MSI PATCH SHEET

Berkener, Lloyd V.

AD- 040 424

NATIONAL BUREAU OF STANDARDS WASHINGTON D C

(U) A NEW KIND OF RADIO PROPAGATION AT VERY HIGH FREQUENCIES OBSERVABLE OVER LONG DISTANCES

SEP 51 1V

PERSONAL AUTHORS: BAILEY,D.K.;BATEMAN,R.;BERKNER,L.V.;

UNCLASSIFIED REPORT

USGO & CONT

DESCRIPTORS: (U) *ELECTROMAGNETIC PROPERTIES, *IONOSPHERE, *RADIO WAVES, *VERY HIGH FREQUENCY, PROPAGATION

AD- 078 003

PREVENTION OF DETERIORATION CENTER NAS-NRC WASHINGTON D C

(U) PREVENTION OF DETERIORATION OF ELECTRICAL AND ELECTRONIC MATERIALS

48 1V

PERSONAL AUTHORS: BERKNER,L.V.;

UNCLASSIFIED REPORT

USGO & CONT

DESCRIPTORS: (U) (*ELECTRONIC EQUIPMENT), LOW TEMPERATURE, COLD WEATHER TESTS, POLAR REGIONS

AD- 231 647

INDUSTRIAL COLL OF THE ARMED FORCES WASHINGTON D C

(U) SCIENCE AND TECHNOLOGY IN THE UNITED STATES TODAY

AUG 59 1V

PERSONAL AUTHORS: BERKNER,LLOYD V.;

REPORT NO. L60 7

UNCLASSIFIED REPORT

USGO & CONT

DESCRIPTORS: (U) *INDUSTRIAL RESEARCH, *LABORATORIES, *RESEARCH MANAGEMENT, *SCIENTIFIC RESEARCH, *UNIVERSITIES, ECONOMICS, FEDERAL BUDGETS, SCIENTIFIC ORGANIZATIONS, UNITED STATES GOVERNMENT

AD- 228 139

INDUSTRIAL COLL OF THE ARMED FORCES WASHINGTON D C

(U) INTERNATIONAL GEOPHYSICAL YEAR

JAN 59 63P

PERSONAL AUTHORS: BERKNER,LLOYD V.;

REPORT NO. Pub-159-97

UNCLASSIFIED REPORT

USGO & CONT

DESCRIPTORS: (U) (*ANTARCTIC REGIONS), SCIENTIFIC RESEARCH, GEOPHYSICS

IDENTIFIERS: (U) INTERNATIONAL GEOPHYSICAL YEAR

AD- 248 422

DEFENCE RESEARCH BOARD OTTAWA (ONTARIO)

(U) FUTURE DEFENSE PROBLEMS IN THE WEST

SEP 60 1V

PERSONAL AUTHORS: BERKNER,L.V.;

REPORT NO. DERR-AE-3

UNCLASSIFIED REPORT

USGO & CONT

DESCRIPTORS: (U) *NATIONAL DEFENSE, MILITARY OPERATIONS MILITARY RESEARCH, FOREIGN POLICY, MILITARY RESEARCH, SCIENTIFIC RESEARCH

AD-B123 045L 21/1 19/3

TSI INC ST PAUL MN

(U) Engine Intake Air Dust Level Detector. Phase 1.

DESCRIPTIVE NOTE: Final rept. Jun-Dec 87,

FEB 88 24P

PERSONAL AUTHORS: Berkner, Larry

CONTRACT NO. DAAE07-87-C-R055

MONITOR: TACOM
TR-13350

UNCLASSIFIED REPORT

Distribution authorized to DoD only; Proprietary Info.; Feb 88. Other requests shall be referred to TACOM (AMSTA-IRSA), Warren, MI 48397-5000.

DESCRIPTORS: (U) *ENGINE COMPONENTS, *ENGINES, AIR, AIR FILTERS, AIR INTAKES, CONTRACTS, COSTS, DAMAGE, DETECTORS, DUCT INLETS, DUST, EARLY WARNING SYSTEMS, PARTICLES, REQUIREMENTS.

AD-B962 445 4/1

CARNEGIE INSTITUTION OF WASHINGTON DC DEPT OF TERRESTRIAL MAGNETISM

(U) Researches of the Department of Terrestrial Magnetism. Volume 12. I. Ionospheric Research at College, Alaska, July 1941-June 1946. II. Auroral Research at College, Alaska, 1941-1944,

AUG 47

PERSONAL AUTHORS: Seaton,S. L. ;Wells,H. W. ;Berkner,L. V. ;Malich,C. W. ;

CONTRACT NO. NXsr-33809, NOrd-392

UNCLASSIFIED REPORT

Distribution: DTIC users only.

DESCRIPTORS: (U) *IONOSPHERIC DISTURBANCES, *AURORAE, EXPERIMENTAL DATA, TABLES(DATA)

IDENTIFIERS: (U) U/A Reports, X-769

ER - 9 - [redacted]
Copy 3 of 9

11 June 1957

MEMORANDUM FOR: [redacted]

THROUGH: [redacted]

SUBJECT: Unidentified Flying Saucers (UFO)

2. In our discussion on UFO you asked three questions which for convenience I am using as side-headings below.

HAS THE RESPONSIBILITY FOR FOLLOWING UFO BEEN TRANSFERRED FROM THE AIR FORCE TO CIA?

No. The Air Force and CIA are both still following UFO.

WHO IN CIA IS RESPONSIBLE FOR UFO?

The DD/I/OSI, Phil Strong, specifically.

WHAT IS CIA DOING ON UFO?

The following is a brief sketch of activity which I obtained from Phil Strong's memory: Five years ago in the summer of 1952, OSI undertook a study of UFO by YAC action. OSI formed a panel consisting of the following members:

Lloyd Berkner, President, Associated of Universities; President, International Council of Scientific Boards; Member of the President's Scientific Advisory Committee, (ODM).

H. P. Robertson, Chairman, Physics Dept., Cal Tech; once WSEG Civilian Director; Science Advisor to SHAPE Commander for two years, OSI Consultant.

Sam Goudsmit, Chairman, Department of Physics, Brookhaven National Laboratory; formerly Member Combined Scientific and Military Team during post-war period examining German nuclear program.

D-

#97

[redacted]

APPROVED FOR RELEASE
DATE 24 Jan 78

-2-

Luis Alvarez, one of country's top physicists at Berkeley, also at Los Alamos.

Thorton Page, John Hopkins University.

The Air Force and Navy (including the Navy's [redacted] FIC) supported the study. Phil says the report was extremely thorough and was distributed to the JAC. (Copy attached, the last two pages contain the summary.)

2. Since the study was made (17 January 1953), OSI has maintained a watching process on UFO. Although very few reports are received, those which do appear are examined by the following units: If concerning natural phenomena, they are turned over to the Geo-Physics Unit of the Fundamental Sciences Division in OSI. If they concern the hardware aspects of flying craft, they are turned over to the former Weapons Unit concerned with aircraft in the Applied Science Division of OSI. Gen. Watson, ATIC, (Phil Strong believes) maintains one or two officers following the UFO question. This ATIC effort is all that is left of an earlier, larger Air Force Project called "Blue Book." (Copy of Project report dated 5 May 1955 is attached, - conclusions are on p. 9A). Concerning take on this question, Phil states that very little comes in and that nothing has been received of importance. Two or three years ago [redacted] reported seeing a flying saucer in vertical take-off in the Soviet Caucasus, but nothing was developed by intelligence. (Analysis of this case is attached.) This incident is the only "flap" that Phil can remember.

3. I asked Phil point-blank if the unexplained category could include actual secret Soviet advanced aeronautical equipment. He replied, "Conceivably, yes." However, speaking from memory he felt that the possibility existed that if further information was obtainable, the remaining small percentage of unknowns might be explained.

4. I also asked Phil point-blank if there was any special collection going on against UFO targets. He replied that there was no collection as such but that radical aeronautical design advances not limited to flying saucer types was a high priority collection requirement. In this regard he added that OSI has no information concerning new Soviet design which would indicate possible construction of flying saucer type aircraft. The Applied Sciences Division of OSI and ATIC work closely together in following radical new designs and advances by the Soviets.

[redacted]

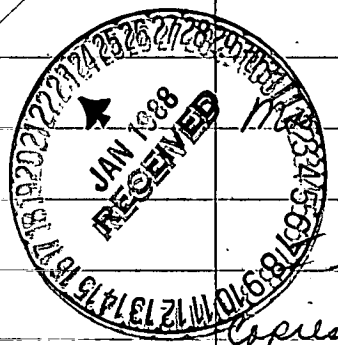
3. For your information I learned from Hoverton and Strong that the British and Canadians have a very sensitive project in this field. Apparently the Canadians run the project which has completed the design of a flying saucer. Hoverton states that he has seen the prototype. Hoverton describes the saucer as "just that" in shape with jets on the circumference. The jets are in vertical position for take-off and are shifted horizontally for forward movement. Strong, speaking from memory, believed the design called for operations at 80,000 feet or better. The responsible aircraft company is the Avirl, a jointly-owned British and Canadian outfit. According to Strong, the USAF initially provided some of the funds, but is no longer doing so. Hoverton advised that the Air Force has "some projects" along this line.

[redacted]
Office of the Director
Planning and Coordination Staff

PC3/DCI [redacted]

0 - [redacted]
1 - File
1 - Chrono

Ref: MJ-12 BERKNER INFO. 5-108



Jan, 10, 1988

Mr. Moore; Mr. Friedman; Mr. Shandera;

I want to thank you for the clear, unexpurgated copies of the "MJ-12" U.F.O. documents you sent me, (I'm a subscriber of the "Fair Witness Project") and I want to pass along some interesting subject matter that I found, that you, may or may not know about, concerning one of the original members of the MJ-12 group; a Mr. Lloyd. V. Berkner—

In a book 1st written in 1964 "We are Not alone" by Walter Sullivan—published by Mc Graw-Hill Book company, I found so very interesting comments about Mr. Berkner.

I obtained a paper Back version (1st printing sept, 1966.) of the Book and on page 198, last paragraph, continuing on to page 199 reads; "Eagerness to observe on the wave length of 21 centimeters had been a major factor in persuading the government of a need for a National Observatory and as Noted in the last chapter, the first big antenna at Green Bank "(project ozma)" was designed with such observations in mind, at about the time that this dish was completed

In March, 1959, Frank D. Drake went to a near by grill for lunch with Lloyd. V. Berkner, acting director of the Observatory and Head of "Associated Universities"; the latter was a "coming-up of nine North western Universities, who's 1st job had been to establish the "Brookhaven National Laboratory on Long Island. This group also had the task of setting up the National Radio Astronomy Observatory, Berkner had been a pioneer in Radio Science, and had risen to world prominence as a science administrator."

And, on page 242, second paragraph, quote " Lloyd. V. Berkner, acting director of the National Radio Astronomy observatory in Green Bank who had given the go ahead for Ozma, was also Chairman of the Academy's Space Science Board, The latter had been formed in 1958, shortly after the launching of the first earth's satellites, to set fourth National space goals that would be scientifically sound; Its membership ~~included~~ included two Nobel laureates, both whom were deeply interested in problems relating to extraterrestrial life.

one, was Harold C. Urey, Professor-at Large of Chemistry, at the La Jolla campus of the University of ~~God~~ California, the other was

Joshua Lederberg, who was a professor of Genetics at Stanford University, and Chairman of the Space Science Board's panel on Exobiology."

And finaly on pages 271 - 272;
"The National Aeronautics and Space Act of July 29, 1958, called for "long range studies" of the benifits and problems to be expected from space activities. Pursuant to this act, N.A.S.A. set up a committee on "Long-Range Studies and awarded a study contract to the Brookings Institution. More than 200 specialists were interviewed by a team led by Donald N. Michael, a social psychologist who later became "Director of the Peace Research Institute in Washington, portions of the resulting report were reviewed by such figures as Lloyd V. Berkner, Head Space Science Board, Caryl P. Haskins, president of the Carnegie Institution of Washington, James R. Killian, Chairman of Corporation of M.I.T. Oscar Schachter, Director of the General Legal Division of the United Nations, and Margaret Mead, the anthropologist,

The document was submitted to N.A.S.A. only a few months after Project Ozma's attempt to intercept signals from two near by stars 1. (Epsilon Eridani, 2, Tau Ceti) and much in the minds of those who drafted it was the question of what would happen if we discovered another far more advanced civilization. The report did not rule out the possibility of direct contact".

I hope that this may be of a small help, because this was written in 1964, before any of the information you have, (1952) (Eisenhower briefing document.) and a lot of this stuff ties in to prove what you have, I think you've finally got the answers to the whole puzzle —

Good Luck

[signature]

Curtis J. Peterson
4424 Isroad St.
Sioux City IA
51108

SIOUX CITY, IA 511
PM
11 JAN
1988

USA 22

Fair - Witness Project, INC,
4219 W. olive St. Suite 247
Burbank, Ca,
91505

P.S. In the last 24 hours we've learned of an extraordinary local abduction, with apparent physical evidence including alleged artifact. Stan — More later. . . .

1/14/88

I trust that by now you've received the Bullard paper I sent you nine days ago. The Berkner stuff is amazing. Do you know he was on the review panel for the famous 1961 Brookings Institution report on the consequences of human/ET contact? Best, Jerry

JEROME CLARK, EDITOR
1511 Greenleaf Street
Evanston, Illinois 60202
(312) 491-9811

January 14, 1988

1/21/88 STF

CAUS
Box 218
Coventry, Connecticut 06238

Dear CAUS:

Recently, as I was reading THE FBI-KGB WAR, I noted author Robert J. Lamphere's needlessly cryptic reference to "levitation experiments" and thought it would be just a matter of time before someone else saw this and jumped to unwarranted conclusions.

No, these experiments had nothing to do with "early attempts to duplicate flying discs," as is suggested in the December issue of JUST CAUSE. While it may be true, as Lamphere writes, that the experiments "are still classified today," it is certainly not true that nothing is known about what they involved. I refer interested readers to Chapter 7 of Ronald Radosh and Joyce Milton's THE ROSENBERG FILE (1983), wherein the matter is discussed. Radosh and Milton write (p. 144), that the "'levitation' experiment /was/ designed to calculate a reduction in the amount of plutonium or uranium necessary to detonate a /nuclear/ bomb." The matter, extremely sensitive, figured in the trial of atomic spy Julius Rosenberg, who was convicted of passing it and other secrets to the Soviets.

CAUS says it filed a FOIA request with the FBI and got no help. The reason no doubt is that you went to the wrong place. The right place, according to Radosh and Milton, is the Atomic Energy Commission. Their source is a February 7, 1951, memo from chief security officer John A. Waters to the AEC (file no. 403/1, AEC files).

Sincerely,

Jerome Clark

Jerome Clark

cc: Lucius Farish

January 6, 1988

Mr. Stanton T. Friedman
79 Pembroke Crescent
Fredericton, New Brunswick E3B 2VI
CANADA

Dear Mr. Friedman:

This is in response to your letter of December 30. The Special Projects Group in the Executive Office of the President was set up primarily as a housekeeping tool to coordinate the internal management and funding of a number of special staffs, assistants, and committees who operated under the direct authority of the President. E. Frederic Morrow was the administrative officer for the Special Projects Group from July 1955 to January 1961. We are enclosing a copy of one page from the finding aid to Morrow's Records. You may want to order the entire finding aid (10 pages) to these records as they contain considerable material on the administration of the Special Projects.

Some of the groups or assistants whose operations fell into the Special Projects category were the Council on Foreign Economic Policy (Joseph M. Dodge and Clarence B. Randall), the Coordinator of Public Works Planning (John Stewart Bragdon), the Special Assistant to the President (Nelson Rockefeller), the Special Assistant to the President for Disarmament (Harold Stassen), and the President's Science Advisory Committee (James R. Killian and George B. Kistiakowsky).

"Special Projects (M)" refers to the President's Science Advisory Committee. (Special Projects-A was the Rockefeller Committee, and Special Projects-B was the Stassen group.) Dr. Lloyd Berkner was a member of PSAC and a consultant to the Special Assistant for Science and Technology. There are at least 300 pages of materials relating to PSAC in Morrow's Records.

We are enclosing a xerox copy of the first page of P.L. 110, General Government Matters Appropriation Act, 1956 (H.R. 6499). This act was signed into law on June 29, 1955, and it includes a $1,250,000 appropriation for Special Projects for Fiscal Year 1956.

The entire file on this bill in Box No. 51 of the collection, Records Officer Reports to President on Pending Legislation, contains 47 pages of material, including the act, the original bill, and reports and recommendations on the bill.

Our files do not appear to contain information on the Special Security Programs of the National Security Resources Board. Since the NSRB was abolished in March 1953 and its functions transferred to the Office of Defense Mobilization, information on the NSRB's programs should be available at either the Truman Library or the National Archives.

If you wish to order copies of any of the above described materials, please let us know.

Sincerely,

MARTIN M. TEASLEY
Assistant Director

Enclosures: (2)

INTRODUCTION

Everett Frederic Morrow was appointed Administrative Officer for the Special Projects Group on July 11, 1955.

The Special Projects Group consisted of special staffs appointed from time to time to advise the President and to coordinate activities which had previously been carried on by the departments and by interdepartmental committees. As Administrative Officer, Morrow was responsible for coordinating the internal management affairs for this Group. In addition, when Maxwell Rabb resigned from the White House Staff in 1958, Morrow assumed his duties of answering mail dealing with Civil Rights. There was, however, no change in his title. Morrow resigned from his position on January 20, 1961.

The file consists of memoranda, press releases, background materials, printed materials, statistical material, correspondence, newspaper clippings, and other working materials. Although Morrow came to the White House in 1955, the files contain documents which precede his entry on duty by date of time. These are documents acquired by Morrow as background material. The subjects of this material cover the many facets of Morrow's housekeeping duties for the Group as well as his duties in connection with Civil Rights issues. No original over-all arrangement was apparent. The folders have been arranged alphabetically in three different sections.

Public Law 110 - 84th Congress
Chapter 226 - 1st Session
H. R. 6499

AN ACT

All 69 Stat. 192.

Making appropriations for the Executive Office of the President and sundry general Government agencies for the fiscal year ending June 30, 1956, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the Executive Office of the President and sundry general Government agencies for the fiscal year ending June 30, 1956, namely:

General Government Matters Appropriation Act, 1956.

TITLE I

EXECUTIVE OFFICE OF THE PRESIDENT

COMPENSATION OF THE PRESIDENT

For compensation of the President, including an expense allowance at the rate of $50,000 per annum, as authorized by the Act of January 19, 1949 (3 U. S. C. 102), $150,000.

63 Stat. 4.

THE WHITE HOUSE OFFICE

Salaries and expenses: For expenses necessary for The White House Office, including not to exceed $215,000 for services as authorized by section 15 of the Act of August 2, 1946 (5 U. S. C. 55a), at such per diem rates for individuals as the President may specify, and other personal services without regard to the provisions of law regulating the employment and compensation of persons in the Government service; newspapers, periodicals, teletype news service, and travel and official entertainment expenses of the President, to be accounted for solely on his certificate; $1,882,500.

60 Stat. 810.

SPECIAL PROJECTS

For expenses necessary to provide staff assistance for the President in connection with special projects, to be expended in his discretion and without regard to such provisions of law regarding the expenditure of Government funds or the compensation and employment of persons in the Government service as he may specify, $1,250,000: *Provided*, That not to exceed 10 percent of this appropriation may be used to reimburse the appropriation for "Salaries and expenses", The White House Office, for administrative services.

EXECUTIVE MANSION AND GROUNDS

For the care, maintenance, repair and alteration, refurnishing, improvement, heating and lighting, including electric power and fixtures, of the Executive Mansion and the Executive Mansion grounds and traveling expenses, to be expended as the President may determine, notwithstanding the provisions of this or any other Act, $366,200.

BUREAU OF THE BUDGET

Salaries and expenses: For expenses necessary for the Bureau of the Budget, including newspapers and periodicals (not exceeding $200); teletype news service (not exceeding $900); not to exceed $70,000 for expenses of travel; and not to exceed $20,000 for services

Standard Form 50 - 5 Part
Rev. July 1957
Promulgated by U. S. Civil Service Commission—FPM-R-1

NOTIFICATION OF PERSONNEL ACTION

1. NAME (LAST [CAPS]—First—Middle—Mr.—Miss—Mrs.)	2. DATE OF BIRTH	3. IDENTIFICATION (optional)
BEKKER, Lloyd V. (Dr.) B-625	2-1-05	

4. THIS IS AN OFFICIAL NOTICE OF THE PERSONNEL ACTION DESCRIBED BELOW, WHICH AFFECTS YOUR EMPLOYMENT. GENERAL INFORMATION CONCERNING YOUR EMPLOYMENT APPEARS ON THE REVERSE SIDE OF THIS FORM.

5. NATURE OF ACTION (standard terminology must be used)	6. EFFECTIVE DATE OF ACTION	7. CIVIL SERVICE OR OTHER LEGAL AUTHORITY for appt.
(1) Termination of Presidential Appt.*	(1) 12-31-58	P.L. 110, Gen. Govt. Matters Approp. Act, 1956 (Special Projects)**
(2) Exc. Appt. (WOC)	(2) 1-1-59	

FROM—	8. POSITION TITLE AND NUMBER	TO—
Member		Consultant
WOC, travel expenses, and $15.00 per diem in lieu of subsistence	9. SERIES, GRADE, SALARY	Same
Executive Office of the President Special Projects (M) President's Science Advisory Committee	10. NAME AND LOCATION OF OFFICE BY WHICH EMPLOYED	Executive Office of the President Special Projects (M)
Washington, D. C. ***	11. DUTY STATION	Washington, D. C. ***
[ ] Yes	12. APPORTIONED POSITION	[ ] Yes [ ] Apportionment Waived [ ] Proved STATE: New York

13. VETERAN PREFERENCE				14. TENURE GROUP	15. POSITION OCCUPIED IS IN THE:	
No	5-pt.	10-pt. Disab.	10-pt. Other		[ ] Competitive Service	[X] Excepted Service

16. APPROPRIATION	17. PAYROLL DEDUCTIONS			18. DATE OF APPOINTMENT AFFIDAVITS (accessions only)
XXXX: Special Projects (M), The XXXX White House Office, 1959.	CSR	FICA	FEGLI	

19. REMARKS:

[ ] a. Subject to completion of 1 year probationary (or trial) period commencing _____

[ ] b. Service counting toward career (or permanent) tenure from: _____

Separations: Show reasons below, as required. Check, if applicable: [ ] c. During probation [ ] d. From appointment of 6 months or less

* Appointment by the President as Member, President's Science Advisory Committee, effective 12-1-57, was for term ending 12-31-58.

** Coverage provided for $15.00 per diem in lieu of subsistence under authority of P.L. 169, 84th Congress, 7-28-55.

*** Residence Station: New Rochelle, New York

20. EMPLOYING DEPARTMENT OR AGENCY	22. SIGNATURE (or other authentication) AND TITLE
Executive Office of the President Special Projects	Robert E. Hampton Special Assistant in the White House Office
21. OFFICE MAINTAINING OFFICIAL PERSONNEL FOLDER (if different than item 10, above)	23. DATE: 2-11-59
The White House Office	

3. CIVIL SERVICE COMMISSION COPY

☆ U. S. GOVERNMENT PRINTING OFFICE: 1958—481208

FORM NSRB-9
(1-17-52)

EXECUTIVE OFFICE OF THE PRESIDENT
NATIONAL SECURITY RESOURCES BOARD

PERSONAL SERVICE CONTRACT

CONTRACT NO. NR 1-744

I. Subject to the conditions stated on the back hereof, the Chairman, National Security Resources Board and Mr. Lloyd V. Berkner (HEREINAFTER REFERRED TO AS THE "CONTRACTOR") hereby contract for the personal services of the Contractor as follows:

(a) TYPE OF SERVICE: ☐ EXPERT ☒ CONSULTANT

(b) TYPE OF EMPLOYMENT: ☐ TEMPORARY ☒ INTERMITTENT ☐ PART-TIME

(IF PART-TIME, WORK PERIODS ARE TO BE _____ (HOURS, DAYS, WEEKS) PER _____ (DAY, WEEK, MONTH))

(c) CIVIL SERVICE OR OTHER LEGAL AUTHORITY P. L. 600, Section 15

(d) DURATION OF CONTRACT: FROM October 30, 1952 TO June 30, 1953

(e) RATE OF COMPENSATION: $ 50.00 PER DIEM

(f) ESTIMATED TOTAL COST: $ 1500.00

(g) CONTRACTOR ☐ IS ☒ IS NOT A RETIRED CIVILIAN EMPLOYEE OF THE UNITED STATES.

(h) CONTRACTOR ☐ IS ☒ IS NOT A RETIRED OFFICER OF THE ARMED SERVICES OF THE UNITED STATES.

(i) NATURE OF PERSONAL SERVICES TO BE RENDERED:
Consult with the Chairman in the area Special Security Programs.

II. The Contractor agrees to perform the foregoing personal services in an efficient manner and to the best of his ability.

Dated at - Washington, D.C.

this 30th day of October 19 52

Oath of Office: October 30, 1952

CONTRACTOR L. V. Berkner

ADDRESS _____

CHAIRMAN Edward L. Lacey

JUSTIFICATION FOR FOREGOING CONTRACT

(1) The services described in the foregoing contract are essential for the following reasons:
The contractor is eminently qualified in this capacity and his services can be secured only in this manner.

_ (2) The services required are not within the capacity of the present force.

_ (3) The work to be performed is not a duplication.

OFFICE, DIVISION AND SECTION	COMPLETE SECURITY CLEARANCE GRANTED
Special Security Programs	BY William E. Elliott DATE OCT 31 1952
RECOMMENDING OFFICER	BUDGET APPROVAL GRANTED
—	BY DATE

COMM.-DC 63163

THE JOINT RESEARCH AND DEVELOPMENT BOARD
WASHINGTON 25, D. C.

24 June 1947

MEMORANDUM FOR ADMINISTRATIVE SECTION, OFFICE OF PERSONNEL MANAGER, OFFICE OF THE SECRETARY OF WAR

SUBJECT: Assignment of Dr. Lloyd V. Berkner

1. Forwarded herewith is Form 57 for Dr. Lloyd V. Berkner. It is desired that Dr. Berkner be appointed as a consultant to the Joint Research and Development Board for consultant services at the rate of $40.00 per day not to exceed 90 days.

2. Dr. Berkner has served as Executive Secretary, Joint Research and Development Board, since 16 July 1946 and is to be replaced by Dr. L. R. Hafstad 1 July 1947.

3. Due to his wide knowledge of Board affairs it is desired that Dr. Berkner be retained in a consultant capacity. It is requested that this appointment be made effective 1 July 1947 and that Dr. Berkner's duty station be Washington, D. C.

F. H. Richardson

F. H. RICHARDSON
Acting Executive Secretary

approved for classification
6/26/47

APPROVED
R.M. Yingling - GWH
Management Branch, OS...

Departmental Funds

THE JOINT RESEARCH AND DEVELOPMENT BOARD
WASHINGTON 25, D. C.

May 27, 1947

Honorable Robert P. Patterson
Secretary of War
Washington 25, D. C.

Dear Mr. Secretary:

As the JRDB approaches the close of its first year of existence, it seems firmly embarked toward its objective of coordination of the research and development programs of the Army and the Navy. While parts of the supporting structure remain to be perfected, I believe the job of construction has proceeded to the point where the outlines are clear and the machinery of the Board is now functioning satisfactorily.

A complete and detailed report of the first year of operation will be made to the Board by the Executive Secretary at the close of the fiscal year.

Since the job of organization for which I came has progressed substantially toward completion, it seems appropriate at this time to ask that I be relieved as Executive Secretary of the Board to permit my return to active research. If acceptable to you and to Dr. Bush, it is my desire that my resignation as Executive Secretary of the Board be effective on July 1, 1947, upon completion of one year of service.

The job of organization has been made easy by the enthusiasm, imagination and diligence of the principal civilian officers of the Secretariat, Mr. Francis H. Richardson, Administrative Secretary; Mr. David B. Langmuir, Director of the Planning Division; Mr. Ralph L. Clark, Director of the Programs Division, and Mr. James H. Mason, Director of the Management Division, as well as the Executive Directors of the several Committees. These men have carried the real brunt of the work of organization.

In forwarding my resignation as Executive Secretary, I want to express to you my sincere appreciation for the honor of the opportunity to do this job and for the stimulating experience in serving you and the Board. In particular, the able, effective, and intelligent support given me by the Army and Navy Secretaries to the Board, Major General A. C. McAuliffe and Captain James H. Thach, Jr., and their associates has been invaluable. The unfailing support of the Board's objectives by the War and Navy Departments demonstrates their real sincerity toward the achievement of a truly national approach to national problems. I am convinced that the Board can achieve

its objectives with this support.

I am forwarding this letter through Dr. Bush with a similar letter to Mr. Forrestal.

Sincerely yours,

L. V. BERKNER,
Executive Secretary.

WAR DEPARTMENT
NOTIFICATION OF PERSONNEL ACTION
(DEPARTMENTAL)

325

1. Date: June 30, 1947

2. TO: Dr. Lloyd (First Name) V. (Middle Initial) Berkner (Last Name)

3. S. S. NO.

4. THROUGH: Joint Research and Development Board (Office in which Employed or to be Employed)

This is to notify you of the following action concerning your employment, which is subject to the provisions on the reverse hereof. This form is an official record of your service history in the War Department and should be retained for future reference.

5. NATURE OF ACTION (Use standard terminology): Excepted Appointment

6. EFFECTIVE DATE: 7-1-47

	(FROM)	(TO)
7. POSITION TITLE		Expert
8. SERVICE GRADE AND SALARY		$40.00 per diem, W.A.E.
9. FORCE SERVICE OFFICE		Office, Secretary of War
10. DIVISION, BRANCH AND SECTION		Joint Research and Development Board
11. DUTY STATION AND LOCATION		WASHINGTON, D. C.

13. Date of Birth: 2-1-05

14. Civil Service or Other Legal Authority: Sec. 15, PL 600 79th Congress

15. Male: X Female:

16. Non Veteran / VETERAN: No Pref. / 5Pt. / 10Pt

17. Civil Service Retirement: Yes / No: X

18. White: X Negro / Other

19. Nature of Position: New / Vice / Iden. Add'l

Reference Name No Etc

20. Date of Oath Accession Action Only

21. Journal or Action No. 077

12. REMARKS:

Appointment is hereby approved for service not to exceed 90 days and not to extend beyond June 30, 1948.

This action is subject to enactment and approval of the Military Appropriation Act of 1948 authorizing compensation at the above rate.

Affidavit executed.

Transferred to Research and Development Board, 10-[illegible]-47, PL 253, 80th Congress.

By order of the Secretary of War

John W. Martyn

Administrative Assistant

WD FORM 1 AUG 45 50A

201 FILE

Standard Form No. 61
Approved January 28, 1943
U. S. Civil Service Commission
C. S. C. Dept. Cir. No. 409

OATH OF OFFICE, AFFIDAVIT, AND DECLARATION OF APPOINTEE

War (Department or Establishment) | Office of the Secretary of War (Bureau or Division) | Washington, D. C. (Place of Employment)

A. OATH OF OFFICE

I, LLOYD V. BERKNER,

Do solemnly swear (or affirm) that I will support and defend the constitution of the United States against all enemies, foreign and domestic; that I will bear true faith and allegiance to the same; that I take this obligation freely, without any mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties of the office on which I am about to enter. SO HELP ME GOD.

B. AFFIDAVIT

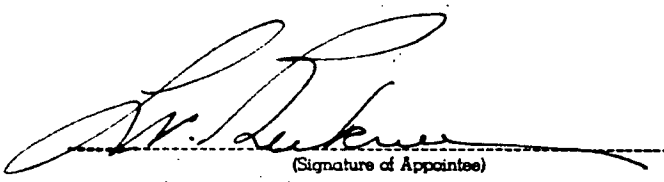
Do further swear (or affirm) that I do not advocate, nor am I a member of any political party or organization that advocates the overthrow of the Government of the United States by force or violence; and that during such time as I am an employee of the Federal Government, I will not advocate nor become a member of any political party or organization that advocates the overthrow of the Government of the United States by force or violence.

C. DECLARATION OF APPOINTEE

Do further certify that (1) I have not paid or offered or promised to pay any money or other thing of value to any person, firm, or corporation for the use of influence to procure my appointment; (2) I will inform myself of and observe the provisions of the Civil Service law and rules and Executive orders concerning political activity, political assessments, etc., as quoted on the attached Information for Appointee, and [strike out either (3) or (4)]

(3) the answers given by me in the Declaration of Appointee on the reverse of this sheet are true and correct;

(4) the answers contained in my Application for Federal Employment, Form No. 57, dated July 1, 1946, filed with the above-named department or establishment, which I have reviewed, are true and correct as of this date, except for the following (if necessary, use additional sheet; if no exceptions write "none"; if (4) is executed, the reverse of this sheet need not be used): None



(Signature of Appointee)

Subscribed and sworn before me this 17th day of July A. D., 1946

at Washington (City), D. C. (State)

[SEAL]

M. Maxine Beddick
(Signature of Officer)

Administrative Assistant
(Title)

NOTE.—If the oath is taken before a Notary Public the date of expiration of his commission should be shown

Section 206, Act of 26 June 1943

16—32868-2

7-16-46	Consultant, WOC	2-1-05
(Date of Entrance on Duty)	(Position to which appointed)	(Date of Birth)

WAR DEPARTMENT

WASHINGTON 25, D. C.

Mr. L. V. Berkner
Department of Terrestrial Magnetism
Carnegie Institute of Washington
5241 Broad Branch Road, N. W.
Washington, D. C.

Dear Sir:

Pursuant to the provisions of Paragraph 6 (d) of the Charter of the Joint Research and Development Committee dated 6 June 1946, you are hereby appointed Executive Secretary of the Joint Research and Development Committee.

W. John Kenney
Acting Secretary of the Navy

Acting Secretary of War

STANDARD FORM 50
UNITED STATES
CIVIL SERVICE COMMISSION
OCTOBER 1946

NATIONAL MILITARY ESTABLISHMENT
SECRETARY OF DEFENSE

FORM APPROVED.
BUDGET BUREAU NO. 50-R064.

23 JAN 1948

NOTIFICATION OF PERSONNEL ACTION

1. NAME (MR.—MISS—MRS.—FIRST—MIDDLE INITIAL—LAST)	2. DATE OF BIRTH	3. JOURNAL OR ACTION NO.	4. DATE
Dr. Lloyd V. Berkner - 74120	2-1-05	48-325	1-21-48

This is to notify you of the following action affecting your employment:

5. NATURE OF ACTION (USE STANDARD TERMINOLOGY)	6. EFFECTIVE DATE	7. CIVIL SERVICE OR OTHER LEGAL AUTHORITY
Transfer to Navy Disbursing	1-11-48	

FROM		TO
	8. POSITION TITLE	Expert
	9. SERVICE, GRADE, SALARY	$40.00 per diem, W.A.E.
	10. ORGANIZATIONAL DESIGNATIONS	Research and Development Board Office of the Ex. Sec. (4120)
	11. HEADQUARTERS	Washington, D. C.
☐ FIELD ☐ DEPARTMENTAL	12. FIELD OR DEPT'L	☐ FIELD ☒ DEPARTMENTAL

13. REMARKS

For administrative purposes only.

Type of appointment: Temporary not to extend beyond June 30, 1948

Not eligible for within-grade salary advancement.

Non-status

PROCESSED

Mo 4403

14. SIGNATURE OR OTHER AUTHENTICATION
Leon L. Wheeless
Director of Personnel

15. VETERAN'S PREFERENCE							16. POSITION CLASSIFICATION ACTION			
NONE	5 PT.	CURRENT DISAB.	CURRENT WIFE	CURRENT WIDOW	WWII	WWI	OTHER	NEW	VICE	I. A.	REAL
	X					X					

17. SEX	18. RACE	19. APPROPRIATION	20. SUBJECT TO C. S. RETIREMENT ACT (YES—NO)	21. DATE OF OATH (ACCESSIONS ONLY)	22. LEGAL RESIDENCE
M		FROM: TO: 9785900 — 74120	no		

U. S. GOVERNMENT PRINTING OFFICE 16—50107-1

STANDARD FORM 50 (7 PART)
UNITED STATES
CIVIL SERVICE COMMISSION
OCTOBER 1946

FORM APPROVED.
BUDGET BUREAU NO. 80-R084.

950

NATIONAL MILITARY ESTABLISHMENT
SECRETARY OF DEFENSE

12 JUL 1948

NOTIFICATION OF PERSONNEL ACTION

1. NAME (MR.—MISS—MRS.—FIRST—MIDDLE INITIAL—LAST)	2. DATE OF BIRTH	3. JOURNAL OR ACTION NO.	4. DATE
Dr. Lloyd V. Berkner — 71512	2-1-05	48-1574	6-16-48

This is to notify you of the following action affecting your employment:

5. NATURE OF ACTION (USE STANDARD TERMINOLOGY)	6. EFFECTIVE DATE	7. CIVIL SERVICE OR OTHER LEGAL AUTHORITY
60 days Excepted Appointment - NTE June 30, 1949	7-1-48	Sec 15, PL 600 79th Congress PL 766 80th Congress

	FROM	TO
8. POSITION TITLE		Expert
9. SERVICE, GRADE, SALARY		$50.00 per diem W.A.E.
10. ORGANIZATIONAL DESIGNATIONS		Research and Development Board Office of the Executive Secretary (XXXXX) (1512)
11. HEADQUARTERS		Washington, D.C.
12. FIELD OR DEPT'L	[ ] FIELD [ ] DEPARTMENTAL	[ ] FIELD [X] DEPARTMENTAL

13. REMARKS

Subject to investigation.
Appointment not to exceed 60 days and not to extend beyone June 30, 1949.

Non-Status

PAYROLL

PROCESSED

14. SIGNATURE OR OTHER AUTHENTICATION
Leon L. Wheeless
Director of Personnel

15. VETERAN'S PREFERENCE								16. POSITION CLASSIFICATION ACTION			
NONE	5 PT.	10 POINT			WWII	WWI	OTHER	NEW	VICE	I. A.	REAL.
	X	DISAB.	WIFE	WIDOW		X					

17. SEX	18. RACE	19. APPROPRIATION	20. SUBJECT TO C.S. RETIREMENT ACT (YES—NO)	21. DATE OF OATH (ACCESSIONS ONLY)	22. LEGAL RESIDENCE
M		FROM TO: 9790100 — 71512	No		—

☆ U.S. GOVERNMENT PRINTING OFFICE: 1947 — 765869

2. PAY ROLL COPY

STANDARD FORM 7 (REVISED MARCH 1949)
PRESCRIBED BY CIVIL SERVICE COMMISSION
FEDERAL PERSONNEL MANUAL

16—64000-8

SERVICE RECORD CARD (VISIBLE POCKET TYPE)

FEDERAL EMPLOYMENT RECORD

22. NATURE OF ACTION	23. EFFECTIVE DATE	24. POSITION TITLE AND NO.	25. SERVICE, CLASS NO. AND GRADE	26. SALARY OR PAY RATE	27. ORGANIZATION, HEADQUARTERS, AND LOCATION
Contr. Appt. thru 6-30-53	10-30-52	Consultant	Intermittent	$50.00 pd	NSRB-Spec.Sec.Prog.
Termination	3-20-53	Consultant	Intermittent	$50.00 pd	NSRB-Spec.Sec.Prog.
Exc. Indef. Appt. E.O. 10182, Sect. 101(a)	6-23-53	Consultant dtd 11-21-50	WOC		ODM-Asst. Dir. for Non-Military Defense
Mass Transfer	6-25-53	The ODM established under E.O. 10193 of 12-16-50, to ODM established under Reorg. Plan 3 of 1953 & E.O. 10461 of 6-17-53			
Transfer	9-20-54	Transferred to Asst. Director for Plans and Readiness			
		GAO X-1			
Termination of Exc.Indef.Appt.	12-20-55	Consultant	WOC	$50 p.d.	" Asst.Dir.for Plans & Readiness

3. DATE OF BIRTH	4. SEX		5. RACE			6. U. S. CITIZENSHIP			14. FOLLOW-UP
MONTH—DAY—YEAR	MALE	FEMALE	WHITE	NEGRO	OTHER	NATIVE	NATURALIZED	NONCITIZEN	
2-1-05	X					X	N.Y.		

7. VETERANS' PREFERENCE								8. COMP. STATUS		9. TYPE OF APPOINTMENT
NONE	5-PT.	10-POINT				WW II	WW I	OTHER	YES	NO	~~Indefinite~~ WOC Exec. Indef.
	X	DISAB.	WIFE	WIDOW	OTHER	X					

10. NATURE OF EMPLOYMENT				11. PAY BASIS				12. SUBJ. TO RETIREMENT			13. SUBJ. TO CLASS. ACT	
FT	PT	WAE	OTHER	ANNUAL	WAGE	WOC	OTHER	NO	CSC	OTHER	YES	NO
			X				X					

15. COMPETITIVE LEVEL	16. RETENTION SUBGROUP	17. SERV. COMP. DATE MONTH—DAY—YEAR	18. PHYSICAL IMPAIRMENTS

19. EFFICIENCY RATINGS

DATE AND TYPE	RATING	DATE AND TYPE	RATING	DATE AND TYPE	RATING	DATE AND TYPE	RATING

20. PERSONNEL FOLDER SENT TO (AND DATE)

Sent to St. Louis 1-18-57

21. ADDITIONAL INFORMATION AND REMARKS

10-30-52 Security Clearance (Top Secret)

1. LAST NAME—FIRST NAME—MIDDLE INITIAL	2.
BERKNER, LLOYD V.	

Dr. Lloyd V. Berkner
President
Associate Universities, Inc.
350 Fifth Avenue
New York 1, New York

AUG 17 1956

Dear Dr. Berkner:

With the concurrence of the President I am pleased to appoint you as a member of the Science Advisory Committee of the Office of Defense Mobilization.

The performance of the Science Advisory Committee has effectively demonstrated the need for a committee of this kind to advise the President and the Director of the Office of Defense Mobilization on scientific aspects of national security policies.

We are delighted that you are willing to serve on this committee and that we will have the benefit of your unusual background and experience.

Sincerely yours,

Arthur S. Flemming
Director

cc-Dr. Flemming
Dr. Isador I. Rabi,
Chairman, SAC
Mr. Beckler, rm 159
Personnel, rm 14
ODM FILES (2)

DXBeckler:RP 8/16/56

(78)

[redacted]

DOCUMENT
CONTROL No. C-66
[illegible]
1 [illegible]
2 [illegible]

CENTRAL INTELLIGENCE AGENCY
WASHINGTON 25, D. C.

20 DEC 1957

Dr. Lloyd V. Berkner
President
Associated Universities, Incorporated
Suite 1750, Coliseum Tower
10 Columbus Circle
New York 19, New York

Dear Lloyd:

With reference to our prior conversation on Unidentified Flying Objects, there is enclosed for your information a copy of a letter to the Air Force together with the declassified version of the Panel Report.

Very sincerely,

Phil -

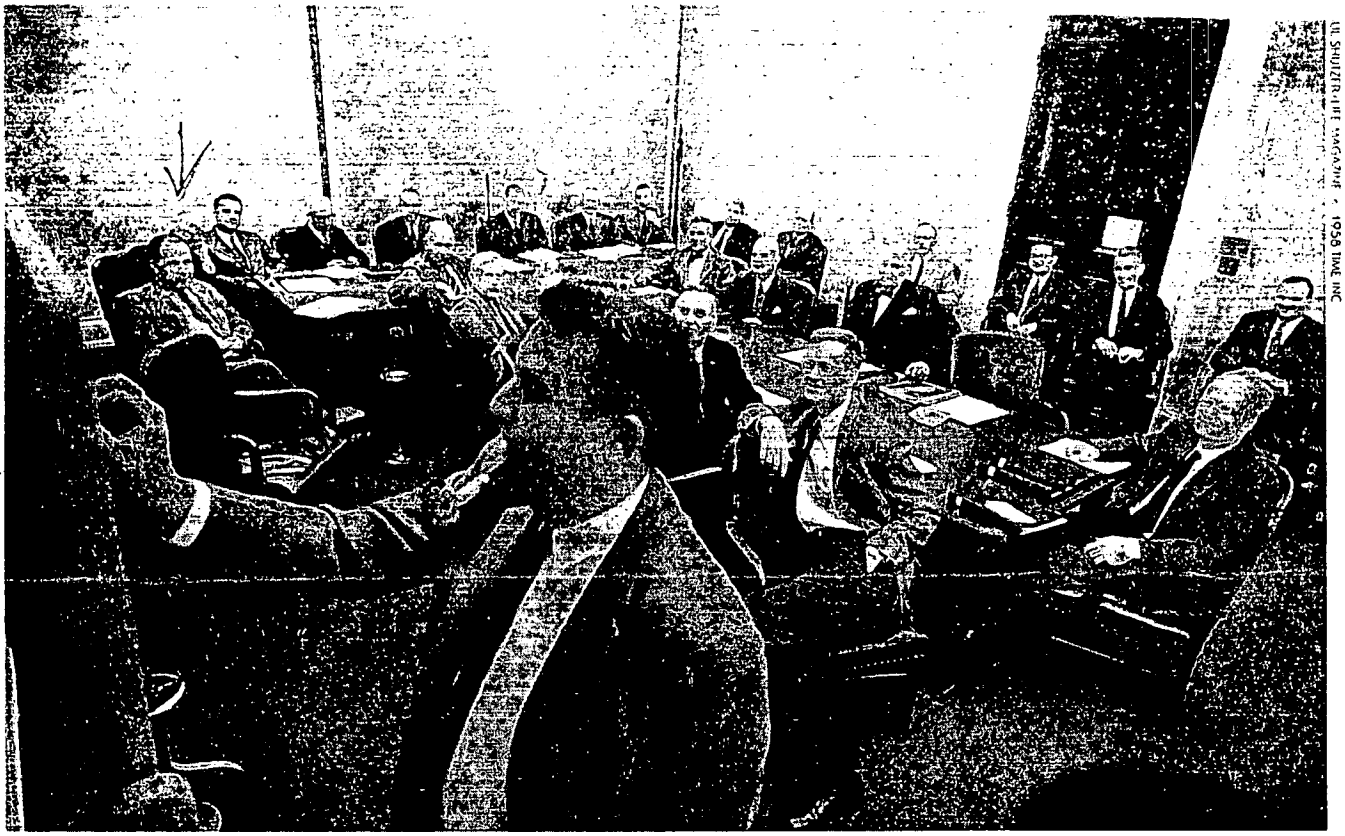
Philip G. Strong
Deputy Assistant Director

B3

Attachments:
1 - Letter to Air Force (S)
1 - Declassified Panel Report (U)

nc 1107

-6-



Eisenhower's Science Advisory Committee, at one of its first meetings in December 1957, listens to York, at blackboard. At tables (clockwise from far left) are Albert Hill, Detlev Bronk, Edwin Land, I. I. Rabi, Robert Bacher, James R. Killian, James Fisk, Jerome Wiesner, Jerrold Zacharias (at far right, top table), Emanuel Piore, James Doolittle, Lloyd Berkner, Hans Bethe (on far right), Edward M. Purcell, Hugh Dryden, Alan Waterman and George B. Kistiakowsky. The four men in the back to the right of Zacharias are unidentified.

Finally, and in close accord with Lawrence's views of the matter, the AEC in June 1952 approved the establishment of a branch of the Berkeley laboratory at Livermore to assist in the thermonuclear weapons program by conducting diagnostic experiments during weapons tests and performing other, related research. The question of how soon, or even whether, the Livermore Laboratory would actually engage directly in weapons development was left open, however. Teller was extremely dissatisfied with the vagueness of the AEC's plans for the new laboratory.

Finally, after mulling the matter over, Teller, in the course of a well-lubricated reception held at the Claremon. Hotel in Berkeley in early July to celebrate the launching of the new enterprise, suddenly announced to Lawrence, Gordon Dean and me that he would have nothing further to do with the plans for establishing a laboratory at Livermore. Lawrence was prepared to go ahead anyway, and he even suggested privately to me that we would probably be better off without Teller. However, at the insistence of Captain John T. Hayward (then deputy director of the AEC's Division of Military Applications), intense negotations were resumed among all concerned. Within days this led to a firm commitment by Dean that thermonuclear weapons development would be included in the Livermore program from the outset, as well as to a renewed commitment on the part of Teller to join the laboratory.

Mike the mighty

On 2 November 1952, the world's first large thermonuclear device, codenamed Mike, exploded on Elugelab Island at Eniwetok Atoll. Its yield was 10.5 megatons, fulfilling the prediction that the superbomb, if it could be made, would be a thousand times more powerful than the bomb dropped on Hiroshima. On the basis of ideas by Teller, Ulam and others, it was built and tested by the Los Alamos Laboratory. Because his relations with the Los Alamos leaders were so severely strained, Teller did not accompany the lab's team to observe it.

AEC authorities, on instructions from the White House, clamped an extraordinarily tight curtain of security over the whole operation. They intended to allow no post-test reports to be sent from the Pacific back to the laboratories or anywhere else until after there had been an on-the-spot analysis of what had happened. Even then, the first word would go directly to Washington only. The Task Force Command did, however, broadcast a coded signal that indicated the moment when the button had been pushed. Because of some experiments on long-range effects that we were doing at Livermore, we were given the means for decoding that message. The moment I received it at my office at the lab, I noted the time and telephoned Teller, then standing by at the Berkeley seismometer, to tell him just when "zero hour" had passed. He kept a very close watch on the seismometer, and at the appropriate time, some 14 minutes after zero hour, he saw the needle jump. He called me to say, "It's a boy!"

When I reflect back on that moment, as I sometimes do in preparing or giving lectures on the history of the nuclear era, a feeling of awe and foreboding always recurs. Even at the time, I thought of that moment and of that coded message as marking a real change in history—a moment when the course of the world suddenly shifted,

Modern Scientists & Engineers 1980

at Washington University in St. Louis. He remained in the microbiology department at Washington University during 1954–59 as a scholar in cancer research and then as assistant and associate professor of microbiology. In 1959 Berg was awarded the Eli Lilly Prize in biochemistry and moved to Stanford University, where he became professor of biochemistry. In 1963 he was designated California Scientist of the Year, and 3 years later he was elected to both the American Academy of Arts and Sciences and the National Academy of Sciences. Between 1969 and 1972 Berg was designated a distinguished alumnus of Pennsylvania State University, was rewarded twice for his teaching at Stanford University with the Kaiser Award, and received the V. D. Mattia Prize of the Roche Institute for Molecular Biology. In 1973 the Salk Institute appointed Berg as a nonresident fellow. In 1974 he was elected to the U.S. Institute of Medicine, and during 1975 he served as president of the American Society of Biological Chemists. Yale University and the University of Rochester awarded Berg honorary doctorates in 1978.

For background information *see* ENZYME; LIPID METABOLISM; NUCLEIC ACID; PROTEIN in the McGraw-Hill Encyclopedia of Science and Technology. ■

BERKNER, LLOYD VIEL

★ American physicist and engineer

***Born** Feb. 1, 1905, Milwaukee, WI, U.S.A.*

***Died** June 4, 1967, Washington, DC, U.S.A.*

During the early years of long-distance radio transmission, it was not clear why radio waves of short wavelength travel almost unattenuated for very long distances around the Earth. By the early 1920s the theories of O. Heaviside and A. E. Kennelly, calling for an ionized layer some 100 kilometers (about 60 miles) above the Earth, had been shown to account for the transmission of very long wavelengths. But these theories could not explain the even better performance of the shorter radio wavelengths.

Berkner became interested in these phenomena as a high school student at Sleepy Eye, MN. Using an amateur radio station, in 1923 he established records in relaying messages by short-wave radio between the East Coast and Hawaii. After graduating from the University of Minnesota in 1927, he continued his studies of high-frequency radio transmission in the Antarctic on the first Byrd Antarctic Expedition in 1928–30. There he showed that high-frequency waves from antipodal points change their direction of travel following the night hemisphere preferentially. Upon his return to the United States, he continued his studies in physics at the George Washington University.

Following the work of G. Breit and M. A. Tuve, who showed that short radio pulses are discretely reflected from the ionized regions above, Berkner, working at the Carnegie Institution of Washington, devised the first instrument to map the height, distribution, and ionic density of the ionized layers of the outer atmosphere, or the ionosphere. Thousands of these complex instruments, known as ionosondes, are now employed over the Earth to describe the three major ionized layers—the E, F_1, and F_2—and their variation with time. Employing this method in Washington, Peru, Australia, and Alaska, Berkner showed how these layers varied diurnally, seasonally, and geographically; their critical dependence on sunspot activity; and their disruption by magnetic storms and solar chromospheric eruptions. Out of this work of Berkner (and related work of others) emerged not only the complete explanation of the propagation of high-frequency radio waves, but also the daily prediction service of the National Bureau of Standards, which forecasts high-frequency radio performance at varying distances. *See* BREIT, GREGORY; TUVE, MERLE ANTONY.

Because the ionized layers showed an interrelationship with meteorology of the Earth's outer atmosphere, Berkner became interested in the origin and development of the atmosphere as early as 1935. Success in obtaining relevant measurements and scientific data required space vehicles, and this necessity resulted in his interest and leadership in space activities. The need for worldwide measurements of the Earth on an organized basis led to his proposal in 1950 for the International Geophysical Year (IGY), the most comprehensive study of the Earth ever undertaken. This study was organized under the International Council of Scientific Unions, of which Berkner became president during the IGY, 1957–59. He also coordinated international planning for scientific research in space during the period in which the first spacecraft were launched by the Soviet Union and the United States.

Berkner's interest in the atmospheres of the planets led to the formulation in 1963 with L. C. Marshall of a general theory of the origin and historical development of the atmospheres of the inner planets. This theory shows that on the Earth oxygen has appeared in significant quantities only in the last one-eighth of its history. The appearance of oxygen in significant concentrations is dependent wholly on the presence of primitive photosynthetic life over sufficient areas. The rise of oxygenic pressures and the advance of evolution toward more complex organic forms constitute an intimately related interaction. More advanced and widespread photosynthetic life produces the atmospheric oxygen required for further evolution of even more advanced forms of organisms, and so on. Only a planet of just the right size and temperature regime can ever acquire an oxygenic atmosphere, and with it the more advanced forms of life.

In engineering, Berkner's initial work with electromagnetic pulses put him in the forefront of development of aircraft radar and navigation devices. As a naval aviator from 1926 (rising to the grade of rear admiral, USNR), he took charge of all engineering of electronics for naval aircraft during World War II. Subsequently, under Vannevar Bush he organized the Research and Development Board of the Department of Defense (now Directorate of Defense Research and Engineering).

later, acting directly under Secretary of State Dean Acheson, Berkner organized the military program under NATO and, following his extensive study, the Science Office of the Department of State in 1950. He was active in the studies establishing the Distant Early Warning System, and he was also one of the codiscoverers in 1951 of ionospheric scattering propagation.

Berkner received a B.S. in electrical engineering from the University of Minnesota in 1927. After his return from the Byrd Expedition in 1930, he joined the National Bureau of Standards in Washington, moving in 1933 to the Carnegie Institution, where he remained until 1951. In that year he became president of Associated Universities, Inc., and in 1960 he was named president and later chairman of the board of trustees of the Southwest Center for Advanced Studies in Dallas. In addition to numerous government decorations and honorary degrees, Berkner received the John A. Fleming Medal and the William Bowie Medal of the American Geophysical Union, the Cleveland Abbe Award of the American Meteorological Society, and the Public Service Medal of the National Aeronautics and Space Administration. He was elected to the National Academy of Sciences in 1948 and to the American Academy of Arts and Sciences in 1956.

The author of more than 100 scientific and engineering papers. Berkner wrote, among other books, *Rockets and Satellites* (1958), *Science in Space* (1961), and *The Scientific Age* (1964).

For background information *see* ATMOSPHERE, EVOLUTION OF; IONOSPHERE; RADIO-WAVE PROPAGATION in the McGraw-Hill Encyclopedia of Science and Technology. ■

BERNAL, JOHN DESMOND

British physicist

Born May 10, 1901, Nenagh, Ireland
Died Sept. 15, 1971, London, England

One of the pioneer investigators in x-ray crystallography, Bernal contributed to the discipline both by his own investigations and by the guidance given to his students. He developed a very powerful, simple graphic method, based on the concept of the reciprocal lattice, for the indexing of crystal planes. He also put forward a theory of the structure of water and, later, proposed a model of the structure of liquids in general.

X-ray diffraction studies began about 1912 with the investigations of Max von Laue. Hearing of his efforts, William Henry Bragg and his son, William Lawrence Bragg, worked out the mathematical details involved in the investigation and derived the equation that bears their name. About 1921 the German crystallographer Paul P. Ewald proposed the concept of the reciprocal lattice to facilitate visualization of the crystal lattice which Bernal independently developed. *See* BRAGG, SIR (WILLIAM) LAWRENCE.

About 1926, while conducting research at the Davy-Faraday Laboratory of the Royal Institution under the direction of William Henry Bragg, Bernal undertook the preparation of a chart for indexing x-ray diffraction photographs from single crystals. Now known as the Bernal chart, it included two sets of curves, from which could be read the radial and axial cylindrical coordinates of the point in reciprocal space that corresponded to any particular x-ray reflection. The two coordinates were ζ, the distance of any reciprocal-lattice point from the equatorial plane, and ξ, the distance of the point from the axis of rotation. To construct his chart, Bernal worked out ζ and ξ for all positions on a cylindrical film. By drawing on a transparent surface two sets of curves through the positions that he had calculated, Bernal created a tool that necessitated only placing a rotation photograph on the chart and reading off the ζ and ξ coordinates for every spot on the film, thus saving many tedious hours of calculation.

In 1933 Bernal and R. H. Fowler published the results of their study of the structure of water and ionic solutions. The x-ray patterns they discussed suggested that water retains in part a hydrogen-bonded structure similar to that of ice. They pointed out that, as temperature increases, more and more of these bonds are ruptured. The oxygen molecules may then arrange themselves in a manner approximating more and more closely the closest packing in spheres. There would be a significant increase in density for such a packing compared with the open packing of the completely hydrogen-bonded structure of ice. They suggested that this might explain the increase in density of water as its temperature increases from 0 to 4°C.

Bernal investigated many areas of crystallography. With Dorothy Crowfoot (later Crowfoot Hodgkin), he investigated liquid crystals and made significant contributions to the crystallography of the mesomorphic state. During 1932–34 Bernal, Crowfoot, and I. Fankuchen collaborated on a crystallographic analysis of sterols and discovered the common structure of their nucleus. During the 1930s, also, Bernal realized that use might be made of a particular property of proteins, namely, that many of them form crystals. He took the first x-ray photograph of a protein crystal, pepsin, in 1934; later he joined with Fankuchen, Max F. Perutz, and Crowfoot to take the first x-ray diffraction photographs of crystals of hemoglobin, chymotrypsin, and insulin. *See* HODGKIN, DOROTHY CROWFOOT; PERUTZ, MAX FERDINAND.

In 1935 Bernal studied the structure of tobacco mosaic virus solutions. This virus was shown to be a nucleoprotein, whose structure was finally solved by his pupil, Rosalind Franklin, as were several other viruses of a crystalline nature by A. Klug and his coworkers.

During the late 1950s Bernal attempted to make a model of a liquid structure that would give a better approximation to the distribution function than does the hard-sphere model. He began by assuming that a liquid consists essentially of a set of molecules similarly—but never identically—placed with respect to one another. He also restricted himself to the simplest case of spherical molecules and assumed that liquids are essentially homogeneous. He built a number of phys-

BENNETT, WALLACE F.—*Continued*

positive, and direct. He is of medium build, speaks in a firm, deliberate bass voice." A past president of the Salt Lake Rotary Club, he headed the county war fund, was president of the Community Chest in 1944-45 and has since been chairman of its budget committee. Since 1935, as member and treasurer of the Latter-day Saints Sunday School General Board, Bennett has helped supervise the finances of 1,500 Sunday schools. An experienced choral director, he is s[illegible]o have written words for several hymns. [illegible]s Bennett is a Republican; his clubs [illegible]lt Lake Country, Ogden Countr[illegible]

At the age of tw[illegible] married in Septembe[illegible] Grant (daughter of [illegible] dent of the Morm[illegible] teaching music a[illegible] is now active i[illegible] dren. The Ber[illegible] Grant (who [illegible] the United [illegible] Wells (fo[illegible] phony O[illegible] mon mi[illegible] nett) [illegible] Benn[illegible] hobb[illegible] fi[illegible] h[illegible] an[illegible]

BERKNER, LLOYD V(IEL) Feb. 1, 1905- United States Government official; scientist

Address: b. c/o United States Department of State, Washington 25, D.C.; c/o Carnegie Institution of Washington, 5241 Broad Branch Rd., N.W., Washington, D.C.; h. 7213 Bradley Blvd., Bethesda 14, Md.

A scientist known for his achievements in the fields of physics and electronics and in public administration, Lloyd V. Berkner was appointed in March 1949 by Secretary of State Acheson [48] to the post of special assistant to the Secretary, in charge of the military assistance program proposed to strengthen Western Europe. Berkner is on the staff of the department of terrestrial magnetism at the Carnegie Institute of Washington, having begun this association in 1933. The executive secretary of the Joint Research and Development Board in 1946 under Dr. Vannevar Bush [47] (now the Research and Development Board of the National Military Establishment), Berkner also was head of a special committee appointed at the request of the Secretary of Defense to direct a study that led to the establishment of the Weapons Systems Evaluation Group.

Of German-French ancestry, Lloyd Viel Berkner was born February 1, 1905, in Milwaukee, Wisconsin, to Henry Frank and Anna Julia (Viel) Berkner. His paternal grandfather, a native of Germany, was a soldier in the American Civil War; and his maternal grandfather grew up on a farm on what was then a partly rural Manhattan Island in New York. Living in Perth, North Dakota, for his first seven years, Lloyd and his two brothers (Cecil W. and Keith Henry) after 1912 lived in Sleepy Eye, Minnesota, where, as a boy, Lloyd began to develop his interest in amateur radio broadcasting. With a homemade set, at seventeen he established the American Radio Relay League speed and distance record, over the circuit from Hartford, Connecticut, to Hawaii. After being graduated from the high school in Sleepy Eye in 1922, he attended Duncan's Radio Corporation of America School for Operators; there, while studying to become a licensed shipboard radio operator, he taught code to earn his tuition. Upon receiving his license he shipped as radio operator on boats sailing to Central and South America, and to the West Coast.

The youth returned to Minnesota in 1923 to enter the University of Minnesota for a course in electrical engineering. There he enlisted on April 1, 1926, in the Naval Reserve as second-class seaman for aviation training, being commissioned an ensign (aviator) in the United States Naval Reserve on March 23, 1927. After flight training at the Great Lakes Naval Training Station and the United States Naval Air Station at Hampton Roads, Virginia, he acquired a transport pilot's certificate. He was also a student lieutenant colonel in command of the engineer battalion in the university regiment ROTC. During 1924-27 he was also chief engineer of the University of Minnesota's radio Station WLB and of amateur Station 9XI. In June 1927 Berkner was graduated from the university with a B.S. in electrical engineering. While at Minnesota he had become a member of Acacia, Theta Tau (professional engineering society), Plumb Bob (senior engineering group), Eta Kappa Nu (honorary electrical engineering society), and the honorary military society Scabbard and Blade. He did some graduate work at the same institution in 1927, and in 1933-35 took additional graduate courses at George Washington University, in Washington, D.C.

During 1927-28 Berkner was employed as an associate electrical engineer supervising installation of the first airways radio range system from Hadley Field in New Brunswick, New Jersey, to the station in Cleveland, Ohio, for the Airways Division of the United States Bureau of Lighthouses. From 1928 to 1933 he was an electrical and radio engineer for the National Bureau of Standards, in Washington, working on radio wave propagation. He assisted Amelia Earhart at this time in her preparations for her first (1928) transatlantic flight. As a member with the rank of ensign of Admiral Byrd's [48] Antarctic Expedition in 1928-30 he built the first radio station on the Great Ross Ice Barrier, and participated in a number of exploration flights. After some brief excursions into Fiji and New Zealand, he joined the Navy Torpedo Squadron VT-4 at the Panama Canal Zone, but by June 1930 he had returned to the Bureau of Standards. His technical studies there eventually led to the discovery of the F-1 layer of ionization in the upper atmosphere.

Berkner was appointed physicist in the department of terrestrial magnetism of the Carnegie Institution of Washington in 1933. Placed in charge of the ionospheric research groups, there he developed the multifrequency apparatus which was to become the basis of ionospheric and wave-propagation research. So as to conduct additional ionospheric work, the scientist established an ionospheric station at the Watheroo (Western Australia) Magnetic Observatory (1938), and a geophysical observatory at College, Alaska (1941). He was in Scotland, England, Germany, Australia, and New Zealand during 1936-40, studying, giving lectures, and setting up research centers; and in the year 1941 he was sent to Fairbanks, Alaska, to organize an arctic observatory for the Carnegie Institution.

During 1935-36 Berkner had served as commander of Naval Aviation Reserve Squadron VS 6-R in Washington; his squadron was awarded the Noel Davis Trophy for the "greatest perfection in operation" in that period. With the approach of World War II and the resultant measures for national defense, in May 1939 the scientist began the preliminary organization, with Merle Tuve and Vannevar Bush, of scientific projects in this effort. Berkner collaborated with Tuve on the "early development of proximity fuses"; he was to become a consultant in the field of proximity fuses and communications to the National Defense Research Committee. He was appointed a lieutenant commander on April 1, 1941, and was called to active duty in the Navy on September 8 of the same year. Promoted to commander on September 5, 1942, he became a captain on March 20, 1945. His first assignment in the wartime Navy was to organize and direct the radar section of the Bureau of Aeronautics. Throughout the war he served this Bureau in various technical executive positions in the radio and electrical group of the engineering division; among his duties was the organization of the Bureau's electronics branch. He also saw active service aboard the carrier U.S.S. *Enterprise* at Okinawa. In 1946 he retained his permanent rank of captain, in an inactive status.

After his release from the Navy in February 1946, Berkner returned to the Carnegie Institution as chairman of the section on exploratory physics of the atmosphere of the department of terrestrial magnetism, continuing his research on atmosphere physics and serving as acting director for a part of this time. In July 1946 he was named executive secretary of the Joint Research and Development Board, which he helped to organize under the chairmanship of Dr. Vannevar Bush. Subsequently, he was named head of a special committee appointed in April 1948 by Secretary of Defense Forrestal [48] and Bush to conduct a study for the National Military Establishment of the problem of evaluating the relative importance of weapons systems to national security. The report of this committee eventually led to the establishment, in January 1949, of the Weapons System Evaluation Group. Of this last-mentioned group, for the establishment of which Berkner was largely responsible, Secretary Forrestal commented that it was "one of the most interesting and significant accomplishments in the work of unification of the military services."

Hessler

LLOYD V. BERKNER

Lloyd V. Berkner returned again to the Carnegie Institution in 1947. On March 30, 1949, Secretary of State Dean Acheson announced the appointment of Berkner as his special assistant to direct the work concerned with the military assistance program being formulated under the North Atlantic Pact. As head of the program Berkner directs the working technical experts who decide the quantity of each kind of arms the nations in the North Atlantic Pact should receive from the United States. The appointment was made with the consent of the Carnegie Institution, where Berkner continues to fill his post while carrying out his special task at the State Department.

Berkner's contributions to science have brought him a number of honors. He received the Byrd Antarctic Expedition I Medal, and was given the science award of the Washington Academy of Sciences in 1941 for his work in ionospheric research. He holds the American Defense Service Medal, the American Area Campaign Medal, the World War II Victory Medal, and the Naval Reserve Medal (United States). He is also Honorary Officer of the Order of the British Empire. For "exceptionally meritorious service" from September 1941 until September 1945, Captain Berkner was awarded the Legion of Merit. The citation read: "His insight into tactical requirements, his formulation of far-reaching policies, and his expeditious engineering of new and improved electronic devices contributed immeasurably to the protection provided our Fleet against air and submarine attacks." He was also presented with the Commendation Ribbon of

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the Secretary of the Navy and with a letter which praised him for "outstanding achievement in a specialized field. . . .He has contributed greatly to the reduction of operational losses and to the increased effectiveness of offensive operations." Vannevar Bush once stated that Berkner has "a thorough knowledge of military and governmental methods . . . a rare and valuable combination."

A member of the National Academy of Sciences (and of its committees on international relationships in science and on the Antarctic) and the National Research Council (and of its committee on prevention of deterioration), Berkner is a fellow of the American Physical Society, Institute of Radio Engineers, and American Institute of Electrical Engineers (as well as secretary-treasurer of its Washington section). He also belongs to the Philosophical Society of Washington, the Washington Academy of Sciences, the American Association for the Advancement of Science, the American Geophysical Union, and to the International Commission on the Ionosphere and the executive committee of the Association of Terrestrial Magnetism and Electricity, both groups being part of the International Union of Geodesy and Geophysics. Chairman of the United States national committee of the International Scientific Radio Union, he is as well a member of the subcommitee on the upper atmosphere of the National Advisory Committee for Aeronautics. His clubs are the Cosmos (Washington) and the Explorers (New York). The scientist represented the National Academy of Sciences at its Edinburgh congress in 1936, and the International Union of Geodesy and Geophysics at its Washington congress in 1939. He is commanding officer of the United States Naval Reserve electronics staff, Bureau of Aeronautics of the Navy.

In the course of the past twenty-five years Berkner has contributed about seventy-five articles to scientific and other periodicals. His books include three volumes on ionospheric research: at Huancayo Observatory, Peru; at College, Alaska; and at Watheroo Observatory, Western Australia. Berkner is a Congregationalist and a Democrat His marriage to Lillian Fulks, of Chevy Chase, Maryland, took place on May 19, 1928; they have two daughters, Patricia Ann and Phyllis Jean. He is six feet two and a half inches tall and weighs 210 pounds; his eyes are blue and his hair is gray. The scientist-administrator finds recreation in golf, gardening, photography, and in his metal and woodworking shop.

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LEM Radar Contract Procedure Weighed

Washington—Grumman Aircraft Engineering Corp. will award a subcontract for the Apollo Lunar Excursion Module (LEM) radar sensor in about two months, but the firm has not decided yet whether to conduct an open competition or make the award to Radio Corp. of America.

RCA was included in Grumman's LEM proposal as the major avionics subcontractor. However, this inclusion was not binding because sensor requirements were not well defined at the time the contract award was made to Grumman.

As prime contractor, Grumman is responsible for procuring the radar package and for assuring it meets the requirements for the complete Apollo guidance and navigation system established by Massachusetts Institute of Technology. MIT is associate Apollo prime contractor for the guidance and navigation system.

There is considerable interest within the avionics industry regarding the LEM sensor package, because of its initial value—$9-$10 million—and of its growth potential.

The radar system in the lunar bug will perform two critical functions. It will provide velocity and altitude information when the bug descends to the lunar surface, and range and range rate and angle and angle rate when the module leaves the lunar surface to rendezvous with the command module.

Berkner Outlines U.S. Space Goals, Argues Against Program's Critics

By C. M. Plattner

Los Angeles—Critics of the Kennedy Administration's "space race" with Russia were described by Dr. L. V. Berkner, consultant and former member of the President's Science Advisory Committee, as unrealistic in attitude and uninformed of the goals of the U.S. space program. Berkner presented his views last week before members of the Aerospace Medical Assn. at their 34th annual meeting here.

The speech, submitted to the National Aeronautics and Space Council and cleared by Vice President Lyndon Johnson, took issue with skeptics in position of national leadership and those in the scientific community, whose arguments range from waste-of-money to the premise that exploring the moon and planets can be done more effectively by instruments than man.

Berkner is president of the Graduate Research Center of the Southwest, Dallas.

Conquest of space has acquired an enormous political value, Berkner said. The nation that can win and retain space superiority will have demonstrated the superior viability of its system in the eyes of the world, he declared.

Unique space achievements by the Soviet Union, he added, could lull that nation into a false sense of superiority and overconfidence. Such a situation, Berkner said, could lead the Russians into irresponsible international adventures, perhaps leading to war.

To prevent Soviet successes, the contest for every major space objective becomes unavoidable, Berkner pointed out. Alternative to an active role in the space race could result in significantly greater costs in the future in terms of expenditures for a military deterrent.

"Because of the very primitive, and deep-seated instinct to conquer the unconquerable, the space race between the U.S. and USSR is inevitable," said Berkner. "Men everywhere see, in the conquest of space, the peaceful demonstration of the superiority of one of the two competing systems of economic organization—capitalism versus communism."

A straight engineering approach to space exploration, championed by skeptics who desire that the space race be considered purely as a political race and de-emphasizing the scientific aspect to save money, presents a superficial and unrealistic attitude, Berkner said. Without the employment of the most advanced conceivable science as the tool for exploration, the space race would degenerate into a phony program.

Another reason for maintaining space science at a high level, Berkner said, is that a straight engineering approach will work only until a serious failure is encountered, arising from natural causes not clearly understood. The program then would come to a shuddering and expensive halt, he said.

Scientific aspect of the space program is most vulnerable to budget cuts, Berkner pointed out, because to accomplish the moon program at all, the engineering aspect—building a vehicle—is essential, while the scientific programs could be trimmed.

One argument, prominent in scientific circles, Berkner said, proposes that instruments can do everything that men can do, and a lot cheaper.

Berkner countered these arguments by noting that skilled interpretation, leading to objectivity in evaluating alternate courses of action ultimately will be required. If scientists were able to build an instrument with this capability, it would look surprisingly like man, he said.

To enhance the scientific aspect of manned lunar and planetary exploration, Berkner said that young, highly-skilled scientists should be included in the astronaut training program. "To do a genuine job, the astronaut team must be a well rounded team including great scientific skill," he said.

Berkner touched on another argument often heard, to the effect that "just think of what we could do with $20 billion [estimated for Project Apollo] if it were turned to man's immediate welfare—medical research, housing of the poor, and so on."

More to the point, he added, we live in a dynamic civilization in which some aspects of technology must always lead others.

Failure to press these differentials will bring technology to a halt. Our space program is the greatest spur to technology today, he said.

There has been a growing tendency in recent months to view landing a man on the moon as the only goal of the U.S. space program, Berkner said, but such a belief warps the original goals.

In defining the goals of the space race, Berkner named the following categories and their associated objectives:

- Scientific. In addition to exploring the moon and other planets, continuing observations of the earth itself, from satellites will further determine its shape, gravitational and magnetic fields, atmosphere and its coupling into the interplanetary medium. Knowledge of the sun and of empty space will be furthered and observations of the universe, through space station-based telescopes, without the filtering effect of the earth's atmosphere, will be possible. Berkner later said that the moon, since it is solid and has a natural gravity, would be preferred as a base for a space station over an orbiting body, which would be perturbed by the movement of its occupants.
- Civil applications. In the field of communications, world-wide direct dialing, radio and television are foreseen. Meteorological science will be further improved with satellites such as Tiros and Nimbus. A proposed satellite, called Reaper, will collect and relay information from free-floating balloons at fixed levels in the atmosphere and from floating buoys, Berkner said.
- Military applications. Berkner defended the right of the military in space on the basis that the U.S. must be able to counter any new weaponry techniques advanced by Russia.