITA.

140. As Vista was winding down, the trustees told DuBridge of their concerns about “wholly classified contracts” which did not contribute to Caltech’s educational mission. “Minutes – January 7, 1952 Meeting of the Trustees”, TMM/CIT. See also Reese Taylor to DuBridge, 14 Feb 1952, Folder 3, Box 123, LAD/CITA.

141. Baldwin (ref. 106); DuBridge to Trustees, 10 Jun 1952, Folder 8, Box 123, LAD/CITA. Nonetheless, one Caltech trustee thanked DuBridge for the article which he believed

and DuBridge may not have shared identical political viewpoints, as they moved between the Pentagon and Pasadena, both endeavored to make Vista benefit both Caltech and national security. When *Fortune* published its “profoundly disturbing” story that claimed that Vista had damaged U.S. national security, DuBridge asked McCone whether his Air Force connections would help tone down any future articles that might impugn Caltech’s reputation.¹⁴²

After Vista ended, Caltech remained a prominent contributor to the Cold War military-industrial-academic complex. Its trustees and alumni had close ties to the Pentagon and military contractors. McCone used Vista’s general recommendations in speeches that advocated the value of tactical nuclear weapons. He later was Eisenhower’s controversial chairman of the Atomic Energy Commission and director of the CIA under Kennedy.¹⁴³ Some Caltech faculty, including Charles Lauritsen, continued to contribute to classified research and advise on defense matters through organizations like the Institute for Defense Analysis and JASON. These permanently mobilized groups of scientist-advisors may be viewed as examples of the “war college” Seitz and Fowler discussed as one possible legacy of Vista.¹⁴⁴

Caltech’s professed ambivalence about JPL and its unwillingness to have classified research on campus suggest that the concept of the “Cold War University” is more complex and subtle than heretofore conceived. More attention needs to be given to whether classified research and labs were located on or off-campus and the rationales behind accepting them. DuBridge and Caltech’s administration were lukewarm about the school’s management of JPL. Off-campus labs doing classified work caused “frequent and often severe” headaches. “We would not consider having on our campus a project of this kind involving classified work. Freedom to exchange ideas with one’s colleagues is essential if a proper research atmosphere is to be maintained,” Caltech’s dean of faculty would later claim.¹⁴⁵

During the first four years of his tenure as Caltech’s president, the politically conservative DuBridge, like many scientists-turned-administrators, advocated the model of scientific research articulated in Vannevar Bush’s *Science—The endless frontier*. DuBridge extolled the value of basic science and lobbied for the establishment of a National Science Foundation which would prevent postwar science

would help generate funds for Caltech from non-government patrons. Albert Ruddock to DuBridge, 30 Jun 1952, Folder 4, Box 129, LAD/CITA.

142. DuBridge to McCone, 8 Jul 1953, Folder 7, Box 4, CCL/CITA.

143. “A basis for survival in the atomic age,” speech by McCone before the Institute of World Affairs in Riverside, CA, 15 Dec 1953, Folder 2, Box 126, LAD/CITA.

144. Caltech and MIT were both charter members of IDA. Judging from materials in DuBridge’s files and the IDA’s own annual reports, Caltech’s institutional commitment to IDA was limited. Several Caltech faculty, however, personally served as members of JASON which became in essence a permanent summer study as noted by Finn Aaserud in “Sputnik and the “Princeton Three”: The national security laboratory that was not to be,” *HSPS*, 25:2 (1995), 185-239.

145. Ernest Watson to George Boyd, 25 Jan 1957, Folder 9, Box 123, LAD/CITA.

from “becoming a step-child of military technology.”¹⁴⁶ After physicists’ wartime successes, he called for scientists to return to the role for which they were originally trained—not as an engineer or the “inventor of gadgets or weapons but...[as] one who seeks knowledge and understanding.”¹⁴⁷ DuBridge expressed concern about secrecy pervading scientific research and warned against it.¹⁴⁸ And when asked by Oppenheimer to be an advisor to the *Bulletin of atomic scientists*, DuBridge had cautioned against scientists venturing too far into the realm of politics and statecraft, replying that “many of the problems which it attacks...go far beyond the bounds of science.”¹⁴⁹ Nonetheless, DuBridge reluctantly organized Caltech’s participation in a secret, federally-funded, “engineering-oriented” summer study in which scientists offered advice on topics that had more to do with national policy and defense than with the research areas in which they were experts.

Because Caltech’s participation in Vista, its connection to JPL, and its rapid reliance on federal funding contradict many of the ideas DuBridge advocated in his postwar speeches and writings, some historians have thought him prone to rationalization and excessive compromise.¹⁵⁰ His inclination to excuse the expansion of weapons research at JPL, his acquiescence to the military’s request to host Vista, and his attempt to modify the draft of the Vista report to accommodate its military sponsors all support this assessment. So does his shifting of the responsibility from himself and Caltech: “The fact that when the war ended in 1945 and we were not able to go back to peacetime activities as we all had hoped is not the fault of Caltech or of the military services but the fault of one Joseph Stalin.”¹⁵¹

A more generous interpretation of DuBridge is that of a pragmatic academic leader who struggled to balance his personal ideals and his goals for Caltech with the rapidly changing exigencies of the postwar world. As Caltech’s president, he used his diplomatic and administrative talents to govern by consensus.¹⁵² As his meetings with Eisenhower and Norstad demonstrated, DuBridge had an ability to make his points, to compromise when necessary, and to avoid taking a hard-line that might alienate others. The same can be said for his dealings with Caltech’s

146. DuBridge (ref. 129). Daniel J. Kevles, *The physicists: A history of a scientific community in America* (Cambridge, 1995), quote on 358.

147. Lee A. DuBridge, “The effects of World War II on the science of physics,” *American journal of physics*, 17 (1949), 273-281, on 274-275.

148. A point made in a number of DuBridge’s articles immediately after World War II ended including ref. 129. His views on the issue of secrecy were strongly supported by primary Vista participants like Charles Lauritsen; see 451-452 of Holbrow (ref. 134).

149. Oppenheimer to DuBridge 23 Sep 1948, and reply, DuBridge to Oppenheimer, 28 Sep 1948, both Folder 1, Box 204, LAD/CITA.

150. Paul Forman, “Behind quantum electronics: National security as basis for physical research in the United States, 1940-1960,” *HSPS*, 18:1 (1987), 149-229, on 185.

151. Stalin quote written specifically in response to Pasadena residents’ complaints about noise from JPL, DuBridge to Harry Newman, 26 Sep 1951, Folder 6, Box 16, LAD/CITA.

152. I owe a debt here to Prof. Larry Badash who stimulated my thinking with his personal recollection of meeting DuBridge.

trustees and faculty, two groups of people that did not always see eye to eye in the charged political atmosphere of the early Cold War.

Despite the Air Force censorship of Vista, DuBridge remained committed to the idea that scientists could have a voice, albeit limited, in national security affairs. His initial and seemingly naïve views of how postwar science would be done, especially at Caltech, were tempered by the unexpected domestic and international crises of 1949 to 1952 and swept away by a flood of federal money. After June 1952, DuBridge, serving as the new chair of the Office of Defense Mobilization's Science Advisory Committee, encouraged his colleagues (who included Caltech's Robert Bacher and Charles Lauritsen) to make defense-related science and their advisory influence in general more effective. His frustration with postwar science advising, and Vista in particular, were reflected in his recollection that "We just didn't see much point in writing reports for a file drawer."¹⁵³

DuBridge saw Vista as a way for Caltech to retain talented faculty and generate income while still performing an important service for national security. He always took care to point out that the institute reluctantly took part in the summer study (a "purely isolated, unique event...nothing like it happened afterwards") and maintained that Caltech was reluctantly conscripted for it.¹⁵⁴ While Vista itself was largely a failure for its sponsors and the scientists and scholars who undertook it, DuBridge went on to pursue a more activist agenda for the SAC and helped forge an advisory mechanism that gave science advisors a more direct connection to Eisenhower and the White House.¹⁵⁵ Rather than being filtered through the military, scientists' input on national security matters would be heard at the highest levels of government. Thus DuBridge established a role for science and himself that more closely reflected his vision and values.

153. Kevles (ref. 4), 325.

154. DuBridge (ref. 58), 18; Goodstein (ref. 126), 298-302.

155. Zuoyue Wang, "American science and the Cold War: The rise of the U.S. President's Science Advisory Committee" (doctoral dissertation, University of California at Santa Barbara, 1994;); Richard V. Damms, "James Killian, the Technological Capabilities Panel, and the emergence of President Eisenhower's 'Scientific-Technological Elite,'" *Diplomatic history*, 24 (2000), 57-78.

W. PATRICK McCRA Y

Project Vista, Caltech, and the dilemmas of Lee DuBridge

ABSTRACT:

In the summer of 1951, more than one hundred scientists and other academics participated in Project Vista, a secret study hosted by the California Institute of Technology. Its purpose was to determine how existing technologies as well as ones soon to be available—tactical nuclear weapons, in particular—could offset NATO’s weaker conventional forces and repel a massive Soviet invasion of Europe many perceived as likely if not imminent. Despite the best efforts of scientists like William Fowler, Lee DuBridge, and J. Robert Oppenheimer, Vista’s recommendations were eventually suppressed by the Air Force. This article examines the history of Project Vista as a circumstance of the early Cold War period. By focusing primarily on the local level, the article presents a detailed examination of how people were recruited to Project Vista, how their work was organized and managed, and the relations between Caltech’s administration and trustees. Finally, this article considers the history of postwar universities as they struggled to adapt to the Cold War environment and scientists’ efforts to provide counsel to the U.S. government and military.
