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THE SITE SELECTION FOR THE NACA ENGINE RESEARCH LABORATORY: A MEETING OF SCIENCE AND POLITICS

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by

John D. Holmfeld

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CHAPTER 1

INTRODUCTION

In 1940 the National Advisory Committee for Aeronautics (NACA) selected Cleveland, Ohio as the site for its new Engine Research Laboratory, which today is the Lewis Research Center of NASA. The story of how that selection was made provides an example of the interaction between politics and science in modern society.

The selection of a site for a major government installation has most frequently been made through the political process. Congressional influence in the location of defense installations, agricultural research stations, and many others has traditionally been large and frequently decisive. The outstanding example is the concentration of Army installations in the southern states which is due to the influence of committee chairmen from that region.

In the case of the selection of a site for the Engine Research Laboratory Congress broke with this tradition, and instead authorized the NACA to select the site. The willingness of Congress to turn the site selection over to an agency of the Executive Branch was based on the belief that the agency could perform the task with the aid of science. The highly respected research agency was asked to make the selection with the understanding that it would employ the same unbiased, rational methods in selecting a site as it employed in its research work. In this context science did not mean the

formal testing and verification of hypothesis. It was seen, rather, in the larger sense as the use of careful criteria and methods. And in this sence science was to replace politics in making the decision.

Several developments resulted from this decision. The pressures normally directed against the Congress by interest groups in such matters were redirected toward NACA. The agency could not ignore these pressures, and it made some procedural concessions to them by extending the number of sites receiving detailed consideration. But these concessions did not affect the criteria or methods developed by the agency for making its selection, and they had no influence on the final result. Thus the pressures originating outside NACA were not able to force the return of the site selection process to the political arena.

NACA, however, found that the use of a site selection procedure based entirely on the methods of science could not provide the complete answer. Before the final choice of a site could be made the agency was forced to add to its selection procedure the kind of considerations and factors characteristic of the political process. These included the reaction to pressure groups, the weighing of factors not susceptible to exact measurement, and the engagement in negotiations to obtain concessions and commitments.

For NACA the selection of a site thus became a process of reconciling the methods of science and politics. The agency began with a clear intention to follow only an exact scientific procedure, but it was forced gradually to include, in addition, political

methods of arriving at a choice. This shift was forced not as much by the traditional interaction of group pressures originating in the larger political system, as by the nature of the task. In spite of the attempt to make it so, the task of selecting a site was one not wholly amenable to the scientific approach. That approach provided a way to evaluate and screen the many site bids which were received, and to determine the three or four top contenders. But a final choice of the most suitable location for the Engine Research Laboratory could only be made by seeking recourse to methods of choice not based on the approach through science.

Thus the story of the site selection for the Engine Research Laboratory is the story of the interaction between science and politics, between the use of exact knowledge and accomodation, in arriving at choice in modern society.

CHAPTER 2

THE ENGINE RESEARCH LABORATORY: NEED AND AUTHORIZATION

The progress made in military and civil aviation by the European powers in the late nineteen-thirties produced two closely related responses in the United States. One was an expansion of the aircraft production program to provide the armed services with a vastly increased number of military airplanes; the other was an increase in the research effort of the NACA. The initial NACA expansion was carried out by adding to the facilities at the committee's one existing laboratory at Langley Field in Virginia. But it soon became evident to NACA's leadership that entirely new laboratories were needed. Before the end of 1940 two such new laboratories, one in California and one in Ohio, had been added.

Aircraft engine research was related to the need for an increase in speed at higher altitudes of military airplanes, both bombers and fighter planes. Aeronautical engineers recognized that within the near future engines in the 3,000 to 4,000 horsepower range, capable of operating at altitudes up to 50,000 feet would be needed.[1] In addition it was thought that with an expected demand

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[1]Carlton Kemper, "NACA Engine Altitude Chamber," memorandum for Engineer-in-Charge, February 20, 1939. All letters, memoranda, and others documents used in this study are found in the U.S. National Archives, Record Group 233 "Records of the NACA - Historical Collection 1915-1957," except where otherwise noted. The records used here are located in the cartons numbered "45" and "46."

for speeds as high as 500 miles per hour, the requirements of streamlining would dictate a change from the air cooled engine, with its large frontal area, to the liquid cooled engine, which has a much smaller frontal area.

Concern about the American aircraft engine research effort grew within the NACA in the late nineteen-thirties. The committee's own staff was keenly aware of the growing gap between the demands of aircraft performance and the capabilities of research facilities. At the research laboratory at Langley Field, engine research had been conducted since 1917, and some work in this area had also been performed by the National Bureau of Standards for the NACA.[2] This effort had, however, only limited personnel and facilities at its disposal. In 1939 the Engineer-in-Charge at Langley, as well as his principal assistants for engine research and for fuel and lubricant research, sent a number of memoranda to the committee's main office in Washington pointing out the inadequacy of the country's as well as the committee's effort.[3] They emphasized that only three facilities for the altitude testing of engines were available in the country. Located at the Bureau of Standards, at the Naval Aircraft Factory in Philadelphia, and at the Air Material Division at Wright

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[2]U.S., National Advisory Committee for Aeronautics, Third Annual Report of the National Advisory Committee for Aeronautics, 1917 (Washington: U.S. Government Printing Office, 1918), p. 26.

[3]See A. M. Rothrock, "Recommendations in Regards to Fuels and Lubricants Research," memorandum for Engineer-in-Charge, August 14, 1939 and Carlton Kemper, "NACA Engine Altitude Chamber," memorandum for Engineer-in-Charge, February 20, 1939.

Field, they were capable of testing engines of 700, 1,000, and 1,500 horsepower respectively. None of these facilities were capable of simulating altitudes above 30,000 feet. In the area of fuels and lubricants, research was similarly limited although a subcommittee of the powerplants committee had been active in this field since 1935.[4]

The concern within NACA was reinforced and backed up with specific information on developments in Europe. The agency maintained a one-man "Office of the Technical Assistant in Europe" based in Paris. The person in charge, John J. Ide, reported on his visits to European research establishments and provided copies and translations of technical reports and articles.[5] NACA's Director of Aeronautical Research, Dr. George C. Lewis, made two extensive trips to Europe, one in 1936 and one in 1939. On the first trip he visited Germany and Russia and on the second trip England, Germany, and France. He returned from both trips highly impressed with the advances being made, in particular with those evident in Germany.

On the 1936 trip Lewis crossed the Atlantic in the Zeppelin airship "Hindenburg" at German invitation. In the company of Dr. Adolf Baumker, who was in charge of research and development in the German Air Ministry under Hermann Göring, he visited several of the

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[4]U.S., National Advisory Committee for Aeronautics, Twenty-First Annual Report of the National Advisory Committee for Aeronautics, 1935 (Washington: Government Printing Office, 1936), p. 39.

[5]See for example J. J. Ide to G. W. Lewis, October 19, 1939 forwarding a report on engine testing by the French Air Ministry.

major research installations and was particularly impressed with the recently completed test stand for water- and air-cooled engines at the research center near Berlin.[6] High altitude simulation covering both engine exhaust and carburetor air intake was available and the size and configuration of these facilities was such that Lewis compared them with Lick Astronomical Observatory. After completing his second European trip two and a half years later, Lewis, in speeches and appearances before congressional committees, stated unequivocally that Germany was the world leader in aeronautical research.[7] As a result Lewis recommended to the NACA main committee an increase in the American aircraft engine research facilities.[8]

Similar warnings came from the most famous member of NACA, Charles Lindbergh. He had been a member of the advisory committee since 1931 and, even though living in France in 1938 and 1939, had been appointed in 1939 to serve another term on the committee.[9] Although unable to be present in person he maintained a strong interest in NACA's work, and he kept up a correspondence with Dr.

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[6]G. W. Lewis, "Report on trip to Germany and Russia, September, 1936," n.d.

[7]New York Times, June 15, 1939, (15:2); Aviation, August, 1939, p. 13.

[8]"Minutes of Meeting of Special Committee on New Engine Research Facilities, November 21, 1939," pp. 3-4.

[9]C. A. Lindbergh to J. S. Ames, November 4, 1939. This and the following letters cited from the Lindbergh-Ames correspondence are found in the files of the NASA Historical Office, Washington, D. C.

Joseph Ames, the NACA chairman. His visits to European countries, in particular to Germany, where he discussed and inspected aviation progress, allowed him to compare progress on both sides of the Atlantic. His views were received with interest by the NACA members, in particular the military members, General "Hap" Arnold and Admiral Cook.[10]

Lindbergh was particularly impressed with the advances being made in the speed of German military aircraft. He found that the latest German bombers exceeded 200 kilometers an hour at operational altitudes and that German engineers were thinking of speeds approaching 800 kilometers and hour. America was already behind Germany in military aviation, he reported to Ames, and would soon be behind in commercial aviation as well. Toward the end of 1938 he wrote to Ames: "I believe we should devote every effort to increasing the speeds of our own machines."[11]

On his several visits to the U.S. Lindbergh reported both to the NACA and to wider audiences on the progress in aviation which he had witnessed in Europe. In the spring of 1939 he returned permanently to the United States and in appearances before congressional committees widely noted in the press, he called attention to the necessity for supplementing the expansion of aircraft production

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[10]J. S. Ames to C. A. Lindbergh, December 22, 1938.

[11]C. A. Lindbergh to J. S. Ames, November 28, 1938.

with a similar expansion of aeronautical research.[12]

The first proposal for the establishment of a new, separate laboratory came from the Army Air Corps members of NACA. In August 1938, the main committee, at the urging of Major General Oscar Westover, the chief of the Air Corps and a NACA member, established a Special Committee on the Relation of the NACA to National Defense in Time of War.[13] It recommended the establishment of an additional research laboratory in order to relieve what was described as "the congested bottle neck" at Langley Field. The need for a new laboratory was further studied by the main committee, and toward the end of 1938, NACA recommended to the President that a new research facility be established.

Early in 1939 President Roosevelt submitted to Congress a proposal for a second research station for the NACA. It was needed, the President noted, to permit the committee to investigate the new range of problems created by the larger sizes and higher speeds of military aircraft. A new, separate laboratory was recommended because space for new facilities was not available at the existing station at Langley Field, and the NACA had selected the Sunnyvale base, like Langley an Army Air Corps field, as the location best

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[12]New York Times, April 21, 1939 (9:12), June 13, 1939 (1:2); Aviation, July 1939, p. 69.

[13]U.S., National Advisory Committee for Aeronautics, Twenty-Fifth Annual Report of the National Advisory Committee for Aeronautics, 1939, (Washington: U.S. Government Printing Office, 1940), p. 38.

suited to its purpose.[14]

But the proposal, considered by the Congress as part of the Second Deficiency Appropriations Bill for 1939, found little support. It was viewed by the House Appropriations Committee as an unnecessary duplication of existing facilities at Langley. The additional cost of administering two laboratories, 3,000 miles apart, was cited, and the committee failed to approve the ten million dollars requested, while recommending the further expansion of facilities at Langley.[15]

In the Senate the proposal similarly found no acceptance in committee, but when the bill reached the floor, Senator Hiram Johnson of California rose to its support. The new station would obviously be of benefit to the aircraft industry in his state, and he proposed an amendment providing a direct appropriation of $4 million and an additional $6 million in contract authorization money. Senator Glass of Virginia, apparently feeling that a second research station would detract from the importance of the Langley facility located in his state, objected.[16] The California senator was able to obtain the passage of a compromise amendment providing for the $4 million appropriation, but deleting the con-

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[14]U.S., Congress, House, Supplemental Estimates of Appropriations for the National Advisory Committee for Aeronautics, 76th Cong., 1st Sess., 1939, House Doc. 151, pp. 2-3.

[15]U.S., Congress, House, Second Deficiency Appropriations Bill, Fiscal Year 1939, 76th Cong., 1st Sess., 1939, H.R. 260, p. 4.

[16]Aviation, May 1939, pp. 53,72.

tract authorization money. However, the amendment died in conference under the combined objections of the House committee and the Virginia congressional delegation.[17]

The proposal was reconsidered four months later as part of the Third Deficiency Appropriation Bill. This time answers to both the technical and the geographical objections were found. Supplementing the testimony of NACA's chairman and Director of Research, a number of witnesses from both government and industry unanimously favored the new laboratory.[18] The most prominent was Charles Lindbergh, who came fresh from his well-publisized European trips and his survey of the nation's aeronautical facilities.

The NACA, at Air Corps urging, had undertaken a survey of all the nation's aeronautical research facilities. A Special Survey Committee on Aeronautical Research Facilities was established for this purpose in the spring of 1939, with General Arnold, Rear Admiral John. H. Towers, and Robert Hinckley of the CAA as members. Its function was "to examine into the aeronautical research facilities now available in the country and their best interrelationship, and to prepare a comprehensive plan for the future expansion of such facilities with especial attention to facilities of the NACA and the universities, including the training of the necessary research

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[17]U.S., Congress, House, Third Deficiency Appropriation Bill, Fiscal Year 1939, 76th Cong., 1st Sess., 1939, H.R. 260, pp. 1-3.

[18]U.S., Congress, House, Third Deficiency Appropriation Bill, 76th Cong., 1st Sess., 1939, H.R. 1439, p. 9.

personnel."[19] Lindbergh was the chairman of this committee, and the survey was performed largely by him through a series of extensive travels throughout the country.[20] As a result of the testimony of Lindbergh and others the important committees were won over and it was agreed that a new laboratory should be authorized.

As regards the site on which the laboratory would be built there was, however, still the unhappiness of the Virginia delegation to contend with and in addition a new factor was introduced. The $10 million facility with its construction work and future payroll was attracting the interest of many other communities and their representatives in Congress.[21] The House committee noted delicately that since the matter had been pending, "advocates of other sites have come forward."[22] The solution arrived at by the Congress was to turn the site selection responsibility back to NACA. It was realized that NACA already had gone on record as favoring the Sunnyvale site and the House Appropriations Committee therefore wrote into its report that the location was left to the further determination of the NACA and that "other sites than the one at Sunnyvale may be

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[19]J. F. Victory, "Origin and Status of the Aircraft Engine Research Laboratory," memorandum for the Chairman, NACA, October 7, 1941.

[20]New York Times, April 19, 1939 (1:3), April 23, 1939, (27:4), and U.S., National Advisory Committee for Aeronautics, Twenty-Fifth Annual Report of the National Advisory Committee for Aeronautics, (Washington: U.S. Government Printing Office, 1940), p. 38.

[21]Aviation, September 1939, p. 52.

[22]U.S., Congress, House, Third Deficiency Appropriation Bill, 76th Cong., 1st Sess., 1939, H.R. 1439, p. 9.

considered."[23]

It is clear, however, that the "may" was not intended to be permissive. It represented a firm order to the agency to conduct a formal and thorough site survey in order to satisfy the many proponents of other sites. Undoubtedly it helped to obtain the favorable votes of those arguing for sites in their own constituencies to have an understanding that all proposed sites would be given consideration.

NACA proceeded immediately to conduct such a survey. The special committee on research facilities under the prestigious chairmanship of Charles Lindbergh was asked to make the selection, and the bids of 54 sites were examined. A careful procedure for weighing the important factors was worked out, and on September 23, seven weeks after the laboratory authorization had passed the Congress, NACA announced its selection. The Sunnyvale site had been selected and the selection committee indicated that the major factor in its selection was the site's proximity to the California airplane manufacturing industry.[24]

In the fall of 1939, with the Sunnyvale laboratory approved and its site selected, the Lindbergh committee turned its attention

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[23] Ibid., p. 9.

[24] New York Times, September 23, 1939 (6:2). The following month Dr. Joseph Ames retired from the committee due to ill health. He had served as a member since 1915 and as chairman since 1929. In April, 1940, when NACA celebrated its twenty-fifth anniversary it was announced that the new laboratory would be named the Ames Laboratory in his honor.

to the need for aircraft engine research. In the middle of October it submitted to the main committee of NACA its recommendations for a further, major expansion of NACA's research facilities. As a result of its examination of the research facilities then available, it concluded that there was "a serious lack of engine research facilities in the United States, and that it is of utmost importance for the development of aviation in general, and for the defense program in particular to take immediate steps to remedy this deficiency."[25] The committee recommended that an engine research laboratory be constructed as soon as possible.

The NACA Executive Committee approved these recommendations at its meeting on October 19. At the same meeting it established a "Special Committee on New Engine Research Facilities" for the purpose of determing the scope of research to be performed at the new laboratory and to make an estimate of the cost of its construction. Dr. Vanevar Bush, who had succeeded Dr. Ames as chairman of NACA, selected the NACA vice-chairman Dr. George J. Mead to be the chairman of the special committee. Before being appointed a member of NACA in October 1938 Mead had had wide experience in the aircraft engine industry. He was a former chief engineer of the Wright Aeronautical Corporation, and had served as vice president of the Pratt and Whitney Aircraft Corporation and of United Aircraft Corporation. The committee's membership included Dr. Lewis and Carlton

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[25] "Report of the Special Committee on Aeronautical Research Facilities for submission to the October 19, 1939 meeting of the National Advisory Committee for Aeronautics," n.d.

Kemper who headed the engine research work at Langley. A representative of the Army Air Corps, Major E. R. Page, Commander Rico Botta of the Navy's Bureau of Aeronautics and a representative from the Civil Aeronautics Authority constituted the other government members. The aircraft engine industry was well represented on the committee. In addition to Mead himself, representatives from the Wright Aeronautical Corporation, Pratt and Whitney, and the Allison Division of General Motors were on the committee. Later, when the scope of the work became better defined, Mr. S. D. Heron of the Ethyl Gasoline Corporation Research Laboratories was added to advise on fuel and lubricants research, and Mr. Frank W. Caldwell of the Hamilton Standards Propellers Company was added to advise on propeller research.

Over the next two months the Mead Committee conducted a thorough inquiry into the research facilities that would be needed at the Engine Research Laboratory.[26] It was decided to provide a laboratory for both liquid and air-cooled engines with provisions for full-scale testing on torque stands as well as testing of components such as superchargers, carburetors, fuel injection and fuel ignition systems, and instruments. A separate laboratory would be provided for fuel and lubricant studies. The question of whether to include a wind tunnel was debated at some length, with some members arguing that flight testing was better as well as much more

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[26]"Minutes of Meetings of Special Committee on New Engine Research Facilities" for November 21, 1939; December 11, 1939; and January 23, 1940.

economical. But agreement was reached on a recommendation for a twenty-five foot diameter tunnel with an airspeed of 300 miles per hour and with provisions for evacuation to simulate altitudes up to 30,000 feet. The tunnel would accomodate up to 3000 horsepower engines with flight propellers installed. Finally a hangar and an administration building would be provided.

The special committee's report was submitted to the NACA Executive Committee at its meeting on February 7, 1940. After hearing Mead's statement the report was approved and Bush was authorized to submit to the Bureau of the Budget a supplementary estimate in the amount of $10,068,250.[27]

The request went forward to the Bureau of the Budget and through the spring of 1940 negotiations on the amount to be requested from Congress tookplace. In order to obtain the Bureau's approval, NACA had to reduce the total sum to $8,400,000 in effect

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[27]This was the amount proposed by the special committee and broke down as follows:

Power-plant laboratory and shops	$4,569,500
Power-plant wind tunnel	3,142,500
Torque stands	500,000
Fuel, oil and instruments laboratory	562,500
Hangar	293,750
Administration building	375,000
Miscellaneous: Central heating plant, electric and water services, roads, fences, fuel storage, etc.	625,000
	$10,068,250

The figures include a twenty-five percent contingency estimate. "Report of the Special Committee on New Engine-Research Facilities," January 24,1940, and "NACA Executive Committee Minutes," February 7, 1940.

eliminating the contingency factor used when the request was submitted.[28] On May 20th, these difficulties had been ironed out and the President sent to the Congress his request for the agreed amount to permit the NACA to construct an Engine Research Laboratory.[29] This time the request did not specify a location. The inclusion of a specific location in the proposal for the Sunnyvale laboratory had aroused opposition in Congress. But the selection made by NACA itself, after the authorization had been obtained and based on the performance of a careful survey, had met with general approval. Consequently the new proposal stated only that the Engine Research Laboratory would be located on a site to be selected by the advisory committee.[30]

The proposal encountered smooth sailing in the Congress. With the war in Europe now underway and the simultaneous step-up in the nation's preparedness program the need for a substantial increase in aeronautical research was unquestioned. The proposal that the highly respected, scientific agency would itself select the site met with general approval and prevented any dispute within the Congress on the matter. Thus on June 26, 1940, five weeks after the proposal had been submitted by the President, Congress approved the Engine

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[28] G. W. Lewis to W. G. Whitman, June 11, 1940; G. W. Lewis to LMAL, June 11, 1940. LMAL is an abbreviation for Langley Memorial Aeronautical Laboratory.

[29] J. F. Victory to V. Bush, May 20, 1940.

[30] U.S., Congress, House, Supplemental Estimate of Appropriation, National Advisory Committee for Aeronautics, 1941, 76th Cong., 3rd Sess., 1940, House Doc. 777, p. 2.

Research Laboratory as part of the First National Defense Appropriations Act. The authorization set a limit on cost of $8,400,000 and appropriated $2,000,000 for the initial construction.

Following the congressional approval of the laboratory, NACA took several steps to speed its construction. The Mead Committee had been reconstituted after the Bureau of the Budget and the President had given their approval, and had continued its work on the broad planning of research facilities.[31] At Langley the small design group, under W. G. Whitney, which had prepared the preliminary layouts for the Mead Committee, was now augmented and put to work on more detailed design of the laboratory buildings. Recognizing NACA's lack of experience in this field Dr. Bush approached the Wright Aeronautical Corporation with a request that Mr. Rudolph F. Gagg be made a consultant to the committee.[32] Gagg was currently directing the design and construction of Wright's new plant near Cincinnati and had wide experience in such work. The corporation agreed to Gagg's service as a consultant and he assumed the direction of the laboratory design and took an active part in the meetings of the NACA technical Committee on Powerplants for Aircraft, the Mead Committee and in the site selection process which simultaneously was getting under way.

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[31] V. Bush to members of the committee, February 7, 1940.

[32] The events relating to Gagg's association with NACA is summarized from a number of letters between, R. E. Gagg, V. Bush, G. W. Lewis, and J. F. Victory over the period July 18 to November 5, 1940.

The process of obtaining authorization for the new laboratory had involved NACA heavily in the political process. It now turned to the task of selecting the best possible location, expecting to employ the scientific methods that had been outstandingly successful in selecting and gaining acceptance of the Sunnyvale site.

CHAPTER 3

NACA'S APPROACH TO SITE SELECTION

In approaching the selection of a site for the Engine Research Laboratory, NACA's leadership was well aware that political interests remained strong. It was clear to Bush that a politician, be it a senator, a governor, or a congressman, would be interested in having such a large facility located in his constituency. And, conversely, if a politician and his constituents thought themselves in a superior position to get the laboratory and failed to be selected, good reasons would have to be given by NACA for its choice. In making its selection it would be important for NACA to avoid charges of favoritism or lack of thoroughness in evaluating the needs of the laboratory and the potentialities of the sites offered. Aware of this factor, and also due to its own self-interest in obtaining the best possible site, NACA now went to work on establishing the most objective and scientific method to select the site for the new laboratory.

The importance attached to the question of site selection is reflected in the choice of members for the Special Committee on Site which was established to evaluate and recommend the best site. In contrast to the Mead Committee which included mostly technical experts and which was chaired by a less prominent NACA member, the

Special Committee on Site was headed by Bush himself.[1] Its small membership came exclusively from the National Advisory Committee itself and included, in addition to Bush, Dr. Lyman J. Briggs, the Director of the National Bureau of Standards, Major General George H. Brett, the acting Chief of the Air Corps, and Captain Sidney M. Kraus from the Navy Bureau of Aeronautics. Unlike Mead, who was retired and therefore had no full time responsibilities elsewhere, the members of the committee on site all had major responsibilities apart from NACA, and while this gave them less time to devote to the detailed work on the committee, it also meant that the work and final selection of the committee would command more respect and be less vulnerable to political pressures and charges of lack of objectivity.

The committee's job, as directed by the NACA Executive Committee in its meeting on May 28, 1940, was to "examine into the merits of available sites for the aircraft engine-research laboratory, and to make a report and recommendation to the Executive Committee as to a site which, in the judgment of the special committee, will best serve the national interest."[2] This statement left the question of criteria for site selection wide open. For the injunction that the site must be one which "will best serve the national interest" was wide enough to encompass almost any

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[1] Mead, although vice-chairman of NACA at the time, had been appointed a member only in October 1939.

[2] "Minutes of the Meeting of Special Committee on Site," August 6, 1940, p. 1.

interpretation.

In the initial phase of formulating the detailed criteria two factors worked to give the staff at NACA headquarters complete control. One factor was the delay in activating the Bush Committee and the other was the availability of the experience and personnel which had worked on the site selection for the Sunnyvale Laboratory eight month before. The committee on site had, as mentioned, been authorized by the NACA Executive Committee. However, no activity took place for several months. A full month went by before Bush, in his capacity as NACA chairman, sent out letters of appointment to the three members, and not until August 6th did the committee hold its first meeting.[3]

Meanwhile the other factor, the experience gained in selecting the site for the Sunnyvale Laboratory, was brought to bear on the determination of detailed criteria for the engine research laboratory site. As part of the Lindbergh Committee's work on selecting the Sunnyvale site a set of procedures and criteria had been developed and applied.[4] A NACA engineer, Russel G. Robinson,

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[3]Bush to Brett, Kraus, and Briggs, June 29, 1940.

[4]The ratings for the top nine contenders were as follows:

Sunnyvale	96
Sacramento	93
Long Beach (Municipal Airport)	91
Los Angeles (Municipal Airport)	87
Stockton	85
San Diego (Camp Kearney)	83
Denver (Lowry Field)	80
Denver (Municipal Airport)	75
Salt Lake City	73

was responsible for much of this work. As a result, when the need to select a site for the engine laboratory arose, there was available to NACA both a procedure and an individual experienced in its administration. It was a procedure which attempted to apply objective criteria in a systematic manner and which could be expected to be non-controversial, for in spite of the outcome it produced, no criticism of NACA's choice had resulted. In May Dr. Lewis wrote Robinson, who was then working at the Sunnyvale Laboratory, that he would have to return East and that "in evaluating the cities that will be proposed for the new engine research laboratory, it may be that we will have to draw upon your experience in the selection of Moffett Field."[5] Robinson, therefore, came to NACA's Washington office, bringing with him his file on the Sunnyvale site selection and began to work out the site criteria for the Engine Research Laboratory.[6]

The result of the preliminary work by the NACA headquarters staff was that on the day that the House-Senate conference committee agreed on the Engine Research Laboratory, June 22nd, letters were dispatched to all congressmen, chambers of commerce, and others who had indicated an interest in the Engine Research Laboratory.[7] The

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[5] G. W. Lewis to R. G. Robinson, May 25, 1940.

[6] When the documents pertaining to the engine laboratory site selection were examined in 1965, in the course of the research for the present essay, Robinson's original rating sheets for the Sunnyvale Laboratory were found among them.

[7] J. F. Victory form letter, June 22, 1940. Copies were sent to all NACA members on June 25th, J. F. Victory to each NACA member, June 25, 1940.

letter was signed, not by Bush, but by the man heading up the headquarters staff as NACA Secretary, John F. Victory. This letter contained a brief statement of the requirements for the desired site and a long list of the factors to be evaluated in the selection. The requirement for for "fee simple title to vest in Federal government to approximately 100 acres on or adjoining an airport owned by a municipality or already owned by the Federal government; proximity to industrial center; adequate power; and adequate water supply." Nine major factors were to be evaluated, and many of these were further broken down into subcategories.

The criteria announced in this letter fall into two distinct groups. One group included those applying to the site itself, such as size, soil characteristics, and availability of utilities; the other group applied to the environment in which the site was located. It was required that the site itself be no smaller than 100 acres to permit the erection of the contemplated laboratory buildings and to allow for a reasonable amount of expansion. Cost would be a factor but a specific figure was not given. The bearing characteristics of the soil should allow buildings and roads to be supported. Proximity to water and sewage connections and accessibility by road, rail, and air connections were to be considered in the evaluation. An important factor was that the site must be on or adjacent to an airfield. It was planned that the research on engines would not be limited to static testing in wind tunnels and on torque stands but would include, as well, flight

testing by aeroplanes operated by the laboratory. Thus it was a requirement that the site provide unhindered access to an airport with permanent runways and with a climate and weather permitting extensive flight operations. To insure this access over the long term it was specified that the airport must be publicly owned.

Stress was laid on the two main utilities needed in the operation of the laboratory: water and electric power. They assumed particular importance in view of the requirements of the wind tunnels which would need substantial amounts of power for the propeller drives and large quantities of water for cooling. The criteria specified that 15,000 KW would be needed and that the government would accept the power at the property line and at transmission voltage, providing its own step-down transformers. It was asked that bidders provide information for evaluation about charges, for both peak and off peak utilization, voltage and frequency, and dependability and capacity for increase. For the water supply, information on cost, chemical composition, summer and winter mean temperatures, seasonal restrictions and the general nature of supply and availability were similarly requested.

With respect to the environmental factors much less detailed information was asked. The factor of proximity to an industrial center included considerations of skilled labor, technical supplies and population. To this was added the factor of living conditions, to be evaluated in the interests of the future staff of the laboratory. But the three other environmental factors were stated

without elaboration:

> accessibility to engine manufacturers,
> accessibility to centers of scientific and technical activity, and
> vulnerability from strategic viewpoint.

The first of these three factors was obviously dictated by the mission of the laboratory as a research facility for aircraft engines. In an age where transcontinental travel was still a time-consuming business it would make little sense to locate an engine laboratory on the West coast if most of the industry that was to benefit from the research was in the East or the Midwest. The same criteria had been applied to the Sunnyvale Laboratory where accessibility to the airplane manufacturing industry was a criteria and where, as a result, the six top contenders were in California.[8] The criteria regarding accessibility to centers of scientific and technical activity appears to have been dictated by a general feeling that this would be a good thing. Strategic vulnerability had been introduced as an additional factor after the Sunnyvale site evaluation was well underway.[9] As a consideration in the selection of a site it was introduced from outside NACA, but the origin of this additional requirement is obscure.[10]

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[8] See p. 22, fn. 4.

[9] The mimeographed evaluation sheets for the Sunnyvale Laboratory show the strategic vulnerability factor added in handwriting and was only on the sheets included in the section marked "Top nine contenders - San Antonio, Texas dropped to 15th place."

[10] Fear that enemy bombers might strike at industrial installations on either the East or the West coasts was real. In a message to Congress on May 16, 1940, President Roosevelt said, referring to

Having mailed to all interested parties a list of the criteria and factors to be evaluated for each site, the NACA headquarters staff proceeded to the next step of developing the exact numerical basis on which each factor would be included into an over-all rating for each site. This involved two separate steps: one was

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the developments in air navigation: "It brings the new possibilities of the use of nearer bases, from which an attack ... on the American continents could be made. From the Fiords of Greenland it is four hours by air to Newfoundland; five hours to Nova Scotia, New Brunswick and the Province of Quebec; and only six hours to New England. The Azores are only 2,000 miles from parts of our Eastern Seaboard and if Bermuda fell into hostile hands it would be a matter of less than three hours for modern bombers to reach our shores." A program to persuade private industry to build its new plants away from the coasts was underway, and Roosevelt, in a press conference, described the government's attitude in the following words: "We doubt very much whether (industry) ought to put more production close to either seaboard and therefore we would much prefer to have (it) go out somewhere between the Alleghenies and the Rockies." See "Message to the Congress asking appropriations for national defense," May 16, 1940, p. 199 and "The Six Hundred and Forty-Fourth press conference (excerpts), May 17, 1940," p. 218, both in Samuel I. Rosenman(ed.), The Public Papers and Addresses of Franklin D. Roosevelt, 1940 Volume (New York; The MacMillan Company, 1941). However, no directive to government agencies on site selection and strategic vulnerability has been found. A memorandum in the NACA files dated after the criterion was introduced discusses the "Program of Industrial Decentralization sponsored by Chester Davis" who in May 1940 had been appointed by Roosevelt to the National Defense Commission. It appears, however, to have been aimed by Davis as much at providing relief for centers of industrial and agricultural unemployment. As late as August 7th Bush wrote to Victory concerning this: "I think you perhaps ought to look this over to see whether site committee should take cognizance." But no further action was taken. See Stacy May, "War Facilities, Plants, Location (new), Importance of Decentralization," memorandum to members of the National Defense Commission, August 1, 1940 with Bush note attached. Later in 1940, pressure from Midwestern states for a chance to participate in the build up made themselves felt. For example, three Midwestern governors came to Washington towards the end of September appealing for plants and contracts. See "The Six Hundred and Eighty-Fifth Press Conference, October 1, 1940," Ibid., p. 450. See also Chapter 5 of the present essay.

to lay down a set of ground rules for assigning a percentage of completeness to each criterion, the other was to draw up a schedule of weights, giving the relative weight to be allotted to each factor being rated. The ground rules for percentage of completeness used detailed but quite simple rules for computing the degree to which any given factor met the requirements. For example, the factor regarding cost of the site was given 100 percent for no cost or one dollar per acre. As cost increased the percentage went down until zero percent was allowed for a cost of $50,000 or over per acre. A few of the ground rules had to be somewhat more imprecise, leaving room for judgement. For example, in evaluating the electric power supply for "dependability, capacity and tie-ins" 100 percent were to be given for "perfectly dependable, ample excess capacity, several tie-ins" while zero percent would be given in cases where the supply was undependable, provided no excess capacity, and had no tie-ins.[11] For this factor the percentage values between 0 and 100 would be determined by a subjective assessment of the particular conditions encountered at each site. For the evaluation of "vulnerability" and "accessibility to engine manufacturers" two maps of the United States were prepared (see Fig. 1 and Fig. 2) showing the percentage values for any location by means of zones of equal value.

There remained the question of the relative weight to be assigned to each of the factors. On this question the staff

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[11]Document "Notes on Evaluation," August 2, 1940.

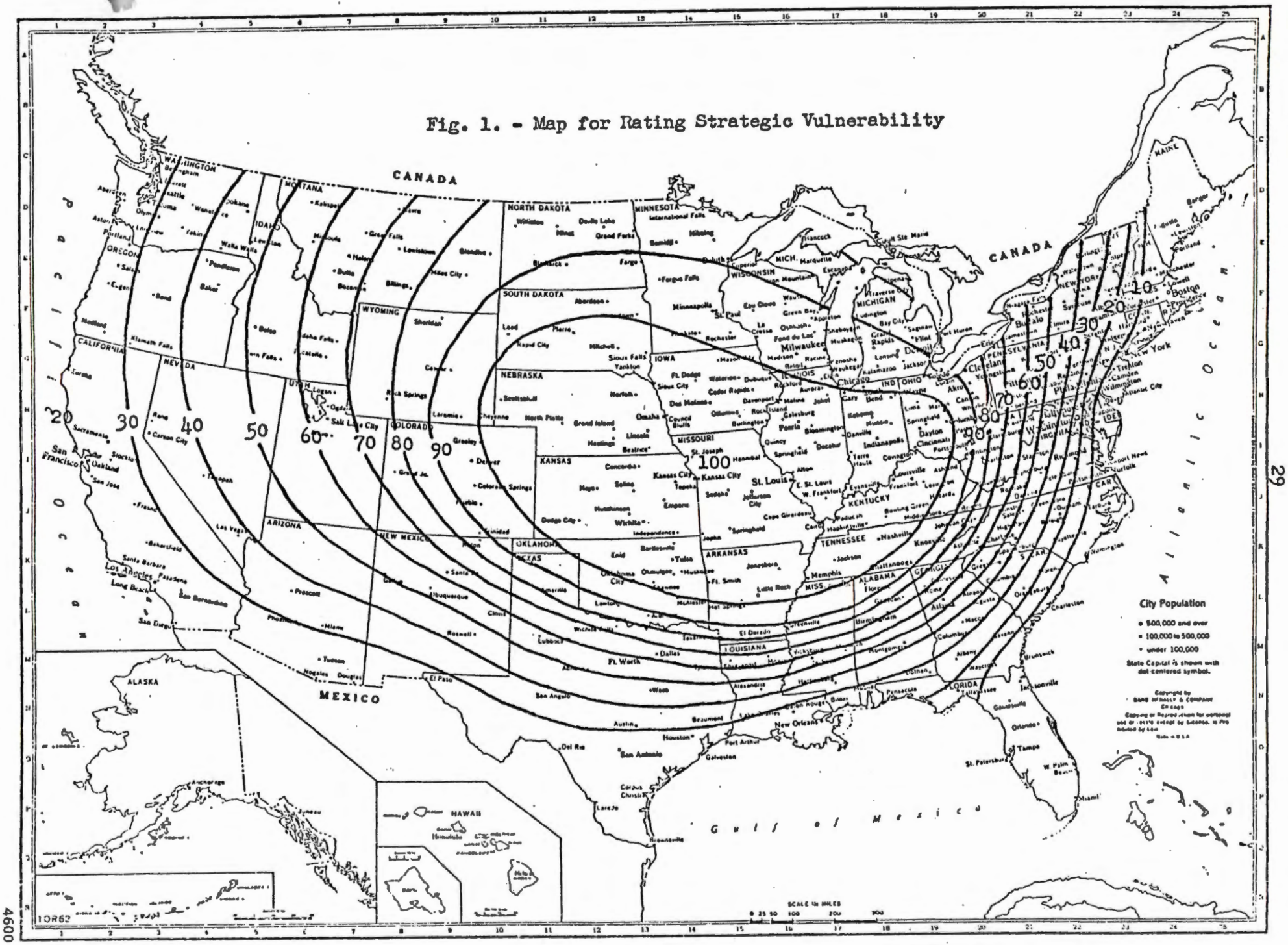

Fig. 1. - Map for Rating Strategic Vulnerability

RAND McNALLY
STATE CITY MAP
UNITED STATES
SIZE 8½ x 11

29

4600

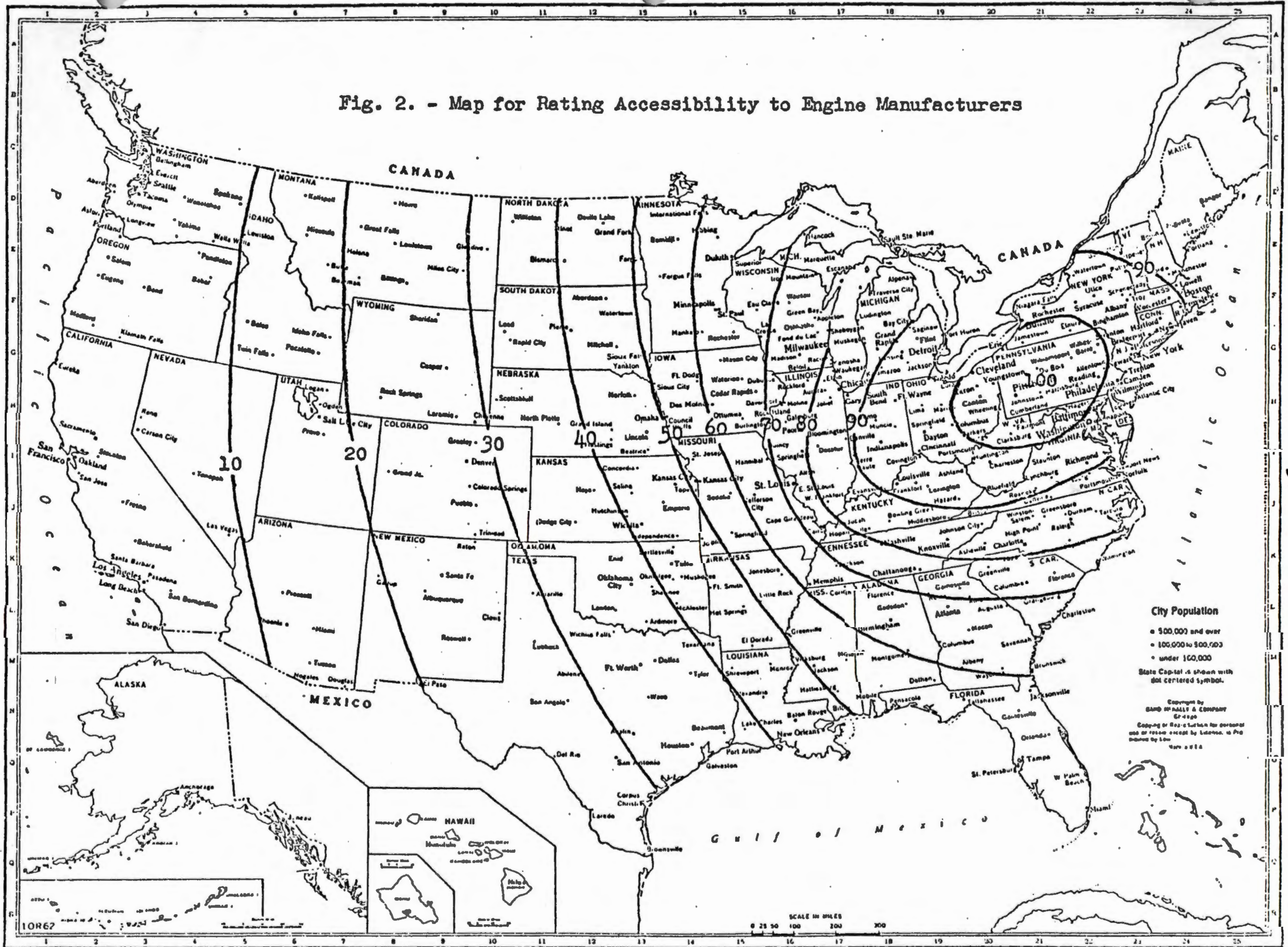

Fig. 2. - Map for Rating Accessibility to Engine Manufacturers

RAND McNALLY
STATE CITY MAP
UNITED STATES
SIZE 8½ x 11
4600

prepared a breakdown, relying on the Sunnyvale experience, but adding a number of refinements. The original Sunnyvale weights, shown in the first column of table III-1, had used round numbers with fifty assigned to environment and fifty to site and utilities. Within these two broad categories six subdivisions existed, but no further breakdown had been attempted. Late in the course of the Sunnyvale evaluation work, the "strategic vulnerability" criteria was added.[12] At that time the weight of fifteen was assigned to that criterion, but no attempt was made to adjust the weights of the other factors so that the sum of all the factors would add up to one hundred. For use in the evaluation of the engine laboratory sites this adjustment was now made. The headquarters staff, as will be seen from a comparison of the second and third columns of Table III-1, computed the adjusted weights and used them in the breakdown of preliminary weights for the engine laboratory. This preserved the relative weights between the three major categories: site, utilities and environment. However, within each of these categories notable changes were made to improve the usefulness of the weights for evaluation of the new sites. The weight for "climate and weather" was reduced from seventeen to five and the extra twelve points allotted to various factors relating to other details of the site. In the area of utilities, water was added to the factors of "electric power" and "flying field." In the area of environment, the requirement for "water route connection and seaplane landing"

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[12]Sunnyvale site evaluation sheets.

TABLE III-1

RELATIVE WEIGHTS FOR SITE CRITERIA

Site Criteria	Weights			
	Sunnyvale Lab		Engine Lab	
(1)	Actual (2)	Adjusted* (3)	Preliminary (4)	"Official" (5)
Site				
Details of Site	-	-	12	12
Climate and Weather	20	17	5	5
Total Site	20	17	17	17
Utilities				
Water	-	-	7	9
Electric Power	10	9	11	10
Flying Field	20	17	9	9
Total Utilities	30	26	27	28
Environment				
Strategic Vulnerability	(15)**	13	17	17
Access to Engine Mfgrs.	20	17	17	17
Access to Science Center	-	-	12	11
Proximity to Industry	20	17	10	10
Water and Seaplane Conn.	10	9	-	-
Total Environment	50	56	56	55
Total All Criteria	100	99*	100	100

*The Adjusted Weights were computed for the purpose of this study only. To avoid the use of decimals all figures are given as whole numbers. As a result the sum of the Adjusted Weights to not add up to exactly 100.

**The Strategic Vulnerability criterion was added late in the Sunnyvale evaluation and no adjustment in the other factors were made to make the weights add up to 100.

which had carried an adjusted weight of nine was dropped and the new criteria of accessibility to centers of science and technology was added and given a weight of twelve.

To further increase the precision of the evaluation scheme the weights for five of the nine factors were further subdivided and assigned to specific components within each factor. This additional breakdown of the weights, shown in table III-2, had not been used in the Sunnyvale evaluation. One notable effect was that while the cost of water and of the site were given the lowest weights (one), the cost of electric power was given a weight five times higher.

The four remaining factors: "climate and weather," "accessibility to centers of science and technology," "accessibility to engine manufacturers," and "strategic vulnerability" were not further subdivided. Five factors which had been included in the original list of criteria sent to interested parties were excluded altogether: "nature"of the water supply, "population" of the industrial center, and, for electric power supply, "delivery to the property line," "voltage and frequency," and "estimated maximum demand." These were factors which did not lend themselves to evaluation by measurement.

It is apparent from the detailed analysis above that a substantial effort was made by NACA to produce a rating and selection procedure which would both result in the best site being selected and do this by the most objective and exact methods. By

TABLE III-2

WEIGHT BREAKDOWN FOR THE FIVE CRITERIA
WHICH WERE SUBDIVIDED

Site Criteria	Weights	
	Preliminary	"Official"
Details of Site		
Accessibility	4	4
Area	2	3
Character of Soil	3	2
Cost	1	1
Water and Sewage Connections	1	1
Altitude	1	1
Total Details of Site	12	12
Water		
Quantity and Seasonal Restrictions	3	4
Mean Temperatures	2	2
Chemical Composition	1	2
Cost	1	1
Total Water	7	9
Electric Power		
Charges, Peak and Off-Peak	5	5
Dependability and Growth Capacity	4	4
Accessibility of Lines	2	1
Total Electric Power	11	10
Flying Field		
Size and Rating	3	4
Volume of Air Traffic	3	4
Ownership	3	1
Total Flying Field	9	9
Industrial Center		
Skilled Labor	5	5
Technical Supplies	3	2
Living Conditions	2	3
Total Industrial Center	10	10

adapting and improving on the procedure used in selecting the Sunnyvale site, the agency attempted to arrive at a system of evaluation that would be as objective and as exact as possible. Through this approach it was expected that the best site would be selected and that political factors in making the choice would be eliminated as far as possible.

With this much groundwork laid, the Special Committee on Site was called together for its first meeting on August 6th, well over two months after its creation. The meeting, presided over by Bush, was attended by the full committee.[13] Also in attendance were the two headquarters people working for the committee, Victory and Robinson, Dr. George Lewis, and his newly appointed assistant, S. Paul Johnston.[14] Bush, after outlining the events leading to the establishment of the special committee and pointing out its mission to select a site best serving the national interest, announced that a statement of site requirements and a list of factors to be evaluated had been sent to all interested parties. Furthermore, he had approved the preliminary schedule of weights prepared by the staff so that it could be used in the initial evaluation of the many proposals already received. The committee after general discussion and careful consideration involving several changes, on

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[13] "Minutes of meeting of Special Committee on Site," August 6, 1940.

[14] Johnston, a former editor of Aviation, had been appointed Coordinator of Research in December, 1939. Aviation, January 1940, p. 27.

motion duly seconded and carried, resolved, that the committee approve the schedule of weights as per copy attached marked 'official'."[15]

The changes made in the schedule of weights were all minor as can be seen from tables III-1 and III-2. In the detailed weight breakdowns (table III-2) seven changes of one point each and one change of two points were made. Since some were increases and others were decreases the effects on the main categories were small and in the weight distribution between site, utilities, and environment the second increased a point while the third decreased a point. No additions or deletions to the criteria list were made by the committee. In the matter of the map prepared to rate "strategic vulnerability" Bush stated that the committee "would prefer to rely upon military advice." The Army and Navy representatives expressed approval and General Brett like the map so well that he requested a copy for use by the Army Committee on Sites. The map for rating sites with respect to accessibility to engine manufacturers was approved after some minor changes. The formal precedure as a whole was finally adopted by the Bush Committee which thus committed itself to arrive at a site selection by the careful weighing of the enumerated factors.

While the site selection method was being developed and refined by the NACA headquarters' staff, the bids from a large number of interested cities were flowing in. They had begun to arrive even

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[15] "Minutes of Meeting of Special Committee on Site," August 6, 1940, p. 3.

before congressional approval of the laboratory had been received. In the spring and summer of 1940 public awareness of the expansions resulting from the government's preparedness program was high. The President's "Fireside Chats" had repeatedly stressed the European crisis and the resulting necessity to step up the American armaments program, in particular in the field of aviation. In his broadcast on May 26, 1940 Roosevelt had indicated that industrial production would be expanded and that new plants would be needed. The response by public officials or chambers of commerce throughout the country produced many offers of sites.[16] The Engine Research Laboratory, with an appropriation of eight million dollars was one of the largest new facilities in need of a suitable site. It was therefore clear that many cities would be interested in offering sites and that competition would be stiff. Aviation magazine in its March issue visualized a veritable army of offers: "Any cities that might want the NACA engine laboratory step forward four paces. Company-halt."[17]

There was some expectation that formal hearings on the site offers would be held by NACA and many groups requested an opportunity to be heard. Such requesters were told that the holding of hearings

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[16]"The Six Hundred and Forty-Seventh Press Conference, May 28, 1940," in Samuel I. Rosenman(ed.), The Public Papers and Addresses of Franklin D. Roosevelt, 1940 Volume (New York; The MacMillan Company, 1941), p. 241.

[17]Aviation, March 1940, p. 81.

was impossible.[18] And at its first meeting the site committee confirmed the policy of no hearings. "Expeditious action in selecting the site is of such importance, and because the consequent delay would be so great ... the committee (did) not feel justified, in the public interest, in holding hearings."[19] But many informal hearings had already been held. A number of cities decided that rather than simply mail their site offer to NACA they would send a delegation to Washington to present the offer. For example, on July 13th the Port Superintendent of Columbus, Ohio accompanied by Representative John Vorys spent two hours in Victory's office presenting the city's bid. The home-town newspaper noted that while the meeting went on representatives of other cities were kept "cooling their heels in Mr. Victory's outer office."[20]

While the formal bids were flowing into the NACA Washington office there was also a good deal of contact with interested Congressmen. Many wrote to the NACA, both before and after Congress

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[18]For example, J. F. Victory to Cleveland Chamber of Commerce, June 7, 1940.

[19]"Minutes of Meeting of Special Committee on Site," August 6, 1940, p. 4.

[20]Columbus(Ohio) Citizen, July 13, 1940. The newspaper citations in this study are from the extensive NACA clipping file dealing with site selection for the Engine Research Laboratory, contained in three spring binder volumes in the NACA Historical Collection (National Archives, Record Group 255, Box 46) entitled: "Special Committee on Site Selection - Clippings Regarding Inspection of Sites," Volume I: August 12-31, 1940; Volume II: August - September 1940; and entitled "Engine Lab Newspaper Clippings, 1941 - 1942" (actually includes November 1940 - December 1943).

had approved the laboratory, indicating an interest in having the laboratory located in their constituency. NACA's policy was to thank them for their interest, to be non-committal about the site selection and to keep all such Congressmen advised of future developments. They all received the form letter outlining the site requirements. Congressmen in turn would offer to provide additional information and in some cases accompany their home-town delegates in presenting site offers to Victory. But the activity was limited to exchanges of information. All parties were interested in maintaining the most pleasant relations and there was at this stage an implied agreement that all interests would be best served by an objective, scientific approach to the matter of selecting a site.

NACA's initial approach to the site question concentrated on removing the selection process as much as possible from the political arena. The carefully designed rating scheme, the blue-ribbon committee, and the refusal to hold public hearings were all aimed at this. But a small initial indication that the normal political pressures would not remain inactive had already appeared. The visits to Washington of delegations from interested cities was a forerunner of much stronger pressures which were to make themselves felt before long. NACA would prove impervious to the application of such pressures in spite of the fact that a number of communities sought to advance their cause through this approach. A different, highly sophisticated approach, which was to prove much more effective, was taken by the city of Cleveland, Ohio.

CHAPTER 4

CLEVELAND'S APPROACH TO SITE SELECTION

In Cleveland, Ohio, the city that was ultimately to be the site of the engine laboratory, the interest in offering a suitable site found expression through the Chamber of Commerce. The chamber was a large, active organization which had the distinction of being the first of its kind in any American city, having been founded as the city's Board of Trade in 1848.[1] In the thirties, a substantial aviation parts industry had grown up in Cleveland and the chamber boasted that the city was the largest aviation parts center in the country.[2] The leadership of the organization included a prominent member of that branch of industry, Frederick C. Crawford, who was president of the Thompson Products Company, and who served two consequtive terms, in 1939 and 1940, as president of the chamber.

Beyond the activities of the chamber there was in the city a strong interest in aviation as evidenced by the sponsorship throughout the thirties of the annual Cleveland Air Races which were held at the city's large airport. In January 1938, a new initiative, which further indicates the interest in aviation, was taken. Backed in part by the Chamber of Commerce, the "1st Annual Aeronautical

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[1]Kenneth Sturges, American Chambers of Commerce (Williamstown, Mass.: Williams College, 1915), p. 137.

[2]Cleveland Press, September 13, 1939.

Planning Conference" was held in the city.[3] The full time staff of the chamber included an Industrial Commissioner whose function it was to bring new plants and industries to the Cleveland area. The post of Industrial Commissioner was held by Clifford Gildersleeve who had joined the chamber in that capacity in 1919.[4] He served throughout the twenties and thirties as Industrial Commissioner except for a brief period in the early thirties when he was general manager of the Cleveland office of United States Airlines, Inc. Gildersleeve was to play the leading role in behalf of Cleveland and its Chamber of Commerce in the drive that led to the location of the Engine Research Laboratory on the site offered by that city.

As the government's preparedness program gained momentum the chamber was well aware of the increasing need for sites on which to locate new industrial plants, new air fields, and new flight training schools. Gildersleeve was active in trying to bring such facilities to Cleveland, and made a number of trips to Washington to present the case for his city. Thus, for example, in May 1940, he went to the capital in an attempt to bring to the city one of two new airplane factories to be built as part of the national defense program.[5] One of the first new government projects that the Cleveland Chamber of Commerce actively sought was the first new

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[3]New York Times, January 10, 1938, (4:3).

[4]This and the following information about Gildersleeve was obtained by an examination of the Annuals for the years 1918 to 1930 published by the Cleveland Chamber of Commerce.

[5]Cleveland Press, September 13, 1939.

NACA laboratory, the one eventually located at Sunnyvale. Gildersleeve, working closely with the Executive Secretary of the chamber, Walter I. Beam, submitted a bid on behalf of Cleveland. They obtained assurances from the city that a portion of the Cleveland airport could be made available for one dollar and that $550,000 could be raised locally to provide power facilities, including $250,000 for power lines to the site, for the laboratory.[6] Gildersleeve and Beam made several trips to Washington in connection with the site selection, and the Lindbergh Committee made a number of last minute telegraphic requests for additional information on Cleveland.[7] When the selection of Sunnyvale was announced, Cleveland officials were given to understand that the city had been the runner up in the competition.[8]

In the course of this site competition Gildersleeve and John Victory, the NACA Secretary, became friends. They had several things in common. They were of the same generation and they had both devoted their adult lives to the service of organizations which they had joined almost simultaneously during the First World War. Victory had joined NACA in 1915 at the age of twenty-three,

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[6]Cleveland Press, September 13, 1939.

[7]Cleveland News, September, 11 and 12, 1939.

[8]Cleveland Plain Dealer, September 14, 1939; Cleveland Press, May 21, 1940. There is no basis for such a statement in the NACA records. If such a statement was made by NACA officials it must have been on the basis of disregarding the criterion on proximity to the aircraft industry. When that criterion was included the first six contenders were all in California. See p. 22, fn. 4.

and Gildersleeve had joined the Cleveland Chamber of Commerce four years later when he was twenty-seven. They were now both in their mid-forties, and they were both administrators working largely behind the scenes to keep their respective organizations functioning smoothly. Following the selection of Sunnyvale as the site for the first NACA laboratory, they kept in touch by correspondence, addressing each other on a first name basis. This corresspondence was maintained at the initiative of Gildersleeve who wished to keep in touch in the event that additional NACA laboratories were to be authorized and a site would be needed. Frequently he sent Victory copies of booklets about Cleveland published by the chamber and newspaper clippings, all of which Victory cordially acknowledged.[9]

In his correspondence with Gildersleeve, Victory maintained the contact while being careful not to show any undue favoritism to his friend. This correspondence with Gildersleeve was not unique but was one of many such contacts which he maintained throughout the country. Many of these called on him for help and advice in connection with both the first and the second site competition. For example, in July 1940 W. P. Redding, a representative of the Denver Chamber of Commerce who was also active in the National Aeronautic Association, was travelling to the West Coast and wrote Victory asking if he could visit the Sunnyvale Laboratory. Victory provided

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[9]C. Gildersleeve to J. F. Victory, December 1, 1939; April 30, 1940. J. F. Victory to C. Gildersleeve, December 4, 1939; April 22, 1940; May 16, 1940.

a letter of introduction to Edward R. Sharp, then the administrative officer at Ames, in which he said:

> Mr. Redding is greatly interested in having our engine research laboratory located in Denver, and is anxious to take advantage of his visit to California to see what the committee is doing at Moffett Field. I will appreciate it if you will extent all possible courtesy to him and to his friends.[10]

Redding, accompanied by the Director of Industrial Development for the Public Service Company of Colorado, spent a full day at Moffett, showing particular interest in the facilities for supplying electric power to the laboratory.[11]

While keeping in touch Gildersleeve was careful not to alienate the goodwill of NACA or Victory by getting involved in schemes not in accord with the agency's own plans. Late in 1939 the National Aeronautics Association adopted a resolution calling for Congress to appropriate a lump sum for at least three more aeronautical research laboratories, and asked chambers of commerce, including Cleveland's, to support the resolution. Gildersleeve, before acting on this request for support, wrote to Victory:

> I wondered if you would be willing to advise me whether or not this movement had the sympathetic interest of the advisory committee or just what the situation is. Under no circumstances would we wish to do anything contrary to the best interests of the advisory committee and of the nation's aviation progress. I shall appreciate it

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[10]J. F. Victory to E. R. Sharp, July 20, 1940.

[11]E. R. Sharp, "Visit of Mr. W. P. Redding and Mr. Ralph B. Hubbard," memorandum to NACA, July 23, 1940.

> as a personal favor if you will set me straight on this particular proposition. If you would prefer to have me telephone you about it, I shall be glad to do so.[12]

Victory's answer avoided going beyond what he could say in an official capacity, but he made it clear that NACA was not behind the resolution. He wrote:

> Your desire to avoid embarrassing the committee is sincerely appreciated. The committee has a policy that whenever a subject matter is under consideration it will neither confirm nor deny rumors concerning it. This policy grows out of the executive order to the United States services to the effect that recommendations of government agencies may not be disclosed in advance of the president's approval and transmission thereof to the Congress. We communicated no information to the N.A.A. regarding their recommendation for three additional laboratories. This is about as far as I am at liberty to respond to your inquiry.[13]

As a result the chamber did not act on the resolution using as its reason, as Gildersleeve advised Victory, "our feeling here that competent technical agencies of the government, like your own, are better able to make recommendations to Congress than are outside agencies.[14] Gildersleeve stressed the chamber's continuing interest in having a NACA laboratory located in Cleveland and stated that "when and if a resolution or any act of ours will be of assistance to your plans in any way, I am sure that our people will be more than anxious to be helpful."

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[12]C. Gildersleeve to J. F. Victory, November 1, 1939.

[13]J. F. Victory to C. Gildersleeve, December 4, 1939.

[14]C. Gildersleeve to J. F. Victory, December 14, 1939.

Victory appreciated this action and Gildersleeve's ability and willingness to maintain their relationship on a basis which did not overstep the boundaries of proper official conduct. In his next letter he stated frankly: "You have such an understanding comprehension of the circumspect attitude that must be taken at times by one in my position. I trust that you will never think of me personally as being as boorish as my official attitude probably made me appear." Victory permitted himself to advise his friend that in the matter of plans for a new NACA laboratory, the forthcoming NACA annual report "may be of interest," but he did no divulge its content.[15]

The annual report of the National Advisory Committee for 1939 was issued in January of 1940, and it mentioned the work and findings of the Lindbergh Committee. The text of the Lindbergh Committee's report, with its urgent recommendation that an Engine Research Laboratory be constructed at the earliest possible date, was included and Bush stated in the report that the National Advisory Committee itself had adopted this recommendation of the Lindbergh Committee.[16]

Gildersleeve read the report in the middle of January and soon wrote to Victory asking to be kept in touch with further develop-

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[15]J. F. Victory to C. Gildersleeve, December 15, 1939.

[16]U.S., National Advisory Committee for Aeronautics, Twenty-Fifth Annual Report of the National Advisory Committee for Aeronautics, 1939. (Washington: Government Printing Office, 1940), p. 2.

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desire.[19] The move was, however, premature. Most of those who received the letters forwarded them to NACA headquarters and advised Crawford that they had done so. NACA in turn advised the chamber that if Congress should authorize the laboratory, and furthermore authorize NACA to select the site, the interest of Cleveland would be welcome but until then nothing could be done by NACA. There occurred as a result a pause in the chamber's activity and Gildersleeve limited his contacts to an occasional letter to Victory forwarding a new pamphlet or clipping.

President Roosevelt sent the proposal for a new engine laboratory to Congress on May 20, 1940, and late that month Dr. Lewis, Lindbergh, and others testified on the proposal before the appropriations committee. The proposal was now officially endorsed on the highest level in the executive branch, and the chamber reactivated its campaign. Gildersleeve, not knowing whether a site would be selected by Congress and written into the legislation, immediately flew to Washington to see the members of the Ohio congressional delegation. It quickly became clear that the site selection was to be left to the NACA, and Gildersleeve, therefore, solicited the assistance of congressmen in having the case for Cleveland presented to the advisory committee. Representative Dow Harter (D., Akron), a member of the House Military Appropriations Committee told Gildersleeve: "I'll do all I can to land it for Akron

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[19]For example, F. C. Crawford to General Henry H. Arnold, February 23, 1940.

first, then Cleveland. If I can't get it for Akron, then I want it in northeast Ohio.[20]

The funds for the new laboratory were approved in June. Even before the final passage on June 26, 1940, the chamber again addressed the NACA asking that "Cleveland representatives be given the opportunity to be heard, in the event that public hearings be held."[21] This request was in the form of a letter from Gildersleeve to Victory which was unusual in that it was addressed "Dear Mr. Victory" and was signed in full "Clifford Gildersleeve." The explanation is to be found in a letter of the same date beginning "Dear John" and signed "Cliff" which began: "The formal tone of the attached letter is based on the thought that it might look better in your records than one less formal." Gildersleeve was, as usual, careful to draw the line between his and Victory's official and informal relationship. The request had little effect for, as noted in Chapter Three, NACA decided to dispense with hearings on the site selection. Instead it began immediately the task of evaluating the many offers it had received.

On receipt of the list of detailed criteria for the new site, worked up by Victory and his staff and contained in Victory's letter of June 22nd, the chamber's first reaction was to refer to the site bid which had been submitted in August of the previous year. Gildersleeve wrote to Victory, calling attention to this bid for the

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[20]Cleveland Press, May 22, 1940.

[21]C. Gildersleeve to J.F.Victory, June 3, 1940.

Sunnyvale laboratory, pointing out that it met all the criteria listed for the new site, and offering to provide any additional information which might be needed.[22] Within a few weeks however, the chamber decided to submit a formal bid which was more directly responsive to the new list of criteria. Consequently a formal bid, signed by chamber president Crawford, went forward to NACA. In this bid details of how Cleveland proposed to meet each of the committee's criteria were provided following the outline and order of the NACA criteria list.

Simultaneously the chamber set in motion an expanded campaign in behalf of Cleveland's bid. The local section of the Society of Automotive Engineers was asked to contact both NACA and Ohio Senator Vic Donahey. The society in letters to both outlined the qualifications of its members as an indication of the technical skills available in the city. Similarly the presidents of Western Reserve University and Case School of Applied Science wrote to NACA offering their cooperation in case the NACA facility should be located in Cleveland and pointing out the laboratory and library facilities available at their respective schools.

In its approach to the site selection question, Cleveland took two routes. One was through the conventional use of letters and visits to important NACA officials and congressmen. But this part of the effort was kept in low key and was never allowed to become an exertion of heavy pressure. Local government officials were not

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[22] C. Gildersleeve to J.F.Victory, June 25, 1940.

involved and newspaper publicity was avoided. The other route was through informal, more personal contact with the NACA headquarters staff, in particular its head, the NACA secretary. While maintaining contact through this channel, which had come to include a personal friendship between Victory and Gildersleeve, the latter was careful not to ask for any help or consideration which could be interpreted as inappropriate. Gildersleeve displayed notable tact and sophistication in handling this relationship with its many delicate ramifications. The chamber used this contact not only to keep informed about each important step in the planning of the new laboratory. Of greater importance, it established an image of itself as a level-headed, capable organization with which NACA could, with confidence, exchange information. When the site selection process reached the stage where negotiations became important the people in Cleveland possessed a well-established reputation among the NACA headquarters staff for tact and discreetness necessary for negotiations in a political environment.

CHAPTER 5

THE REJECTION OF POLITICAL PRESSURES: THE SUBCOMMITTEE ON SITE SELECTION

By the middle of July NACA had received offers of sites from 62 cities. The midwestern states were heavily represented with Illinois, Indiana, and Ohio accounting for twenty of the bids. In the far west only Sacramento and Spokane indicated an interest in the laboratory, while on the Atlantic coast seven Connecticut cities came forward but few others were interested. A scattering of southern cities submitted bids.

At NACA headquarters Robinson, the NACA engineer who was assisting Victory in the site selection work, made an initial screening of the bids and found that fourteen of the sites offered were immediately disqualified because the adjoining airport was either not publicly owned or too small or both. In two other cases the unavailability of electric power caused the sites to be disqualified. The list of potential sites was thus reduced to forty-six.

When the Special Committee on Site held its first meeting early in August, Robinson presented his analysis of the proposals received together with a list ranking the sites based on the tentative schedule of weights. The analysis made it clear that a substantial number of sites met the minimum requirements. It also

showed that information about a large number of the sites was incomplete, and that many aspects of the sites could only be evaluated by on-the-spot inspections. After some discussion the site committee decided that in the interest of increasing the accuracy and completeness of the information being used in the site evaluation scheme, a fact finding committee should be appointed. A resolution was passed authorizing Bush to appoint a Subcommittee on Site Inspection consisting of four members for this purpose. To insure that all sites with a reasonable chance of eventual selection were surveyed, the fact finding committee was instructed to visit each of the first twenty sites on Robinson's list.[1]

Bush immediately announced that he would appoint John Victory chairman of this committee and Robinson as one of its members. It was agreed that the Army and Navy members would each designate an individual to complete the fact finding committee. Subsequently General Brett nominated Army Captain Donald J. Keirn, an Air Corps officer from Wright Field, and Admiral Towers nominated Lieutenant Commander J. M. Rutherford of the Navy's Bureau of Aeronautics.[2] Letters of appointment went out over chairman Bush's signature and on August 12th the Victory Committee began its inspection trip.[3]

In undertaking this inspection trip, the NACA joined the many

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[1] "Minutes of Meeting of Special Committee on Site," August 6, 1940, p. 4.

[2] Ibid., p. 5.

[3] V. Bush to J. F. Victory, R. C. Robinson, D. J. Keirn, and J. M. Rutherford, August 9, 1940.

other agencies which were sending inspectors out to look for suitable sites on which to locate the many activities being started as part of the Preparedness Program. Airport sites were in particular demand as a result of the stepped up aircraft production and pilot training programs. In reporting the committee's visit to Indianapolis the local newspaper referred to the fact that its municipal airport had been "inspected minutely this summer by an imposing variety of commissions and individuals, both military and civil."[4] At Columbus, Ohio, the committee's inspection took place the same day that a group of three officers from the Army Air Corps was inspecting the airfield as a possible base for a fighter group. And the same airfield had been inspected shortly before for its suitability for a Naval Training Unit by a group which included Commander Rutherford, who was now a member of the Victory Committee.[5]

Fourteen cities, which had offered a total of twenty sites, were visited.[6] They were the twenty top-ranking sites on Robinson's rating list. Five Ohio cities (Akron, Cincinnati, Cleveland, Columbus, and Dayton), three Illinois cities (Chicago, Aurora and Rockford), but only one Indiana city (Indianapolis) were included from the three central midwestern states. To these were added five cities located close to this three-state area (Louisville, Detroit, St. Louis, Milwaukee, and Buffalo). Each of the sites in these

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[4]Indianapolis Star, August 15, 1940.

[5]Columbus (Ohio) Citizen, August 12, 1940.

[6]Chicago offered six sites, St. Louis two sites.

cities met the minimum requirements and were in the general areas identified as having maximum accessibility to the engine industry and minimum vulnerability to strategic air attack.

Prior to the committee's departure, Victory notified the interested parties of the committee's arrival. In the city to be visited he advised the mayor, chamber of commerce officer or other local official. In those cases where a congressman had been active in presenting his city's bid, he was also advised. The pending visit of the committee received prominent notice in the local press in most cities. The theme was that the visit indicated that the city's chances for obtaining the laboratory were enhanced by being selected for inspection and many thought themselves to be one of a small group of five or six cities so chosen. In St. Louis, Congressman Cochran was quoted as saying that "several" cities had been selected for personal inspection.[7] Representative Ralph Church told a reporter for the Chicago Daily Tribune that there was a "strong possibility that the Curtis-Reynolds field at Glenview, a suburb of Chicago, would be chosen."[8]

On its arrival in each city, the committee was met by a group of local officials and dignitaries. It invariably included several members of the chamber of commerce and frequently prominent members of the business and industrial community. If there was a college or university in the city or close by faculty members would be a part

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[7]St. Louis Star-Times, August 8, 1940.

[8]Chicago Daily Tribune, August 9, 1940.

of the group, and sometimes the institution's president would be present. In Chicago, for example, Dr. Robert M. Hutchins, president, and Dr. Arthur Compton, dean of the Division of Physical Sciences, both of the University of Chicago, as well as faculty members from Northwestern University and the Armour Institute of Technology were included in the group which received Victory and his committee. In twenty-seven of the thirty-four cities eventually visited the mayor, or his representative, was also present often accompanied by members of the city council and by the local airport manager and the city engineer. Officials or politicians on the state or national level were rarely present. On only one occasion, in Milwaukee, Wisconsin, did a state governor participate in the reception and briefing of the committee. Similarly, only in one instance did a U.S. senator participate: in Rockford, Illinois Senator Scott Lucas attended the luncheon given for the committee. Members of the House of Representatives were present in Louisville, Akron, and Minneapolis.

The activities at each stop usually included an inspection of the site or sites offered by the city and a meeting at which the committee sought to obtain and clarify details of each site and how it would meet the stipulated criteria. Questions were raised regarding water and power supply, soil bearing characteristics, educational and recreational facilities, and living accomodations. Often the committee was able to clarify the criteria for the site to the local people, and many cities as a result asked for and were given a chance to submit new or revised bids. The reports of the

Special Committee on Site shows that in most cities additional inquiries were made about time lost in strikes, degree of labor union participation and percentage of negro population. When a site posed special problems, such as for example flood and drainage problems, these were discussed in detail.

Many cities presented to the committee information about what they considered special advantages of locating the laboratory on their site, some relevant, some of questionable merit. For example, Cincinnati noted that it was one of the largest centers in the country for the manufacture of machine tools, Oklahoma City pointed out that it had one of the greatest concentrations of commercial laboratories engaged in fuels research, and Denver mentioned that it would be possible to conduct engine altitude testing on 14,000 foot Mount Evans which was accessible by a good road and was only 56 miles from Denver. On the other hand, Akron noted that its sloping site was particularly advantageous in the event an underground laboratory was contemplated by the committee, Toledo made the claim that the "instruction classes" at the Toledo Museum of Art had a greater attendance than all other art museums in the United States combined, and Omaha felt that it was useful to note that it had the lowest death rate in the country.

It was unavoidable that each host city would raise the question of its chances of having the laboratory located on its site. To all questions of that nature Victory repeatedly stated that he could give no indication of the probability that any given site would be

selected and that he could not discuss the relative merits of the sites.[9] The sensitivity of this whole question and the committee's reaction is indicated by the decreasing willingness of the committee to discuss the number of sites which met the minimum requirements and the number of sites which were being inspected. Victory was aware that such discussions could easily lead to the injection of political factors into the site selection procedure. Early in the trip he was quoted in a Louisville paper as saying that "out of forty possible sites Louisville is one of four being considered seriously."[10] When the committee reached Chicago, about halfway through its trip, the press was given to understand that twenty sites were being inspected and that eight of these filled the requirements.[11] But for the remainder of the trip the committee declined to discuss how many sites were being inspected.[12] Victory increasingly stressed that the committee was merely a fact finding committee which would report to the main committee in Washington where the decision would be made.[13] In spite of this rumors began to circulate to the effect that certain cities had a favored position.

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[9]For example, Victory's statements as reported in the Chicago Daily Tribune, August 16, 1940, and in the Cleveland Press, August 23, 1940.

[10]Louisville (Kentucky) Courier-Journal, August 14, 1940.

[11]St.Charles (Illinois) Chronicle (weekly), August 22, 1940.

[12]Cleveland Plain Dealer, August 23, 1940.

[13]St. Louis Globe Democrat, August 15, 1940; Milwaukee Journal, August 21, 1940.

While the Victory Committee was still engaged in its inspection trip, Drew Pearson reported in his column that five midwestern cities fulfilled the specifications and that Indianapolis was "considered the best bet by insiders, with South Bend second."[14]

When the committee arrived in Buffalo, the next to the last stop, the local committee was reported to "have gained the distinct feeling that Cleveland will be the final choice."[15] Victory, perhaps to counteract this feeling, told the Buffalo Evening News that "the laboratory could be operated very effectively here," but he again stressed the nature of his committee's work: "We are only a fact finding committee. We will give the NACA the facts as we found them. Our job is not to make recommendations."[16]

The people in Buffalo felt, however, that these assurances were inadequate, and they initiated the first attempt to bring pressure on NACA through their representatives in Congress. The local paper reported that "some Buffalonians prominent in the drive to bring the laboratory here feel that if their city is to have a chance Senator James M. Mead will have to do something for Buffalo."[17] Two days later in an editorial the paper called on Mead to press the city's claim.[18] Buffalo's mayor wrote Mead asking him to approach

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[14] "Washington Merry-Go-Round," Tulsa World, n.d. (August 1940).

[15] Buffalo Evening News, August 24, 1940.

[16] Ibid.

[17] Ibid.

[18] Ibid., August 26, 1940.

NACA, and the senator called on Victory after the committee's return to Washington and discussed Buffalo's advantages. He indicated that additional data to amplify the city's claim would be filed with NACA and that he planned to "confer with the committee frequently to keep it fully informed of the manifold advantages of the Buffalo site."[19] Victory apparently agreed to accept the additional data, which was in agreement with the policy of permitting many other of the cities visited to file additional data or amendments to their bids. But this attempt to influence the selection through the political process was not carried further, and it had no effect on either the selection procedure or the final choice.

It is clear that Victory expected that no more inspections would be carried out and that a decision would be made based on the inspection by his committee of the top twenty sites. When asked in Chicago about the timing of the decision he stated that it would not be before August 26th and that his committee's report, on which the decision would be based, would be submitted shortly after that date.[20] He described this report as the "final" report.[21] When approached by Senator Mead about the Buffalo site he stated that no further hearings or inspections were contemplated.[22]

Early in September this plan was shattered and NACA was forced

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[19]Buffalo Courier Express, August 27, 1940.

[20]Chicago Daily Tribune, August 16 and 24, 1940.

[21]Ibid., August 16, 1940.

[22]Buffalo Courier Express, August 27, 1940.

by political pressures to conduct additional site inspections. Strong dissatisfaction arose among western cities which had submitted bids but had not been included in the inspection trip. The dissatisfaction became public when the Topeka State Journal of Topeka, Kansas printed a story headlined "Kansas Given a Run-Around ... Committee Got Only to St.Louis."[23] The story reported that the governor of Kansas had been informed that neither one of the two large cities in his state which had submitted bids, Wichita and Kansas City, had been inspected. The governor had wired the state's two senators and two representatives with a strong protest. His reasons were outlined in the telegram:

> I have been informed that the special government committee authorized to select the site for the new $8,400,000 airplane engine laboratory apparently went no farther than St.Louis in their inspections and that this laboratory will be established somewhere east of the Mississippi River. Both Wichita and Kansas City, Kansas filed briefs for this laboratory. It appears that their claims are to be ignored without even the formality of an inspection. Such action will render meaningless repeated assurances from Washington that our state will be given fair consideration in the industrial plan for national defense. I am wondering if you have any suggestions to make whereby we may be of service in persuading members of the National Advisory Committee for Aeronautics to have the Kansas sites inspected before the final decision is made.[24]

While this was the first public indication of dissatisfaction, the complaints had begun earlier. At the next meeting of the full

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[23]Topeka State Journal, September 5, 1940.

[24]Telegram from Governor Payne Ratner to Senators Capper and Reed and Representatives Guyer and Houston. Partial text reprinted in the Topeka State Journal, September 5, 1940.

committee on site, held on September 10th, Chairman Bush reported that he had received a number of "earnest requests from congressmen and others that their cities be accorded the courtesy of inspection."[25] As a result, Bush ordered Victory and Robinson to conduct an inspection of four more cities, three in Ohio (Zanesville, Youngston, and Toledo) and Nashville, Tennessee. This inspection was carried out on the fourth, fifth, and sixth of September, and due to the haste with which it was arranged, the two other members of the Subcommittee on Site Inspection, Captain Keirn and Commander Rutherford, did not participate.[26]

The report on this additional inspection trip as well as on the first one were available at the September 10th meeting of the Bush Committee. The information they contained provided the additional information for Robinson to complete the ratings, in particular those of the top twenty contenders, and the committee had expected to make its choice based on these ratings. But both Bush and Victory now reported that since the second inspection trip a number of additional telephone calls from congressmen had been received asking that inspections of sites in their community be authorized. In addition, a letter from the governor of Kansas, as well as one from Senator Reed (R., Kansas), were read to the commit-

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[25] "Minutes of meeting of Special Committee on Site," September 10, 1940.

[26] Victory and Robinson, "Inspection of Sites for the Engine Research Laboratory," memorandum for the Chairman, September 9, 1940.

sult of these developments, the Bush Committee directed
committee on Site Inspection should proceed to make
of additional sites and submit a report as quickly as
inquiry Dr. Lewis, who was in close touch with the
laboratory construction plans, stated that "a delay of
weeks in selecting a site would not impede progress in
ion of plans and specifications for the laboratory."[27]
same meeting, Robinson presented an evaluation of the
on the rating scheme worked out by him and slightly
the full committee in its first meeting on August 6th.
the top twenty-five sites is shown in table V-1. Of the
sites all but Toledo, Ohio, which ranked fifteenth, had
ted the first trip. The sites now selected for
were those which followed the first twenty on the rating
of these were located in cities which had complained
ctly or through their representatives in Congress.[28]
with the exception of Springfield, Ohio and Lansing,
located west of the Mississippi River where no cities
Louis had previously been inspected.
nspections by the four men of the Victory Committee took
the sixteenth to the twenty-fourth of September with an

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nutes of meeting of Special Committee on Site," September
. 4.

ver; Kansas City, Kansas; Kansas City, Mo.; Madison;
; Oklahoma City; Omaha; Springfield, Ohio; Tulsa; and
l al been heard from. Des Moines; Lansing; and St.Paul
insp ted.

TABLE V-1

SITE RATINGS FOR THE TOP TWENTY-FIVE SITES AS PRESENTED AT THE SECOND MEETING OF THE COMMITTEE ON SITE ON SEPTEMBER 10, 1940

Ranking	City	Rating
1	Cleveland	83.51
2	Dayton	83.49
3	Detroit	82.64
4	Cincinnati	81.83
5	Aurora, Illinois	81.00
6	Glenview, Illinois	80.40
7	South Bend	79.37
8	Milwaukee	78.87
9	Chicago Municipal	78.80
10	Columbus, Ohio	77.66
11	St.Charles, Illinois	77.10
12	Lockport, Illinois	76.40
13	Joliet, Illinois	76.30
14	Indianapolis	76.01
15	Toledo	75.90
16	Louisville	75.87
17	Akron	75.81
18	Buffalo	75.03
19	Rockford, Illinois	74.10
20	St.Louis	73.74
21	Lansing	73.35
22	Des Moines	73.05
23	Minneapolis	72.98
24	Kansas,City, Missouri	72.25
25	Kansas City, Kansas	72.20

additional trip by Victory and Robinson to Lansing and Des Moines on the third and fourth of October. These inspection trips were similar in character to the first one with the single exception that Victory repeatedly impressed on the local committees the non-political nature of the whole selection process. Following the visit by Victory and Robinson to Nashville the local paper reported that "the

NACA is strictly business. In inspecting the sites available here, the members pursued an inspection pointed solely at the qualifications of the location. It would be well to bear in mind the fact that political considerations will have no conceivable part in the committee's ultimate decision."[29] In Denver, a subcommittee of the chamber of commerce reported in the chamber's publication that the NACA subcommittee "gave the impression of possessing the highest type of non-political patriotism, their sole objective being to find, no matter where and with no regard whatsoever to exerted influence, the best possible location for the laboratory."[30]

The site inspections by the Victory Committee were undertaken to insure that NACA's site selection procedure would achieve its objective. They were intended to provide improved information for inclusion into the carefully designed rating scheme. But these trips provided the opening for the application of conventional political pressures. The initial, isolated attempt by Buffalo had no effect, but the concerted application of pressure by a large number of communities, of which Kansas was typical, forced NACA to respond. The response was very limited, however. The only change made was to gather additional data, but neither the individual criteria, nor the method of selection by means of a rating scheme were changed.

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[29]Nashville Tennesseean, September 13, 1940.

[30]Denver (Magazine of the Denver Chamber of Commerce), October 19, 1940.

In this meeting between politics and science those attempting to influence the decision by conventional political means thus found them to be inadequate. As the proponents of a purely scientific approach NACA was soon to find that its approach did not provide a fully adequate answer either.

CHAPTER 6

THE INADEQUACY OF SCIENCE: THE FINAL DECISION

With the site inspections completed, all the data necessary for a final selection was now available. The Committee on Site met again to hear the report of Victory's latest inspection trips and the results of Robinson's rating calculations. It was now expected that on the basis of the fully completed ratings the final choice could be made.

The day before the October 8 meeting, at which the decision was expected, Victory submitted a two-page memorandum to Dr. Bush. In this memorandum he outlined the procedures used by the Subcommittee on Site Inspection, described the general reaction he had met in visiting the many interested cities, and proposed a detailed procedure to be used by the Bush Committee in reaching its final decision at its upcoming meeting.[1] Mr. Robinson, he pointed out, had served not only as a member of the subcommittee, but had also acted as its agent in collecting facts and weighing them in accordance with the schedule of weights approved by the Bush Committee. Victory granted that the ratings made by Robinson were subject to the error of human judgment, but he felt that they had

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[1] J. F. Victory, "Selection of a Site for the Engine Research Laboratory," memorandum for Dr. Bush, October 7, 1940.

been made "with great ability, complete fairness, and absolute integrity."[2] The schedule of weights itself, Victory said, was not perfect, and might possibly be improved. But he stated his belief that it could not successfully be challenged on the ground that it reflected a bias or partiality for or against any city or selection. In his many discussions of the site selection Victory had found a wide interest in the subject by congressmen, governors, mayors, and chambers of commerce. He had found, he reported, that all interested parties were well satisfied with the committee's plan to weigh impartially the advantages of each site and to select the site which, all things considered, would prove best for American aviation and for the country. He added finally that the correspondence and all records of deliberations and inspections had been preserved so that all transactions "may at any time be disclosed with credit to the committee, should the procedure ever be investigated."[3]

To carry on in this tradition of scrupulous fairness Victory proposed a three-point procedure. Its aim was to insure the selection, in the most objective manner, of the best possible site. The proposed procedure was as follows:[4]

> (a) That the Special Committee on Site analyze and review the ratings of the sites in accordance with the schedule approved by the Committee; that it then proceed to the selection of a site, starting with the site that has the highest rating and taking into account with respect to that site any special advantages or disadvantages that are not reflected in the rating system; and that if such site be disqualified for cause, it proceed to the consideration of the site with the

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[2] Ibid., p. 1. [3] Ibid., p. 1. [4] Ibid., p. 2.

next highest rating, and continue the process until a decision is reached.

(b) That such decision when reached be conditioned upon a careful check of every material factor affecting the construction and efficient operation of the laboratory, and upon the obtaining of explicit, binding agreements of the proper parties in such community to do each of the essential things proposed and deemed necessary by the Committee to be done.

(c) That the Chairman be authorized to submit report and recommendation accordingly to the main Committee, with the recommendation that he be authorized by the main Committee to withhold announcement pending satisfactory completion of all necessary preliminary arrangements; and that in the event that a careful check discloses adverse factors of a serious nature in the site selected, the Special Committee on Site be reconvened.

This procedure contains the first explicit recognition that factors not accounted for in the rating scheme would have to be taken into consideration. While it constituted a careful statement of an orderly series of steps to be followed, and while it was based on the existing rating scheme, it provided that other factors should be taken into account, and that even after an initial selection had been made all "material" factors be further checked into. The primary aim was to secure the best possible site, and to reach this goal Victory suggested in effect that it would be necessary to go beyond the carefully established rating scheme.

Victory's memorandum was presented to the committee when it met on October 8th. The suggested procedure was carefully considered and then a resolution was passed, formally adopting the procedure as the one to be followed.

Following the adoption of the selection procedure Bush

introduced Rudolph Gagg and asked him, in his capacity as construction consultant for the engine laboratory, to present his ideas as to the best location. Gagg reported that he had personally visited the sites under consideration in Dayton, Chicago, Cleveland, Detroit, and Indianapolis. He had been most impressed with the advantages in Cleveland, and he felt that it rated highest, all factors considered. Furthermore, if the factors of access to scientific and technical activities, accessibility to the engine industry, and strategic vulnerability were ignored, the Cleveland site would still rate the highest.

Next, the detailed site ratings were presented. As in previous meetings the presentation was made by Robinson, who was the only individual devoting full time to the work of the site committee. Since the last meeting the additional site inspections had taken place and many bid amendments, as authorized by Victory, had been submitted to NACA's Washington office. Robinson had carefully taken every bit of information which reached him, and as conscientiously as he could had applied the rules and weights contained in the official schedule. Before this meeting he had, as before previous meetings, added up all the points to arrive at a rating for each site. He now presented the results, carefully noting the changes that had taken place since the last meeting and explaining the reasons in each case. The top ten contenders now were:[5]

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[5] "Minutes of Meeting of Special Committee on Site," October 8, 1940, p. 3.

Glenview	85.10
Cleveland	83.33
St. Charles	82.53
Detroit	82.04
Dayton	81.91
South Bend	81.69
Aurora	81.53
Indianapolis	81.28
Cincinnati	80.47
Toledo	80.20

The surprising thing about this latest rating was that for the first time the site at Cleveland did not occupy the number one position. Up to that time, in spite of changes and adjustments in the point scores of most of the top-ranking sites, including that for the Cleveland site, that city had remained the highest on the list, as can be seen from table VI-1.

The site that now ranked number one was Glenview, located in a suburb of Chicago adjacent to the Curtiss-Reynolds airfield. Several factors contributed to Glenview's high standing. The research community in Chicago, made up of the universities, led by the University of Chicago, and the private firms engaged in research, took an active part in presenting the city's case although it did not press for any one of the several sites offered in or close to the city. President Robert Hutchinson and Dr. Arthur Compton were members of the delegation which welcomed the Victory Committee to Chicago. Shortly after the visit both men wrote to NACA emphasizing their belief in the importance of locating the research laboratory in an environment that would encourage research.[6] They felt that Chicago

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[6] "Minutes of Meeting of Special Committee on Site," September 10, 1940, p. 3.

TABLE VI-1

RATINGS OF THE TEN TOP RANKING SITES AT SUCCESSIVE POINTS IN THE WORK OF THE COMMITTEE ON SITE IN 1940

Using Preliminary Schedule of Weights*	As Presented at September 10 Meeting		As Calculated After Second Subcommittee Trip September 23		As Presented at October 8 Meeting		As Presented at October 24 Meeting and in Final Report	
Cleveland	Cleveland	83.51	Cleveland	84.10	Glenview	85.10	Cleveland	85.16
Dayton	Dayton	83.49	Dayton	83.67	Cleveland	83.33	Glenview	84.30
Detroit	Detroit	82.64	Detroit	83.43	St. Charles	82.53	Dayton	84.11
Aurora	Cincinnati	81.83	Aurora	82.10	Detroit	82.04	St. Charles	82.53
Cincinnati	Aurora	81.00	Cincinnati	81.65	Dayton	81.91	Detroit	82.04
Glenview	Glenview	80.40	Glenview	81.40	South Bend	81.69	South Bend	81.69
Chicago	South Bend	79.37	Chicago	80.30	Aurora	81.53	Aurora	81.53
Milwaukee	Milwaukee	78.87	Milwaukee	79.03	Indianapolis	81.28	Indianapolis	81.28
South Bend	Chicago	78.80	South Bend	78.84	Cincinnati	80.47	Cincinnati	80.47
Columbus	Columbus	77.66	Columbus	78.06	Toledo	80.20	Toledo	80.20

*The individual ratings on which this ranking was based by the use of the preliminary schedule of weights, were not found in the surviving records.

Note:

Chicago refers to the site offered adjacent to the Chicago Municipal Airport. Aurora, Glenview, and St. Charles are all located in Illinois close to Chicago. Columbus refers to the Ohio city.

would provide such an environment. Nine firms having research laboratories in the Chicago area wrote similar letters and both the universities and the research laboratories pledged their cooperation.[7]

The Glenview site itself suffered from one handicap. The adjacent airfield was not publicly owned but was the property of the Curtiss-Wright Corporation. It was used, however, as a naval reserve base and with the expansion of the pilot training program the Navy had become interested in the possibility of acquiring the field for use in preliminary flight training.[8] Before being sent to Pensacola for advanced flight training pilots would, according to this plan, receive instruction at the Curtiss field. The idea of having the Navy acquire the field was actively encouraged by the congressman from the district, Representative Ralph E. Church, who was a member of the Naval Affairs Committee. Church had a general interest in securing for his district a share of the expanding industrial and military facilities and, like other midwesterners, had strongly advocated that aircraft industries should be located inland where they would be secure in case of an emergency. He was active in getting negotiations between the Navy and Curtiss-Wright underway, and it was while these negotiations were in progress that NACA announced that it was looking for a site for its engine

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[7] "Order of Business, Special Committee on Site," September 10, 1940.

[8] Chicago Daily News, August 15, 1940

laboratory.[9] Church took a strong interest in Glenview's bid for the laboratory and was active in insuring that information showing that the site would meet the established NACA criteria was submitted to the Victory Committee.

In spite of the fact that the airfield was privately owned at the time the Glenview bid was submitted, NACA was persuaded, on the strength of the Navy's plans, to include the site in its evaluation.[10] On August 15th, the very day on which the Victory Committee was in Chicago inspecting the Glenview site, the newspapers in that city carried the report that the Secretary of the Navy, Frank Knox, had announced in Washington that the facilities at the field would be extensively expanded.[11] This undoubtedly strengthened Glenview's claim to remain in the competition by giving the impression that the handicap of airfield ownership was about to be eliminated.

When the Bush Committee had met, after the first site inspection trip to the top twenty cities had been completed, Robinson's ratings showed that the Glenview site rated sixth with 81.40 points.[12] Following Victory's visit the Chicago group continued to supply additional information, both about the advantages of the city in general and about the Glenview site. It was as a result of

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[9] Chicago Daily Tribune, August 9, 1940

[10] The rating sheet for Glenview carries the entry: "Would be all-military, hence under control."

[11] Chicago Daily News, August 15, 1940

[12] Table VI-1.

the changes in a substantial number of the items rated that the total rating of the Glenview site increased markedly between the meetings of September 10 and October 8. Of the twenty-three individual items rated, changes were made in eight, with six increases totaling 4.85 points and two decreases totaling one point. The individual changes are shown in table VI-2.

TABLE VI-2

CHANGES IN THE RATINGS OF THE GLENVIEW SITE BETWEEN MEETINGS OF THE COMMITTEE ON SITE ON SEPTEMBER 10 AND OCTOBER 8, 1940

Site Criteria	Percentage Rating		Maximum Weight	Point Rating		Increase or Decrease
	Sep 10	Oct 8		Sep 10	Oct 8	
Increases						
Airport Size	45	60	3	1.8	2.4	.6
Site Soil	80	90	2	1.6	1.8	.2
Water and Sewage Conn.	30	50	1	.3	.5	.2
Power Dependability	40	100	4	1.6	4.0	2.4
Living Conditions	60	80	3	1.8	2.4	.6
Access to Engine Mfgrs.	75	80	17	12.75	13.6	.85
Total Increases						4.85
Decreases						
Access to Site	85	80	4	3.4	3.2	.2
Power Charges	75	59	5	3.75	2.95	.8
Total Decreases						1.00

In the same time interval in which Glenview's rating increased so notably most of the other leading contenders registered small decreases. Cleveland's rating went down by .77, Dayton's by 1.76,

and Detroit's by 1.39. The changes in the ratings of individual items for Cleveland are shown in table VI-3.

TABLE VI-3

CHANGES IN THE RATINGS OF THE CLEVELAND SITE BETWEEN MEETINGS OF THE COMMITTEE ON SITE ON SEPTEMBER 10 AND OCTOBER 8, 1940

Site Criteria	Percentage Rating		Maximum Weight	Point Rating		Increase or Decrease
	Sep 10	Oct 8		Sep 10	Oct 8	
Increases						
Volume of Air Traffic	20	40	4	.8	1.6	.8
Site Cost	70	100	1	.7	1.0	.3
Water and Sewage Conn.	90	100	1	.9	1.0	.1
Power Accessibility	30	50	1	.3	.5	.2
Access to Science Center	80	88	11	8.8	9.68	.88
Total Increases						2.28
Decreases						
Airport Size	100	90	4	4.0	3.6	.4
Power Charges	70	40	5	3.5	2.0	1.5
Living Conditions	90	80	3	2.7	2.4	.3
Access to Engine Mfgrs.	100	95	17	17.0	16.15	.85
Total Decreases						3.05

The changes in the ratings for any of the sites do not follow any particular pattern and appear to be the result of Robinson's reevaluation of the individual factors based on new information reaching him.

Faced now with the sudden rise of Glenview to the top rating, Bush noted that the airfield was still privately owned but that negotiations for its acquisition by the Navy were underway. He

asked the Navy member of the site committee, Captain Kraus, to ascertain the status of the negotiations. While Kraus left the room other matters were discussed. The record does not show what Captain Kraus reported on his return. It is likely that he simply reported that negotiations between the Navy and Curtiss-Wright were continuing but had not yet been concluded. This raised the question of whether the Glenview site should be considered by the committee. It held the highest rating among the sites and the committee had just formally adopted a procedure which stated that it was to make its selection by "starting with the site that has the highest rating." There appears to have been some disagreement among the members over this question, and it was only settled when a motion was "duly seconded and carried" by which it was "resolved, that the committee proceed to consider the cities in their respective standing in accordance with its approved policy."[13]

The way was thus opened for a consideration of the Glenview site, and an extended discussion of its special advantages and disadvantages took place. The result was that the committee decided, probably because of the airfield ownership problem, to pass over Glenview temporarily and proceed to consider the second ranking site, Cleveland. This brought the committee back to a subject which it had begun to consider while Captain Kraus temporarily left the room, namely the subject of electric power rates.

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[13] "Minutes of Meeting of Special Committee on Site," October 8, 1940, p. 5

Robinson reported that a difference of $11,575 in the expected monthly operating cost existed between the highest and lowest power cost quoted by the ten top ranking cities.[14] Although this difference had been taken into account in rating the cost of power he felt that the difference was so significant that it should be called to the attention of the committee. It was a matter, Robinson noted, that had become of concern while the subcommittee was performing its site inspections and he had called it to the attention of Mr. Victory.

Victory now explained that as a result he had decided to explore the possibility of a reduction in these rates. It would be worthwhile, he reasoned, to approach a few of the cities which had quoted unusually high power rates, but which otherwise ranked high, for this purpose. At the completion of the second site inspection trip of the full Victory committee, which ended in Springfield, Ohio, the committee had gone to Dayton, only twenty-five miles away. A special conference was held there on September 24th on the question of power rates, but the Dayton Power Company had stated that its quotation could not be further reduced. On the way back from the short trip that he and Robinson had made to Lansing and Des Moines in early October, they had stopped in Cleveland for the same purpose. In discussions with the Cleveland Illuminating Company it had not been possible, however, to obtain an immediate

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[14] It is not clear from the surviving records how Robinson arrived at this figure.

reply. Although Victory did not go into details, this meeting, which had been arranged by Gildersleeve, produced a promise by the Illuminating Company that the question would be further studied, and a "satisfactory" proposal would be telephoned to Victory in Washington.[15] This proposal had apparently not reached Washington as the Bush Committee met, and Victory, without any information on hand, and as always careful to be scrupulously fair, reported only that the Cleveland negotiations had produced the same result as in Dayton. The power rates could not be further reduced.[16]

The committee agreed that the question of power costs was important and discussed in some detail the technical questions of load and capacity requirements. Dr. Briggs, of the National Bureau of Standards, expressed concern that the variation in power quotations might be due to differences in understanding the exact requirements which the laboratory would have. Robinson, however, stated that in each city visited by the committee he had personally discussed the nature of the power load on which the bids were to be based with the president, executive vice-president, or chief engineer of the local power company. He was satisfied that the problem was thoroughly understood.

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[15] C. Gildersleeve to J. F. Victory, October 21, 1940. Gildersleeve referring to the visit of the two men, wrote that "I enjoyed the time I spent with you and 'Robby' to the fullest extent and I hope there will be many more such occasions," indicating that he was now on a first name basis with a second member of the NACA headquarters staff.

[16] "Minutes of Meeting of Special Committee on Site," October 8, 1940, p. 4.

After this review of the power situation, the committee continued its consideration of Cleveland. One problem that had to be considered was that the airport in Cleveland was the site of the annual Cleveland Air Races and the spectator stands for this event were positioned on the site proposed for the engine laboratory. The committee felt that the removal of these stands as well as the more general problems of whether the holding of the air races would interfere with the operations of the laboratory should be answered before a final decision regarding the Cleveland site could be reached.

It appears that in this discussion detailed comparisons were also made with the other top ranking sites. It is probable that a feeling developed that this discussion and comparison could become very extended, and that time had come for the committee to come to grips with the business of making the decisions which would lead to the final selection of one site. At the same time there appears to have been a desire to carry on with the formal procedure adopted at the beginning of the meeting. Finally Gagg, who had given his evaluation early in the meeting, had favored the Cleveland site and it may be that at this point the possibility of a further reduction in the Cleveland power rates was brought out. Some such combination of motives led to the agreement on the resolution which the committee now adopted:

> RESOLVED, that Glenview be eliminated, that Cleveland be held in suspense for further consideration,

and that the committee proceed to consider the merits of St. Charles.[17]

The discussion of the St. Charles site which now took place is not summarized in the minutes of the meeting. Only the fact that it took place is mentioned. Before all the details of this, the third ranking site, had been discussed, Dr. Briggs, apparently feeling that the questions regarding the Cleveland site should be clarified before further detailed discussion took place, proposed a motion to that effect. The motion recommended that a "further investigation be made of the Cleveland site with a view to its recommendation, provided more advantageous power rates can be obtained and that the air race stands can be removed." Although this approach was not strictly in accord with the adopted procedure, Bush siezed on the proposal as a way to reach a final decision. He suggested to Briggs that his motion be strengthened to provide for definitive selection of Cleveland provided that the two questions of the air race stands and the power rates could be adequately settled.

The readiness of Briggs and Bush to depart from the established procedure was dictated by their desire to bring the time consuming work of the site committee to a conclusion. Both were shouldering increased responsibilities elsewhere. Bush had recently been appointed chairman of the National Defense Research Committee, established by the President in June 1940 to expand scientific research in support of the preparedness program, and he held this

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[17] Ibid., p. 5.

new responsibility while still serving as chairman of NACA and as president of the Carnegie Institution of Washington.[18] Briggs, in addition to his position as Director of the National Bureau of Standards, was serving as chairman of the Advisory Committee on Uranium established by President Roosevelt in October, 1939.[19] For both men the selection of a site for the engine laboratory was a problem of lesser importance which should be brought to satisfactory but speedy conclusion.

Briggs readily agreed to the change proposed by Bush. The two military members, however, demurred. Captain Kraus felt that the committee had made a fair start in its analysis of the highest ranking sites. He pointed out that the committee, following its agreed upon procedure, had succeeded in eliminating one site, in passing over another site, and was considering a third. He thought that the work should continue along these lines, narrowing down the field and making its final selection by elimination. General Brett indicated that before a final selection was made he would like to see the merits of Dayton considered. The officers of the Material Division of the Army Air Corps at Wright Field near Dayton were very interested in having the engine laboratory located there, and felt that this would be of mutual benefit to the Army Air Corps and the

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[18] Irwin Stewart, Organizing Scientific Research for War (Boston: Little, Brown and Company, 1948), pp. 8-9.

[19] Rexmond C. Cochrane, Measures for Progress - A History of the National Bureau of Standards (Washington: U.S. Department of Commerce, 1966), pp. 362-363.

NACA. General Brett stated that he was in a position to give assurances that the Army would cooperate in every way should the laboratory be located on a site near Dayton.

Briggs' motion, as amended by Bush, was not further discussed. When Bush called for a second to the motion, which would have formally placed it before the committee for further debate, none came, and in the absence of a second Briggs withdrew the motion itself. Bush then indicated that the committee would proceed to consider Detroit, the fourth ranking site. But before consideration could begin it was found that it was late in the afternoon. Bush himself had to leave to catch an airplane. The meeting therefore broke up after passing a final resolution in which it was agreed to meet again a week hence and instructing the committee staff to seek a further clarification of the questions which remained outstanding regarding the Cleveland site.[20]

On October 14th, the day before the Bush Committee was due to meet again, Victory, accompanied by Robinson and Gagg, visited Cleveland. This visit marked a transition in NACA's approach to the site selection process. Up to the time of this visit emphasis inside NACA both in the committee and among headquarters staff had been on the scientific procedure with its careful gathering of data and its weighing of this data by means of the carefully designed rating scheme. The previous trips and visits had been aimed at obtaining

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[20] "Minutes of Meeting of Special Committee on Site," October 8, 1940, p. 6.

the most complete data for use in this approach, and when Victory authorized the submission of bid amendments he was primarily motivated by a desire to improve the accuracy of the data. The visits to Dayton and Cleveland to discuss the electric power rates were also primarily for the purpose of improving the data concerning one of the rated factors, although these visits with the NACA suggestion for additional concessions had certain aspects of negotiations.

With the October 14th visit to Cleveland the emphasis shifted. Instead of gathering data the task now in reality was to obtain assurances and commitments. The means to be employed for this new purpose was no longer the rating scheme but the conduct of negotiations. Thus the approach taken by NACA's representatives was no longer through science, but through politics. But while this shift was made by Victory, as the person responsible for obtaining the necessary commitments, it could not be acknowledged outside the headquarters staff. In its relationship with the outside world of interested bidders and congressmen, and even in its relationship with the Bush Committee, where certain outside interests were represented through the military members, the idea of sole reliance on the scientific approach had to be maintained. As a result several conflicts arose which had to be resolved before the final choice of a site could be made and announced to the public.

Gilderaleeve, appraised of the visit by Victory, Robinson and Gagg, had prepared well for the discussions to take place. The

affected parties in Cleveland were ready to make the necessary concessions and commitments, to back them up in writing, and even, in one case, to provide additional inducements. The Illuminating Company was ready to make reductions in its rates. The effect was that the monthly operating cost was reduced by $3,880. Furthermore, the minimum annual charge was reduced from $120,000 to $50,000 provided that a minimum of $3,000 per month was charged.[21] To clarify the question of the air race stands, a meeting was held with the board of directors of the National Air Races. This group, of which F. C. Crawford, the chamber of commerce president, was at the time vice-president, expressed its willingness to cooperate with the NACA in every way. The directors indicated that due to the war situation it was their expectation that no more air races would be held at the Cleveland airport, and that, in the event that the Cleveland site was selected for the laboratory, the group would be willing to have the spectator stands removed from the site. A few days after these assurances had been given the president wrote Victory: "It occurred to me following our very pleasant meeting in Cleveland a few days ago that you might like to have for the records ... a statement with regard to the attitude of the National Air Races of Cleveland, Inc." The letter repeated the statement regarding the expectation that the air races would not be continued

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[21] J. F. Victory, "Memorandum for Dr. Bush, Chairman, Special Committee on Site," October 15, 1940.

and the willingness of the group to have the stands removed.[22] Victory met finally with the superintendent of the Cleveland airport, Major Berry, who as a further inducement proposed that the site offered by the city be enlarged somewhat so that it would stretch from the airport fence to the boundaries of an adjacent public park. This would assure the NACA that there would be no other buildings close to the laboratory.

In the course of the one-week adjournment of the Bush Committee, other contenders were not idle. Additional information was received from St. Charles, Lansing, and Dayton.[23] The information from St. Charles was of little relevance and no adjustment in this site's rating was made. Lansing was not among the leading contenders and the additional information was not sufficient to bring its rating up to that of the three or four sites under serious consideration. More important, the Dayton Power Company reversed its stand on the question of power rates and submitted a very substantial reduction. The exact figures are not known, but they were sufficient to increase the percentage rating of Dayton's power cost from 25 percent to 69 percent with a corresponding increase in the weight rating from 1.25 points to 3.45 points.

If only the changes in power rates at Cleveland and Dayton had been considered in the total ratings the results would have been as

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[22] L. W. Grewe to J. F. Victory, October 18, 1940.

[23] "Minutes of Meeting of Special Committee on Site," October 15, 1940, p. 1.

shown in table VI-4. Glenview and Cleveland would have retained their respective positions as number one and number two, while Dayton would have moved up from its number five to the number three position, bypassing St. Charles and Detroit.

TABLE VI-4

THE EFFECTS OF POWER RATE CHANGES
ON THE TOTAL RATINGS

Site	Rating October 8 1940	Change in Power Rating	Total Rating Considering Only Power Rate Change
Glenview	85.10	--	85.10
Cleveland	83.33	Plus .8	84.13
Dayton	81.91	Plus 2.2	84.11

This result was, however, inconsistent with the action taken by the Bush Committee in its last meeting when it had decided to eliminate Glenview. It was also inconsistent with Victory's own best judgment which pointed to the selection of Cleveland. This judgment was directly supported by Gagg and had implicitly been supported by Briggs and Bush at the last meeting. It was based in part on the general excellence of the Cleveland site. Cleveland had been given intensive attention in the process of selecting a site for the first new laboratory, and only its unfavorable geographical location had prevented its selection over the West Coast site at Sunnyvale. Furthermore, it had up until the October 8th meeting always occupied the top position in the current ratings despite many small adjustments in the point scores for all the top-ranking

sites (see table VI-1). Victory's judgement was also based on the knowledge that, with the shift of emphasis in the site selection process to a reliance on negotiations, the ability to engage in the give and take of such negotiations in a responsible as well as discreet manner would be important; and here he knew the Cleveland representatives to have the highest qualifications.

Both the Bush Committee's earlier decision and Victory's own judgement made it increasingly certain that Glenview would not be selected, and that Cleveland would be the final choice. But this choice was inconsistent with the current results of the rating scheme even after the most recent adjustments for the reductions in electric power rates by Cleveland and Dayton.

This inconsistency could of course have been removed by a stringent application of the scientific rating scheme. In the middle of October it would have been perfectly in accord with the established procedure to announce that the Glenview site had been eliminated because it did not qualify. At that point in time it clearly did not meet the requirement that the adjacent airport must be publicly owned. But such an announcement would undoubtedly have raised the same kind of public protests and pressures which the committee had been exposed to from Buffalo, Kansas and others after the first site inspection trip. And even if the decision was not publicly announced, the Navy's interest in this matter, and the presence on the committee of Captain Kraus, who was in touch with the Curtiss-Wright negotiations, meant that any such decision would

be expected to become known to the Chicago group. The group in Chicago included an important congressman and a number of other influential personalities. They had been given to understand that the Glenview site would be included in the survey in spite of the ownership difficulty, which some of them were actively working to resolve. An abrupt decision by NACA that Glenview was disqualified could be expected to evoke protests and renewed application of pressures through conventional political channels.

The unexpected rise of Glenview thus produced a conflict between the choice indicated by the rating scheme, which NACA officially relied on, and the choice indicated by considerations of informed judgement, the requirements of negotiations, and the desire to avoid a reopening of the selection process to political pressures. This conflict could be resolved if the relative ratings of Glenview and Cleveland were reversed.

Before the Bush Committee reconvened a close examination was made of the factors entering into the total ratings of both sites. The examination had the effect that certain of the factors in the ratings of both sides were changed. These factors and the changes which were made are shown in tables VI-5 and VI-6. The reason why these particular factors were subject to change is not made explicit in the surviving records. It is clear, however, that the net effect was that the four factors which were changed in the Cleveland rating were all increased and the two factors which were changed in the Glenview rating were both decreased. Closer examination shows that,

TABLE VI-5

CHANGES IN THE RATINGS OF THE CLEVELAND SITE
BETWEEN MEETINGS OF THE COMMITTEE ON SITE
ON OCTOBER 8 AND OCTOBER 15, 1940

Site Criteria	Percentage Rating		Maximum Weight	Point Rating		Increase or Decrease
	Oct 8	Oct 15		Oct 8	Oct 15	
Increases						
Volume of Air Traffic	40	50	4	1.6	2.0	.4
Site Soil	70	90	2	1.4	1.8	.4
Power Charges	40	56	5	2.0	2.8	.8
Climate and Weather	55	60	5	2.75	3.0	.25
Total Increases						1.85
Decreases						
None						

TABLE VI-6

CHANGES IN THE RATINGS OF THE GLENVIEW SITE
BETWEEN MEETINGS OF THE COMMITTEE ON SITE
ON OCTOBER 8 AND OCTOBER 15, 1940

Site Criteria	Percentage Rating		Maximum Weight	Point Rating		Increase or Decrease
	Oct 8	Oct 15		Oct 8	Oct 15	
Increases						
None						
Decreases						
Airport Size	60	50	4	2.4	2.0	.4
Volume of Air Traffic	80	70	4	3.2	2.8	.4
Total Decreases						.8

aside from the increase in the rating of Cleveland's power charge, which was made as a result of the substantial lowering of the rate itself, two of the rating increases for Cleveland, those for site soil characteristics and for climate and weather, had the effect of making the Cleveland rating equal to the Glenview rating.[24] In the case of the air traffic factor where changes were made in the ratings of both sites the effect was to bring the ratings closer together.[25] This pattern suggests that the changes in the ratings arose as a result of a close comparison of the ratings of individual factors for the two sites. As a result of the changes made after this comparison the final ratings for the five top ranking sites, as computed prior to the next meeting of the Bush Committee, were as follows:

Cleveland	85.16
Glenview	84.30
Dayton	84.11
St. Charles	82.53
Detroit	82.04

With the rating inconsistency thus resolved there remained, however, one potential obstacle to a final decision inside the site committee. That was the committee's three-point procedure, which to some extent was in conflict with the actions taken by the committee at its last meeting. In accordance with the procedure the group had

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[24]Glenview had a site soil characteristics rating of 90 percent and Cleveland's rating was raised from 70 to 90 percent. Glenview had a climate and weather rating of 60 percent and Cleveland's rating was raised from 55 to 60 percent.

[25]Glenview's rating was decreased from 80 to 70 percent and Cleveland's rating was increased from 40 to 50 percent.

been preparing to consider the site offered by Detroit, when its last meeting broke up. Both General Brett and Captain Kraus had stressed adherence to the procedure, and had also indicated their desire to have a number of the top-ranking sites considered before a final decision was made. At the same time the last meeting had concluded with the adoption of a resolution instructing the staff to gather additional information about Cleveland, which had been held in suspense for further consideration.

To eliminate any chance of a procedural tangle at the forthcoming meeting of the Bush Committee two resolutions were drafted. One was in the form of a change to the already adopted procedure. It inserted in the first paragraph, after the call for a review of the ratings, but before the step calling for the selection of a site by starting with the highest ranking site, the words "that it then consider the merits of all sites proposed."[26] The second change was in the form of an additional paragraph stating "that in pursuance of this procedure consideration of the advantages and disadvantages of all sites shall be in order, regardless of their relative standing or of previous committee action."

There is,,curiously, no record in the minutes of the committee's next meeting that these two resolutions were adopted, or even discussed. However, the committee did consider all the ten top-ranking sites, and the final report of the committee, which includes

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[26] "Special Committee on Site," typed sheet, no author, October 15, 1940.

the full text of the three-step procedure, does include the added language, in slightly modified words.[27]

During the meeting itself Victory reported on the results of his trip to Cleveland and on the further bid changes received from Dayton and other cities. Captain Kraus reported on the status of the airfield negotiations which were still underway. Robinson presented the latest ratings and the rankings of the top ten contenders together with a chart showing the ratings for each individual factor. Then Victory discussed each site summarizing the special advantages and disadvantages of each. At the request of the committee Robinson gave a summary of the existing scientific and technological activities in each of the ten cities.

At length the final choice was made. The committee adopted a resolution which recommended the selection of the Cleveland site subject to a careful check of the factors affecting the construction and operation of the laboratory and "the securing of commitments by the proper authorities to do each of the essential things proposed."[28] With this action step one in Victory's three-step procedure had been accomplished and the way had been opened for the last phase in the selection of a site for the Engine Research Laboratory.

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[27] "That is consider in detail all of the sites." "Report of Special Committee on Site - Aircraft Engine Research Laboratory," October 24, 1940, p. 4.

[28] The minutes show that an informal ballot was conducted in which each member of the committee indicated his top three choices. However, the individual votes are not recorded. "Minutes of Meeting of Special Committee on Site," October 15, 1940, p. 2.

Robinson and Victory had been the first to recognize the limitations of the rating scheme. The question of electric power cost had forced them to go beyond simple information gathering and seek concessions in this limited area. The limitations of the rating scheme found wider recognition in the three-step procedure in which the site committee formally recognized that a number of factors beyond the rating scheme would have to be considered. The rating scheme lost its usefulness as a selection method when the need for commitements rather than information arose in the site selection process. It finally became necessary to adjust the results of that rating scheme to the needs of the larger political world in which the final choice was being made. While the approach through science could select the three or four best suited sites it could not make the final choice among them given that environment.

CHAPTER 7

THE RETURN TO POLITICS: NEGOTIATIONS AND PUBLIC ANNOUNCEMENT

A full month was to elapse before the selection of Cleveland was publicly announced. In this period a series of difficult negotiations regarding the transfer of title to the Cleveland site took place. These negotiations, which constituted the final phase of the site selection process, involved Victory, various bodies of the Cleveland city government, and the U.S. Department of Justice. They required a high degree of negotiating skill on the part of all the participants. These were the skills of decision making in the political context to which science had little to contribute. NACA now abandoned entirely its reliance on the approach to the site selection question through science and relied for the final stage on the skills and tools of negotiation and persuasion.

Victory's arrival in Cleveland two days after the last meeting of the Bush Committee marked the opening of these negotiations. Accompanied by Robinson he spent three days in an attempt to make the checks and obtain the commitments which were needed before the final selection and public announcement of that site could be made.[1] His instructions from the Bush Committee were "to check every

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[1] J. F. Victory, "Report of Careful Check of Cleveland Site," memorandum for V. Bush, October 24, 1940.

material factor affecting the construction and efficient operation of the laboratory at that site, including the securing of commitments by the proper authorities to do each of the essential things proposed."[2] But most of these questions had already been resolved. Commitments had been obtained that the air race stands would be removed. Gagg had inspected the site and reported that from the point of view of construction and operating feasibility, no obstacles were evident. Victory therefore concentrated his efforts on clarifying the legal status of the site and the problems involved in its transfer to the federal government.

Before coming to Cleveland, Victory had sent to the airport manager, Major Berry, a draft of an option on the land.[3] The preparation of such an option would require an investigation of the legal problems involved in the transfer of several parcels of land under consideration, while not requiring a final commitment to be made by the government. It was soon found that the problem could not be handled by the airport manager but required action by the city government. The first step was to have the Cleveland City Council authorize the mayor to give such an option. Victory arranged a telephone call which brought together the City Law Director, Henry S. Brainard, and the chief of the Land Section of the Department of Justice for a discussion of the legal problems

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[2] "Minutes of meeting of Special Committee on Site," October 15, 1940, p. 2.

[3] J. F. Victory to Major John Berry, October 17, 1940.

involved.[4] He then met with the mayor, the City Law Director and other officials and assisted in the drafting of a resolution for presentation to the city council. It authorized the mayor to offer any one of several parcels of land adjacent to the airport at a price of one dollar an acre. The mayor was further authorized to negotiate the specific clauses to be included in the option with the NACA and the U.S, Attorney General. Only two specific provisions were to be included in the option: one provided that neither the airport nor the laboratory would erect buildings that would obstruct the operation of the other; the other clause stated that in the event the use of the site for aeronautical research purposes should cease, the site would revert to city ownership.[5] The resolution was given the status of an emergency resolution and as such was passed by the city council within a few days.

Simultaneously a title search was begun at the city's request by the Land Title Guarantee and Trust Company of Cleveland. The initial search showed that the city had title to all the land in question, but that several encumbrances in the form of an oil and gas line lease and two rights-of-ways existed. With these steps taken and arrangement completed Victory returned to Washington for the final meeting of the Bush Committee. Gildersleeve took his

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[4] J. F. Victory, "Report on Careful Check of Cleveland Site," memorandum for V. Bush, October 24, 1940.

[5] "An Emergency Resolution, Resolution No. 1859-40, October 21, 1940." Copy attached to C. Gildersleeve to J. F. Victory, October 25, 1940.

visitors to the airport and, now confident that Cleveland would be selected, asked Victory to provide him with detailed technical information about the laboratory for use in newspaper articles and other publicity.[6]

Prior to the meeting Victory took certain steps to insure that no stumbling blocks would be encountered. To insure that his report of the activities carried out in accordance with the committee's instructions would be complete, he asked Gagg to provide a summary of his evaluation of the material factors affecting the construction and operation of the laboratory at the Cleveland site. Gagg was evidently not in Washington, but a report highly praising the site as one providing "a combination of physical facilities and intangible advantages which are unique," was telephoned in by him and typed up for presentation to the committee.[7]

Victory also recognized that the Cleveland site was open to one major criticism. It was not located within the zone of minimum strategic vulnerability. This criterion, like the criterion that the adjacent airfield must be publicly owned, had from the beginning been one of the important major criteria. It was furthermore one on which the committee had sought and accepted the advice of its military members. On this criterion Cleveland scored less than the desirable 100 percent, having obtained a rating of 90 percent. To blunt possible criticism in the committee of the Cleveland site,

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[6] C. Gildersleeve to J. F. Victory, October 21, 1940.

[7] "Telephone message from Mr. Gagg," October 24, 1940.

Victory asked Dr. Lewis, the Director of Aeronautical Research, whether the Committee on Power Plants for Aircraft had any opinion on the strategic vulnerability criteria. Lewis indicated that the power plants committee a month earlier had discussed the subject. It had adopted a resolution to the effect that if the vulnerability criteria was to prove an obstacle to finding a suitable site the requirement that the site be located adjacent to an airfield should not be considered mandatory. A memorandum summarizing this position was obtained by Victory to be held in readiness in case a member of the Bush Committee should raise the subject.[8] Its value was questionable since it gave preference to the strategic vulnerability criteria over the airfield criteria and it was never used.

The last meeting of the Bush Committee was held on October 24th.[9] As the first item on the agenda Bush reported that a number of cities had submitted further modifications to their bids. St. Louis, apparently aware that the question of electric power rates had received special attention, cut its rate almost in half, reducing the charge per kilowatt hour from 4.9 cents to 2.54 cents. Dayton, which had earlier reduced its power rate, now was further prepared to have the city donate the land for either of the two sites being offered. And from Chicago came a wire informing the committee, that

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[8] G. W. Lewis, "Action of Power Plants Committee regarding the location of Engine Research Laboratory," memorandum for Chairman, Special Committee on Site, October 22, 1940.

[9] "Minutes of Meeting of Special Committee on Site," October 24, 1940.

after negotiations with United Airlines president W. A. Patterson, agreement had been obtained to continue a shuttle between Curtiss Field and the municipal airport.[10]

These modifications indicated several things. It is apparent that Dayton was aware of its high standing in the ranking and was determined to continue to modify its bid in an effort to obtain the laboratory. It is probable that information about the work of the Bush Committee was reaching Dayton, perhaps through Air Corps sources. The lowering of the Dayton power quotation came soon after this subject had been discussed in the Bush Committee, and occurred after the Dayton Power Company shortly before had turned down Victory's request for a lower rate. In addition, the new offer to donate the land came after the reduction in power rates had failed to place the city in the top-ranking spot. These bid modifications also show that, with the exception of Dayton and perhaps St.Louis, other parties were entirely unaware of the committee's deliberations. The Chicago group would probably not have limited its activity to the relatively minor question of a shuttle service had it known of the Glenview sites high standing and the specific difficulties it was facing in the committee.

The bid modifications reported by Bush were not discussed nor were the site ratings adjusted to reflect the new information. The committee proceeded to hear Victory's report of his investigations

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[10]Telegram, Chicago Association of Commerce to J. F. Victory, October 22, 1940.

in Cleveland. He indicated that the resolution which he had helped prepare had passed the city council and that work on the preparation of the option was proceeding smoothly.

The final report of the committee had been prepared and circulated to the committee members prior to the meeting. It gave a detailed summary of the committee's work including the work of the Subcommittee on Site Inspection. The final recommendation was that the laboratory be constructed on the site offered by Cleveland, and the report emphasized that the recommendation was one on which the committee was unanimous. The report stated that the Cleveland was, in the view of the committee, the site which in its combination of advantages would "best serve American aviation and the interests of the nation."[11] General Brett, who had suddenly been called out of town, had already signed the report. Without further discussion the other members now signed it and the Special Committee on Site thereupon adjourned, its task completed.[12]

The preparation of a formal option on the land, which had been authorized by the Cleveland City Council, ran into several minor difficulties. Brainard, the law director, had several meetings with the title company concerning the oil and gas leases on the land, and eventually, through the cooperation of the East Ohio Gas Company and the Ohio Public Service Company, these encumbrances were elimi-

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[11] "Report of Special Committee on Site - Aircraft Engine Research Laboratory," October 24, 1940, p. 7.

[12] "Minutes of Meeting of Special Committee on Site," October 24, 1940.

nated.[13] All the land northwest of the airport, including the 200 acres in question, was technically under the control of the Cleveland Metropolitian Park Board. The board requested that certain restrictions against erection of billboards and against the construction of buildings within thirty feet of the park areas be included in the option. Brainard did so, explaining to Victory that they would also appear in the title certificate, but that as a practical matter they were of no concern.[14] Brainard also, as a precaution, included a statement concerning the tax exempt status of the land.[15] The preparation of the detailed description of the metes and bounds of the parcel took more time than anticipated. But finally the preliminary title report was received and the option was sent to Washington late in October.

In the course of the early negotiations the cost of the parcel of land was raised slightly. The city had originally offered the land at one dollar an acre bringing the total price to two hundred dollars. Brainard found that the cost of obtaining the title certificate would amount to about five hundred dollars, and he felt that the city should at least recover this amount in the transaction. He therefore suggested to Victory that the consideration in the option be raised from two hundred dollars to five hundred dollars. In making the proposal he emphasized that if Victory in

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[13] H. S. Brainard to J. F. Victory, November 1, 1940.

[14] H. S. Brainard to J. F. Victory, October 26, 1940.

[15] Ibid.

any way objected he would withdraw the suggestion. The city would not permit the matter of the title charge to interfere with the project.[16] Victory, however, readily agreed and the new figure was included in the option.

Throughout the negotiations all parties, at Victory's request, took care to emphasize that a final selection had not yet been made. Victory's recommendation to the Bush Committee, which had been adopted, was that until a thorough investigation had been conducted and all possible obstacles and difficulties had been removed, no public announcement should be made. In the recommendation to its parent body, the NACA main committee, the Bush Committee similarly recommended that the decision be held "strictly confidential" pending the completion of all necessary arrangements.[17] Victory, after his most recent trip to Cleveland, had made arrangements with the Soil Conservation Service of the Department of Agriculture to send a survey party to the city to prepare a contour survey of the site. However, he decided that it would be inadvisable to have this survey done until after the formal announcement of the final decision was made.[18]

Victory also enlisted the cooperation of the city officials in

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[16] H. S. Brainard to J. F. Victory, October 22, 1940 and October 24, 1940.

[17] "Report of Special Committee on Site - Aircraft Engine Research Laboratory," October 24, 1940, p. 7.

[18] J. F. Victory, "Report on Careful Check of Cleveland Site," memorandum for V. Bush, October 24, 1940, p. 2.

emphasizing the idea that no final decision had been reached. When the city council resolution was being drafted and submitted to the council, Mayor Burton announced that its purpose was "to put the city in a better position to deal promptly if the government should decide to locate the laboratory here."[19] The press was given to understand that Cleveland was one of three cities receiving final consideration and that the resolution was being rushed through under a suspension of the rules in an effort to keep Cleveland ahead.[20] The resolution itself included a preamble which emphasized that the competition was still in progress.

In spite of these precautions, at least one instance of premature announcement took place. A Cleveland radio station announced that the laboratory would definitely come to Cleveland. Word of this reached Victory in Washington and he phoned Henry Brainard, asking him to check into this. Brainard, a few days later, wrote Victory that both he and the mayor had exercised particular care to insure that no misunderstandings occurred.[21] He sent along one of the articles that had appeared in the local newspaper as typical of the reports published on the subject. It was regrettable that a radio broadcaster had misunderstood the situation, Brainard agreed, but he pointed out that city officials could, of course, not be responsible

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[19] Cleveland Press, October 21, 1940.

[20] Cleveland Press, October 17, 1940 and October 21, 1940.

[21] H. S. Brainard to J. F. Victory, October 26, 1940.

for accounts appearing in the press.

As the negotiations proceeded and city officials made several quick trips to Washington the press in Cleveland became increasingly confident that the choice would fall on the city. Each such trip was carefully reported accompanied by speculation about the final decision.[22]

Within NACA itself specific steps were taken to prevent working level personnel from knowing which site would be selected. In his work with the construction office at Langley, Gagg had to provide some indication of the size and shape of a possible site. When he provided the office with a blueprint of the Cleveland site he took careful precautions to eliminate any information that might identify the site's location[23]

When Victory received the option and turned it over to the Justice Department numerous legal complications were discovered. The department's Land Division, based on its wide experience in handling the acquisition of land on behalf of the government, raised a number of questions.[24] Some of these questions sought simply to clarify how the city had acquired the land and to insure that it had full and unrestricted title. More basic questions were raised, however, concerning whether an Ohio city had the authority to convey

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[22]Cleveland News, November 7, 1940 and Cleveland Plain Dealer, November 20, 1940.

[23]R. Gagg to J. F. Victory, November 2, 1940.

[24]J. F. Victory to H. S. Brainard, November 5, 1940.

land to anybody for a nominal consideration. It also appeared that a provision in the Ohio Code required public advertising for five consecutive weeks before any such sale could be made. Finally, the wording of the council resolution and the option itself was defective in several respects: the resolution would have to state specifically that the land no longer was needed for municipal purposes, and both documents would have to specify the one parcel of land in question rather than offer a choice of several parcels. The Land Division officials also asked for clarification of the park board restrictions and certain sewer easements contained in the option.

After several conferences between Victory and officials of the Land Division and many telephone calls to Cleveland, it was decided to hold a meeting to resolve the issues. Law director Brainard and Major Berry, the airport manager, flew to Washington early in November. At this meeting all the questions raised by the Land Division were discussed in great detail. As a result of this discussion it was concluded that a new resolution should be drafted and submitted to the city council, and, following passage, a new option would be drawn up and submitted.

The new council resolution was drawn up by Brainard on his return to Cleveland. It was worded to meet all the legal objections discussed at the Washington meeting. For example, it stated that the city council had found that the land was no longer needed for municipal airport purposes and that competitive bidding in the sale of the real estate was deemed "not appropriate" for the trans-

action.[25] While drafting the resolution, Brainard also worked on the revised option. Drafts of both documents were sent to Victory for checking with the lawyers in the Land Division and minor changes in language were made before the final form was agreed to.[26] When passage was obtained on Monday, November 18, the council was simultaneously advised to be on call for a special meeting later in the week. This was in anticipation of acceptance of the option by the government, although the reason given was the more vague and ambiguous one that it was in anticipation of "final action on the location of the federal government's ... Engine Research Laboratory at Cleveland airport."[27]

With the successful passage of the new resolution by the city council and receipt of the option, NACA decided to go ahead with its public announcement rather than wait for the formal acceptance of the option and the final enabling action by the city council. On the twenty-third the press in Washington was advised that the announcement of a site for the Aircraft Engine Research Laboratory would be made two days later at the NACA headquarters.[28]

The day before the press conference letters were sent to congressmen and other prominent individuals. In these letters, Dr.

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[25]City Council Resolution 2003-40, November 18, 1940.

[26]H. S. Brainard to J. F. Victory, November 14, 1940.

[27]Cleveland News, November 19, 1940.

[28]National Advisory Committee for Aeronautics, "Memorandum for the Press," November 23, 1940.

Bush, acting as chairman of NACA, referred to the extensive review of the many bids and stressed the unanimity with which the committee had selected Cleveland as the site which could best serve the national interest and the interest of aviation.[29] Simultaneously letters were sent to Mayor Burton and chamber of commerce president Crawford advising them of the decision. In Cleveland the announcement was enthusiastically received. The success of the city's efforts were due, said Walter Beam, the chamber's Executive Director, to the close cooperation between business and the city administration.[30] He singled out for special mention the chamber's president and its Industrial Commissioner, Fred C. Crawford and Clifford Gildersleeve, the mayor and his Law Director, Harold H. Burton and Henry C. Brainard. Major Jack Berry, the airport manager, council president A. L. DeMaoribus, and president F. G. Crawford of the Cleveland Illuminating Company.[31]

The public announcement of NACA's selection of a site for its Aircraft Engine Research Laboratory was made on Monday, November 25, 1940. Bush in his statement pointed out that the new laboratory was urgently needed to serve the needs of both national defense and the future of commercial aviation. The research which would be carried out at the laboratory would insure that the large investment in the nation's aircraft program would bring maximum return. To expedite

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[29]For example, Frances P. Boulton to V. Bush, November 26, 1940.

[30]Cleveland Press, November 25, 1940.

[31]Cleveland News, November 25, 1940.

matters construction would begin within a month. As for the site selected, Bush indicated that a thorough study of the 72 sites offered by 62 cities had been made. He praised the patriotic interest of the many cities which had offered sites for the laboratory and expressed the thanks of the committee for the splendid cooperation which had been extended. Cleveland had been selected because of "the finding that in its combination of advantages (it) will best serve the interests of aviation and of the nation."[32]

With NACA's official announcement the path was cleared for the remaining legal steps in turning the site over to the government. Brainard completed his draft of the third city council resolution which formally authorized the sale of the land.[33] This was duly passed by both the council and the Board of Control, and on the twenty-sixth the official deed was signed by Mayor Burton. It turned over to the United States of America 199.696 acres of land and granted the right to use the airport wihtout charge for the landing and taking off of heavier-than-air aircraft.[34] The question of whether the city had the authority to undertake this entire transaction was not formally resolved until the following year. In January of 1941 two bills were introduced in the State Legislature.

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[32]National Advisory Committee for Aeronautics, "Memorandum for the Press," November 25, 1940.

[33]Cleveland Press, November 25, 1940.

[34]"Official Deed from the City of Cleveland to the United States of America," November 27, 1940.

One authorized municipalities to transfer real estate to the federal government for defense purposes and the other retroactively ratified the Cleveland transaction.[35]

35C. Gildersleeve to J. F. Victory, January 16, 1941 and H. S. Brainard to J. R. McDonald, January 24, 1941.

CHAPTER 8

CONCLUSION

The reaction to NACA's selection of the Cleveland site was almost entirely favorable. This reaction showed that the agency's approach to the site selection problem had been successful. The approach placed the emphasis on the scientific method but had sufficient adaptability to take into account the political environment in which the selection had to be carried out.

The reactions of those with an interest in the matter were expressed in letters to NACA's Washington office.[1] Many found NACA's assurance that the selection had been made in the best interest of the country sufficient reason to be satisfied thus implicitly endorsing the approach taken. The Nashville Chamber of Commerce stated that: "Obviously we would have liked to have been awarded the location of this great enterprise, however we would not be so unpatriotic as to have the laboratory located here if a location elsewhere would best serve the nation." The Chicago Association of Commerce wrote: "We are confident that the committee made the decision with the best interests of aviation and the defense program as their test." From Columbus came the statement that "your

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[1]The following quotations are extracted from a compilation of comments in the NACA files entitled "Some Comments on the Selection of Cleveland as the Site for the Aircraft Engine Research Laboratory," December 1940.

committee had to select the location which, from all standpoints, was the best for the national defense, and in that we are all in accord."

Many others specifically praised the procedure employed by the committee. Congressman Hawks of Wisconsin's second district wrote: "I know that your committee gave Madison every consideration and I want to thank you and the committee for your kindness in this matter. I am sure that their judgement in selecting Cleveland was based upon sound principle." In a similar vein the mayor of Tulsa commented: "I greatly appreciate the courtesies extended by your committee in its careful and unbiased consideration, and we greatly enjoyed the visit of your Special Subcommittee on Site Inspection and wish to highly compliment them upon their business-like consideration and inspection of Tulsa." The Denver Chamber of Commerce commented: "We have never had occasion to observe the development of a project that was so free from political influence," and Fred C. Crawford, of the Cleveland chamber, wrote to Bush that "we have high admiration of the scientific, painstaking care and the wholly commendable methods used ... in studying the advantages of various cities which offered sites."[2]

A few dissents were heard.[3] Some bitterness was expressed by a member of the Dayton committee: "The decision of the committee is a keen disappointment to us, for the reason that our city possesses

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[2] F. C. Crawford to V. Bush, November 27, 1940.

[3] The following three quotations appear on a separate, typed sheet entitled "Unfavorable Comments on the Selection of Cleveland as a Site for the Aircraft Engine Research Laboratory," n.d.

many advantages unequalled by other locations. The power problem on service and rates finally met your approval and commendations, which I am quite sure no other city could match. Repeatedly I asked you whether we were wasting our time, money and energy on this project and in each instance you informed me we were not."

Congressman Ludlow, who represented the district which included Indianapolis, reflected the disappointment of a congressman who had taken an active interest in the project and saw his efforts coming to naught. He wrote Bush: "I would not be frank if I did not say that our Indianpolis people are deeply disappointed over the decision of your committee, as it was their sincere belief that they were offering an ideal location, and I think they are disappointed with their congressman, as there was a general feeling that my devotion and assistance to aviation and national defense would be helpful, all things else being equal. Since the decision, I have received letters expressing surprise that a city so near the border should have been chosen."

The congressman from Louisville, Emmet O'Neal, who sat on the powerful appropriations subcommittee which handled the NACA appropriations, critisized NACA's application of one of its major criteria. He wrote: "If a true inland site had been chosen it would be understandeble. Apparantly, the committee does not consider an attack on the United States in the future as even a possibility. The selection of a site virtually on the Canadian border is hard to justify, especially since the other two laboratories are on the two seaboards.

Our committee objected to Sunnyvale because of its accessibility to attack, and we acceded when we felt that the third place would be in the interior. But so it goes. However, all of us in Louisville will remember and be grateful for your splendid attitude."

NACA was thus successful in reconciling the methods of science and politics. It had conducted the initial phases of the site selection process by means of the approach through science and this had served to narrow down the choice to a small number of highly qualified contenders. At the same time this approach had enabled it to ward off the application of conventional political pressures applied through elected public officials. When the selection process reached the stage where the approach through science no longer was adequate, NACA easily adopted to the requirements for skillful negotiations, while maintaining its official reliance on the approach through science. The reconciliation of the conflicts arising from this meeting of science and politics was accomplished in a manner which kept the many interested parties content and which assured for NACA an excellent site for its Engine Research Laboratory.

BIBLIOGRAPHICAL NOTE

Manuscript Materials

The source materials on which this study is primarily based are the records of NACA, chiefly the records of NACA's headquarters office in Washington, D. C. These records are preserved in the U. S. National Archives where they are part of Record Group number 255, entitled "Records of the NACA - Historical Collection, 1915 - 1957." The records dealing with the site selection for the Engine Research Laboratory are contained in two cartons of that record group numbered "45" and "46," the first of which contains five manila folders and the second of which contains nine manila folders and four spring binders. Three of these binders contain newspaper clippings and one contains several sets of site rating sheets. The entire collection dealing with the site selection and the events leading up to it consists of 1,022 documents, 513 newspaper clippings, 316 site evaluation sheets, and 11 maps. The documents range in length from single sheet letters to reports up to 43 pages in length.

The manila folders carry the following numbers and titles:

From carton 45:

Folder 19-1 Engine Research Laboratory, Special Committee on Site, 1940
Folder 19-1 Engine Research Laboratory, Special Committee on Site, 1941
Folder 19-2 Special Committee on Engine Research Facilities, 1939-1940

Folder 23-1 Engine Research Laboratory, General, May 1940-July 1941
Folder 23-1 Engine Research Laboratory, General, Aug 1941-

From carton 46:

Folder 23-2 Laying-Out of Cleveland Laboratory(1)

Folder 23-2 Laying-Out of Cleveland Laboratory(2)

Folder 23-14 Field Station Policy and Procedures

Folder 62-1 Site for Lewis, 1916-42

Folder Cong. Hearings Preliminary to Lewis

Folder 123 AERL

Folder 123 AERL 2

Folder 123 AERL (3)

Folder Cleveland, Ohio

When the records were examined in the fall of 1965 it was found that there was only a limited agreement between the folder titles and their actual contents. Nor did the dates shown on the folders accurately reflect the dates of the enclosed documents in many cases. Thus the folder titles do not provide an accurate guide to the location of any particular document in the collection.

For the time period of main concern to this study these materials provide a very complete record. All of NACA's activities from the time of the Lindbergh Committee's recommendation for a new Engine Research Laboratory in October 1939 to the final announcement of the site for that laboratory in November 1940 are available. They include external correspondence as well as internal memoranda, reports, and working papers.

The only portion of the record which is not found among these papers is the correspondence between NACA and the site bidders other than Cleveland. Neither the formal bids nor the subsequent correspondence with these groups were found in the records studied.

The manuscript materials from the National Archives were supplemented with a small number of documents from the NACA Historical Office in Washington, D. C. These documents consist of three letters from the Lindbergh - Ames correspondence and the itineraries and reports of the two European journeys by Dr. Lewis.

Government Documents

For the events leading up to the congressional authorization of the Engine Research Laboratory congressional documents provide much information in particular about the authorization and site selection for the Sunnyvale Laboratory. The annual reports of NACA provide information about the several committees which reviewed the over-all research policy. President Roosevelt's messages dealing with the new NACA laboratories and his press conferences dealing with the strategic vulnerability criterion are found in the semi-official volume by Samuel I. Rosenman(ed., The Public Papers of Franklin D. Roosevelt, 1940 volume (New York: The MacMillan Company, 1941).

Newspapers and Journals

The official records have been supplemented with the newspaper clipping file maintained by NACA. The clippings in this

file begin with the first trip of the Victory Committee on Site Inspection, and continue through the final announcement. They provide valuable information about the reaction of local communities to the site selection problem. They also provide many indications of Victory's verbal statements to interested individuals and groups which otherwise would not have been available.

For the period prior to the first trip of the Victory Committee the New York Times and the monthly journal Aviation provided much useful information about NACA's activities as seen from outside the agency.

The Cleveland newspaper coverage of that city's participation in the site selection process was studied intensively for a preliminary paper on this subject. The morgue of the Cleveland Plain Dealer was found to contain a number of clippings from the city's three daily newspapers, and some of these are used in the present essay.

Secondary Literature

No secondary literature dealing specifically with the role of NACA and its engine research requirements in 1939 and 1940 exists. For a general picture of the problems and policies of government and research in that period the two best sources are: Irwin Stewart, Organizing Scientific Research for War (Boston: Little, Brown and Company, 1948), and Rexmond C. Cochrane, Measures for Progress - A History of the National Bureau of Standards (Washington: U.S. Department of Commerce, 1966).