MC 572
S.8
BOX 11 FOLDER 3

HEPAP correspondence

1969

Columbia University
DEPARTMENT OF PHYSICS

NEVIS LABORATORIES
P.O. Box 137
Irvington, N.Y. 10533
914 LY 1-8100

April 24, 1969

Prof. Victor F. Weisskopf
Massachusetts Institute of Technology
Dept. of Physics
Cambridge, Mass. 02139

Dear Viki:

I am in favor or Larry Jones.

Sincerely,

Leon M. Lederman

LML:at

UNIVERSITY OF CALIFORNIA

LAWRENCE RADIATION LABORATORY
BERKELEY, CALIFORNIA 94720

April 23, 1969

APR 25 1969

Professor Victor F. Weisskopf
Massachusetts Institute of Technology
Department of Physics
Cambridge, Massachusetts 02139

Dear Viki,

I think that we should hear Jones. As to the strength of the opinion I would say that I am definitely favorable but would not argue if you decide the other way. The reason for my opinion is that the effectiveness of HEPAP depends in part on the degree to which it understands and represents the views of its constituency. If a responsible scientist believes that we have not heard the story on an important issue, we should try to hear him. At the same time, we have to guard against endless debate on every issue. I don't believe that we have yet approached that point on the cosmic ray proposal.

Sincerely,

Ed.

Edward J. Lofgren

EJL:amn

WASHINGTON UNIVERSITY

ST. LOUIS, MISSOURI 63130

GEORGE E. PAKE
EXECUTIVE VICE CHANCELLOR
AND PROVOST

CARL A. DAUTEN
VICE CHANCELLOR AND
ASSOCIATE PROVOST

GEORGE W. HAZZARD
VICE CHANCELLOR FOR
PROFESSIONAL SCHOOLS
AND RESEARCH

ADMINISTRATIVE OFFICES

April 21, 1969

Professor Victor F. Weisskopf
Department of Physics
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

Dear Viki:

This is in response to your April 17 letter about the request from Lawrence W. Jones.

I have the general feeling that HEPAP's role should not be the evaluation of any specific research proposal. Yet I realize that we have, for example, taken positions on storage rings that were tantamount to approval of a specific proposal.

I am willing for HEPAP to hear Jones if that is its desire. However, we shall then be setting a precedent that may be hard to live with: why will we not hear from others who have proposals if we have heard from Jones?

I vote no on hearing Jones but I will, of course, abide by the will of the majority of HEPAP.

Sincerely yours,

G. E. Pake

THE UNIVERSITY OF WISCONSIN

MADISON 53706

DEPARTMENT OF PHYSICS
475 NORTH CHARTER STREET

April 21, 1969

Victor F. Weisskopf
Massachusetts Institute of Technology
Department of Physics
Cambridge, Massachusetts 02139

Dear Viki,

I believe we should give Larry Jones a hearing if he wants it. If a proposal of this magnitude were being made by a national laboratory we would certainly give a hearing. I think we should do as much for any serious proposal by a responsible physicist. I believe it is particularly important for a proposal like this which is off the beaten track and not likely to receive careful consideration otherwise.

Sincerely yours,

Keith Symon

KRS:jsl

STATE UNIVERSITY OF NEW YORK
AT STONY BROOK
STONY BROOK, LONG ISLAND, NEW YORK
11790

THE INSTITUTE FOR THEORETICAL PHYSICS

April 22, 1969

Dr. Victor F. Weisskopf
Department of Physics
M.I.T.
Cambridge, Massachusetts 02139

Dear Viki:

I think we should hear from Larry Jones. Cosmic Ray experiments could be very interesting, and he may have some new ideas to do it more cheaply.

Yours sincerely,

Frank

C. N. Yang

CNY:jl

PRINCETON-PENNSYLVANIA ACCELERATOR

Memo to: HEPAP Date: April 15, 1970

From : M. G. White

Subject: Proposal to Operate the PPA at $1.2 Million

1) Although the $40 million investment in the PPA justifies an operating level of several million dollars it does not require that rate of expenditure in order to perform first class experiments. On the contrary, because the Laboratory is well equipped, and the synchrotron has just undergone several major improvements, the physics output per dollar in FY 71 at $2.0 million, and in FY 72 at $1.2 million, will be higher than it ever has been. It seems very likely that no other major accelerator could make as effective use of the $1.2 million as could the PPA.

2) In proposing to run at $1.2 million in FY 72 we take the view that we should maximize the actual, current physics output thereby minimizing the effort to improve further the synchrotron or to design and build expensive devices. Our present secondary beams have reached a fairly stable design and need not be changed from experiment to experiment. Repair, maintenance, rigging and administrative staff have all been reduced drastically. Nevertheless we believe that the essential requirements of the physics research program can be met, though more slowly. Using groups will have to perform more of their own setup, maintenance and repair. At a recent meeting of PPA Users we described what life would be like in FY 72 at PPA. The Users all felt that they still would find it very productive to work at the PPA.

3) The staff for FY 72 consists of the most capable, flexible, highly motivated members of our present staff. Every piece of equipment, every function is covered by at least one expert plus one or more others who can serve as back-up. All of our present synchrotron operators have been kept; so if more power is available than that indicated by the $200,000 allocated we can run more hours per year, up to 4,000, without increasing the operating crews.

4) The experimental program for FY 72 will probably be an outgrowth of the research performed in the coming fifteen months. Even though most potential PPA Users are discouraged about the prospects of there being any PPA to use in FY 72, and therefore are understandably reluctant to submit detailed proposals, we still have a number of strong experiments, proposed by strong groups, which we want to run in FY 72. The research program now scheduled for FY 71 will be explained in detail at this meeting of HEPAP by several members of the PPA using groups.

5) We expect to raise at least $200,000 from private sources and are proposing that $1.0 million come from Federal sources, presumably the NSF since there appears to be no hope that the AEC will reverse its decision.

6) Princeton University, after recommendations made to President Goheen by the Physics Department, the Research Board, and the Committee on Priorities, has agreed to contribute $60,000 per year for two years. Also the academic year salaries of M. G. White and F. C. Shoemaker will be carried by Princeton.

7) The University of Pennsylvania, Rutgers, Columbia, Temple, Yale, the University of Michigan, and others are now actively exploring ways of contributing to the support of PPA.

8) Our object in appearing before the High Energy Physics Advisory Panel today is to convey to you the strong sense of convictions of everyone connected with the PPA that there is still much good physics to be extracted from the PPA, that there is the will and determination to do so, and that the proposed level of support does, indeed, provide for a viable Laboratory. We seek your endorsement of our belief that $1.2 million, spent as proposed, will do more for physics and more actual high energy physics than if it were spread uniformly across three or four other accelerators. Your strong endorsement will be crucial in securing the support of government and private agencies.

9) You have also been informed of the present experimental program to which the Laboratory is committed until about January 1971, even if there is no funding for FY 72 from any source. We feel that these experiments must be completed before the PPA is shut down. Your strong endorsement of this will be essential for we are under great pressure from the AEC to cease all operations by September 30, 1970.

10) The attached budgets of personnel and costs for FY 70, 71 and 72 indicate the way in which we are reducing our staff and costs. The following are the definitions of Columns I, II, III, and IV.

I - All improvements in the synchrotron, secondary beam lines or associated equipment which increase the capacity to do physics experiments. All major new devices for future use by experimenters. All planning for future improvements.

II - Operation and maintenance of existing synchrotron and external beam line in status quo. Electric power for Laboratory requirements.

III - All User support including secondary beam lines, rigging, maintenance of PPA equipment furnished the User. Electric power is included in Column II.

IV - Costs of terminating AEC contract assuming operations in FY 72 at indicated level. Included are severance pay of those being terminated, sorting and packing of equipment not required under the reduced scope of FY 72, and salaries of staff to accomplish these functions.

MGW:mc
Attachment

MGW

4/15/70

PRINCETON-PENNSYLVANIA ACCELERATOR

FY 1970
($ 000)

		I	II	III	IV
A.	**Staff**				
	1. PHD	2			
	2. Engineers and M. S. Physicists	9	11	9	
	3. Senior Technicians	5	9	8	
	4. Technicians	11	34	38	
	Total	27	54	55	
B.	**Budget**				
	1. Salaries	$310	$ 536	$ 526	$299
	2. Overtime & Premium	-	88	40	-
	3. Benefits (14%)	43	87	79	42
	4. Indirect (59%)	183	368	334	
	5. Materials & Services	330	355	115	45
	6. Power & Water	-	350	-	-
	7. Contingency	-	-	-	-
	Total	$866	$1,784	$1,094	$386

TOTAL $4,130

4/15/70

PRINCETON-PENNSYLVANIA ACCELERATOR

FY 1971
($ 000)

		I	II	III	IV
A.	Staff				
1.	PHD	1			
2.	Engineers and M. S. Physicists	1	8	3	
3.	Senior Technicians	1	8	2	
4.	Technicians	1	21	2	
	Total	4	37	7	
B.	Budget				
1.	Salaries	$ 53	$ 414	$ 90	$240
2.	Overtime & Premium		40	15	-
3.	Benefits (14%)	7	61	15	34
4.	Indirect (59%)	31	256	62	17
5.	Materials & Services	15	249	30	88
6.	Power & Water	-	300	-	-
7.	Contingency	-	-	-	-
	Total	$106	$1,320	$212	$362

TOTAL $2,000

4/15/70

PRINCETON-PENNSYLVANIA ACCELERATOR

FY 1972
($ 000)

	I	II	III	IV
A. STAFF				
1. PHD	1	-	-	-
2. Engineers & M.S. Phy.	-	6	2	-
3. Senior Technicians	-	5	2	-
4. Technicians	1	16	2	-
Total	2	27	6	-
B. BUDGET				
1. Salaries	$ 27	$ 310	$ 75	$ -
2. Overtime & Premium	-	-	-	-
3. Benefits (14%)	4	43	11	-
4. Indirect (63%)	17	195	47	-
5. Materials & Services	2	118	21	-
6. Power & Water	-	200	-	-
7. Contingency	-	130	-	-
Total	$ 50	$ 996	$ 154	$ -

TOTAL $ 1,200

PRINCETON-PENNSYLVANIA ACCELERATOR
PRINCETON UNIVERSITY
JAMES FORRESTAL CAMPUS
PRINCETON, N.J.

MAIL ADDRESS
ACCELERATOR, P.O. BOX 682
PRINCETON, N.J. 08540

TELEPHONE
PRINCETON, N. J.
609-452-3000

March 11, 1970

The Honorable Chet Holifield
Vice Chairman of the
Joint Committee on Atomic Energy
Congress of the United States
Washington, D. C. 20510

Dear Mr. Holifield:

Thank you for giving me the opportunity to add a written statement to my extemporaneous remarks made at the March 3 Hearings of the Joint Committee on Atomic Energy. At that time I expressed my dismay over the closing down of the Princeton-Pennsylvania Laboratory, just as its value to the scientific community is sharply increasing.

First, I would like to express my appreciation of the efforts made over the years by the JCAE to support basic research in various scientific fields which relate either to the advancement of atomic energy, or which benefit by the techniques developed for atomic energy. In particular the JCAE and the Atomic Energy Commission are largely responsible for the vigorous state of high energy physics in America. Now, however, severe budget cuts threaten to dismantle much that has been built up at considerable expense. It is my belief, and that of many other scientists, that at some future date the discoveries made in elementary particle physics will prove to be essential to human progress, perhaps even to survival. How, or when is not predictable, but it seems clear to me that anything so fundamental as increasing our understanding of the basic structure of matter, space and time must, someday, result in a powerful interaction with human affairs. Admittedly no one can, at the present moment, identify the possible areas of practical application, but this is always true of the most basic research. Those of us who work in high energy physics are motivated almost solely by the intellectual challenge of gaining a deeper insight into the very essence of our existence. Admittedly it is an act of faith, borne out by innumerable historical examples, to believe that basic discoveries will eventually profoundly affect all sciences and technology and that therefore one is justified in asking for the large sums of money required for their pursuit. Where would we be today without the basic discoveries made 50 years ago about the nature of radiowaves, light, neutrons, atoms and molecules? In fighting today's "war" we must not neglect the basic research required to win tomorrow's wars.

PRINCETON-PENNSYLVANIA ACCELERATOR

To : HEPAP Members Date: April 9, 1970

From: M. G. White

In preparation for our forthcoming meeting in Berkeley, I enclose a copy of my letter to Chet Holifield, Chairman of the Joint Committee on Atomic Energy. You will note that we propose to operate at a level of about one million dollars in FY 1972 and that we believe we can perform a lot of valuable physics for that money. Our presentation to HEPAP on April 17, will give operating details and examples of the experimental program which we believe we can run.

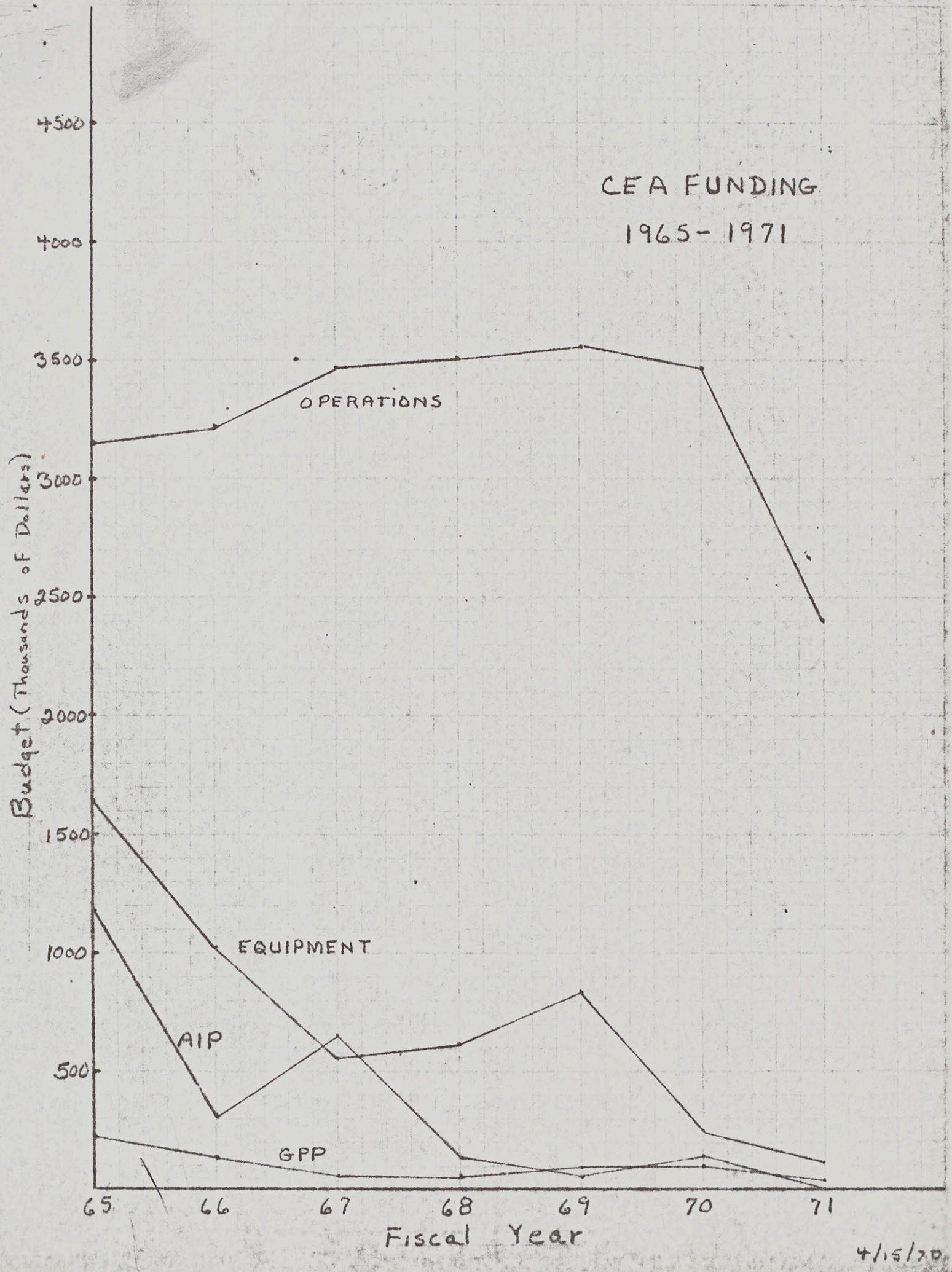
It is our hope that you will agree with our thesis, which is, that in view of the large investment already made at the PPA an annual operating expenditure of around one million dollars of federal funds will do more good physics, and be better for physics, than would the same money spread over several laboratories with the consequent destruction of the PPA.

Sincerely yours,

Walter D. Wales

for Milton White

MGW:mc
Enc.
cc: P. McDaniel
W. Wallenmeyer


CEA FUNDING
1965-1971
4500
4000
3500
3000
2500
2000
1500
1000
500
Budget (Thousands of Dollars)
OPERATIONS
EQUIPMENT
AIP
GPP
65
66
67
68
69
70
71
Fiscal Year
4/15/70

CEA BUDGET BY FISCAL YEARS

(Thousands of Dollars)

Type of Funding	1964	1965	1966	1967	1968	1969	1970	1971
Operations	2650	3160	3208	3470	3504	3553	3475	2400[1]
Equipment	1450	1649	1016	570	615	850	250	110[1]
A.I.P.	114	1187	300	650	110	45	200	0[2]
G.P.P.	45	208	134	69	40	95	30	20[2]
Total	4259	6203	4862	4758	4269	4543	3955	2530

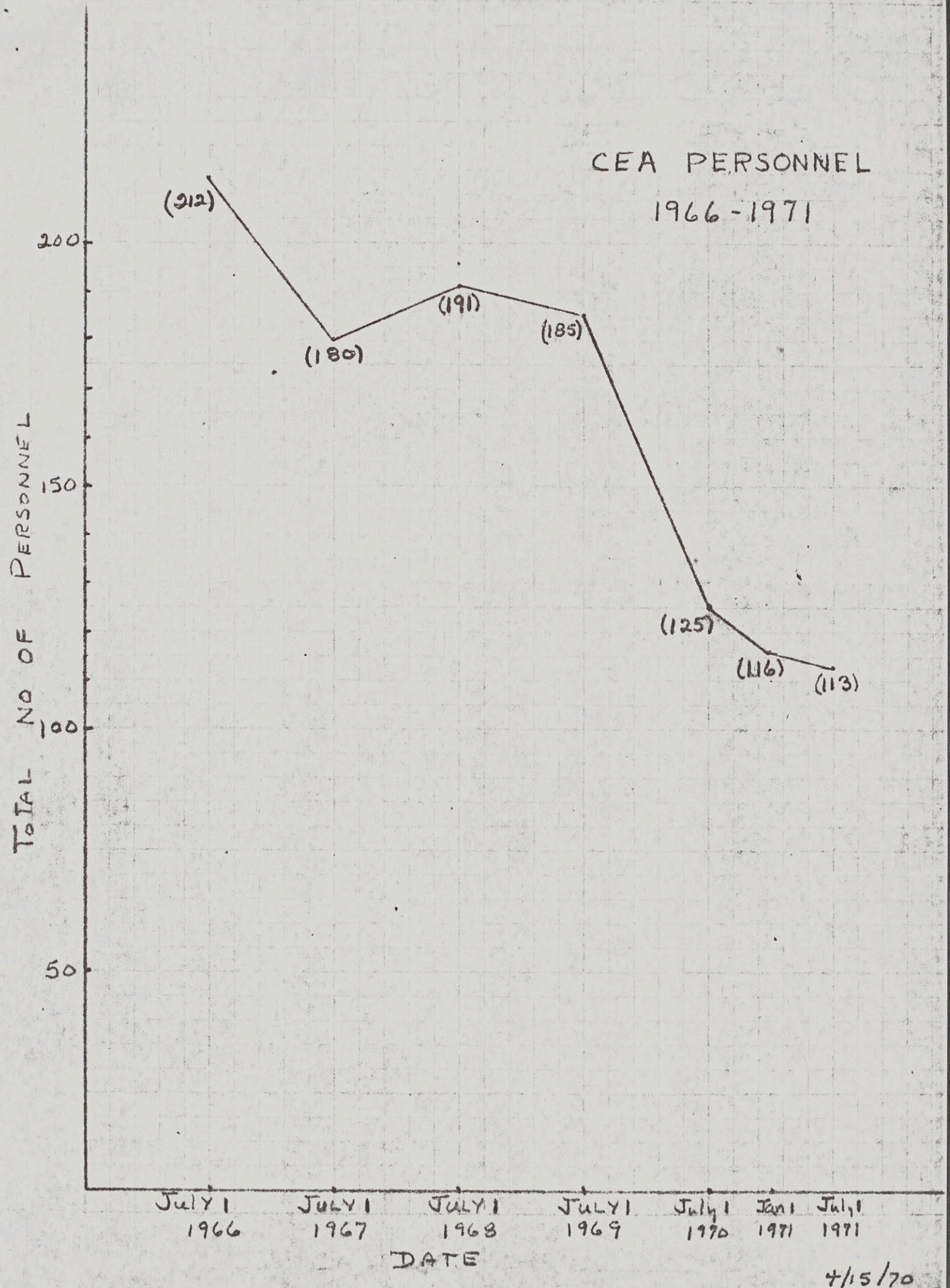
[1]President's Budget

[2]Estimated

CW/bm

4/15/70

CEA PERSONNEL
1966 - 1971



4/15/70

CAMBRIDGE ELECTRON ACCELERATOR PERSONNEL

	FY 70	Mid FY 71	End FY 71
Staff - General Scientific			
Experimental	9[1]	6[1]	4[1]
Theoretical	3	2	1
	12	8	5
Administration			
Staff	5	5	
Senior Administrators	2	1	
Clerical	18[1]	8	
	25	14	
Cryogenics			
Staff	1	0	
Engineers	2	0	
Technicians	10	0	
	13	0	
Electrical Engineering			
Staff	3	3	
Engineers	6	4	
Technicians	15[1]	9	
	24	16	
Electronics Engineering			
Staff	1	1	
Engineers	5	5	
Technicians	8	7	
	14	13	
Mechanical Engineering			
Staff	1	1	
Engineers	6	5	
Technicians	3	0	
	10	6	
Operations			
Staff	5[1]	4	
Engineers	14[1]	9	
Technicians	18	9	
	37	22	
Experimental Floor and Machine Shops			
Staff	1	1	
Engineer	1	1	
Machinists	7	5	
Technicians	18	12	
	27	19	
Maintenance			
Engineer	1	1	
Mechanics	6	4	
	7	5	
Safety			
Engineers	2[1]	1[1]	
Vacuum			
Engineer	1	1	
Technicians	7	8	
	8	9	
Programming			
Staff	2	1	
Programmers	2	2	
	4	3	
Total Personnel	183	116	

[1] Includes one person working 1/2 time

CW/bm
4/1/70

CEA PROGRAM

	Calendar Year			
	1968	1969	1970	
			1st half	2nd half (projected)
Electron and Photon Beam Physics	75%	66%	50%	∿ 0%
Colliding Beam Development and Physics	25%	33%	50%	∿100%

ELECTRON AND PHOTON BEAM PHYSICS

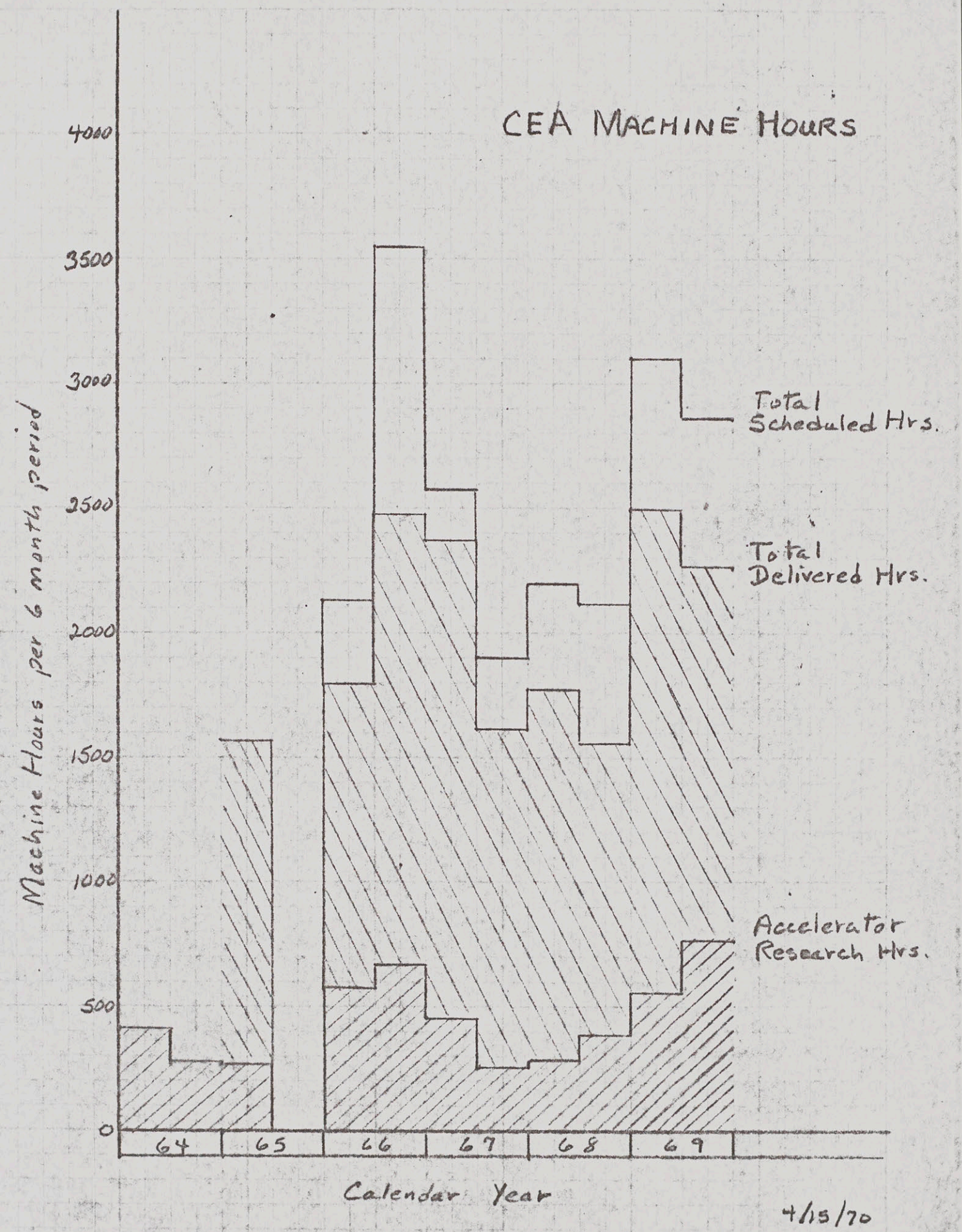
	Hours of Delivered Beam Time		Additional Requests
	7/1/69 - 12/31/69	1/1/70 - 4/1/70	
1. Inelastic Electron Scattering Program Pipkin group (Harvard)	551	542	1300+
2. Photoproduction with Polarized Photons Bar Yam (S.M.U.)- Luckey-Osborne (M.I.T.)	467	257	500+
3. Boson Resonance Photoproduction Russell-Tannenbaum (Harvard)	231	∿ 300	300+
4. Recoil Proton Polarization in π^0 Photoproduction Deutsch (M.I.T.) - Rutherfoord (Tufts)	-	runs with Exp't 3	+
5. Particle Detector - Transition Radiation Development Yuan (B.N.L.)	parasitic 123	298	+

KS/bm
4/15/70

Highlights of CEA Colliding Beam Program

October 1964:	First proposal for use of CEA itself as a positron-electron storage ring (CEAL-TM-145).
October 1965:	Proposal for Bypass colliding beam facility with low beta (CEAL-TM-149).
June 1966:	Damping system installed in synchrotron.
August 1966:	3-BeV electrons stored in the synchrotron for 21 minutes.
November 1967:	First electron multicycle injection achieved.
June 1968:	Completion of Bypass installation and first passage of electrons through the Bypass and back into the synchrotron.
October 1968:	Accumulate 45 mA peak e^- current in half second using the new 120-MeV electron linac.
August 1969:	Acceptance of 120 MeV positron linac.
August 1969:	Operation of e^- linac in tandem with e^+ linac to produce 240 MeV electrons for injection into synchrotron.
August 1969:	Completion of the synchrotron ultra high vacuum system. 1/e - decay times of small electron beam currents up to 2 hours.
December 1969:	Completion of 120-MeV positron and 240-MeV electron injection systems.
January 1970:	2-BeV electron beam stored in the Bypass with a 1/e lifetime of 45 minutes.
March 1970:	11 mA peak positron beam accumulated in 60 seconds (1/e-lifetime constant - 20 sec.)
April 11, 1970:	First simultaneous storage of electrons and positrons in the synchrotron.

4/16/70


CEA MACHINE HOURS
4000
3500
3000
2500
2000
1500
1000
500
0
Machine Hours per 6 month period
Total Scheduled Hrs.
Total Delivered Hrs.
Accelerator Research Hrs.
64
65
66
67
68
69
Calendar Year
4/15/70

CAMBRIDGE ELECTRON ACCELERATOR

DELIVERED MACHINE HOURS PER 6-MONTH PERIOD

USE	Calendar Year											
	1964		1965		1966		1967.		1968		1969	
	First Half	Second Half	First Half	Second Half	First Half	Second Half	First Half	Second Half	First Half	Second Half	First Half	Second Half
Experimental Research Hours (Prime User Only)			1303	0	1224	1803	1924	1366	1497	1164	1946	1506
Accelerator Research Hours	408	284	270	0	573	682	460	251	281	381	552	752
Total Delivered Hours			1573	0	1797	2485	2384	1617	1778	1545	2498	2258
Total Scheduled Hours				0	2138	3550	2577	1894	2197	2112	3100	2854
Efficiency					84.1%	70.0%	92.5%	85.4%	80.9%	73.2%	80.6%	79.1%
Total User Hours (Prime, CEA, plus Secondary User)	1963	1973	2154	0	2596	4202	3779	2427	3235	2591	3631	2915

CW/bm

4/15/70

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

FEB 2 1970

Professor Karl Strauch
Cambridge Electron Accelerator
Harvard University
Cambridge, Massachusetts 02138

Dear Professor Strauch:

The high energy physics program is faced with a serious fiscal crisis in FY 1971. After careful study, including extensive discussions with the High Energy Physics Advisory Panel, we have reluctantly decided to institute a reduced mode of operation at the Cambridge Electron Accelerator (CEA). In the President's Budget for FY 1971 $2.4 million of operating funds are programmed for the CEA. It is anticipated that this level of funding will permit the colliding beam program to be maintained but will probably force cessation of conventional electromagnetic experiments at CEA.

During the past year we have given careful study to the problem of how best to respond to the ever increasing budget restrictions being imposed on the high energy physics program. It is clear that the cumulative effect of several years of restrictive budgets has caused a situation in which high energy physics contractors are all having serious difficulties and there is no encouragement that relief from budgetary pressures may be expected during the next few years. In order to somewhat ease the impact of these restrictive budgets on the highest priority research facilities and their associated research programs, we have concluded that selectively greater reductions at certain other facilities are necessary. The decision to apply such a reduction to the CEA has been most difficult. We recognize that the CEA is performing important experiments and can be expected to continue as a major element in the nation's high energy physics effort. We anticipate that the indicated new level of funding will permit continuance of the top priority colliding beam research program. We will continue to seek means of providing for the operation of this important facility at a more productive and desirable level.

We are available to provide whatever assistance we can to help you carry out the difficult actions required by this funding reduction.

Sincerely,

Paul W. McDaniel

Paul W. McDaniel, Director
Division of Research

cc: New York Operations Office

MASSACHUSETTS INSTITUTE OF TECHNOLOGY · HARVARD UNIVERSITY

CAMBRIDGE ELECTRON ACCELERATOR

HARVARD UNIVERSITY
42 OXFORD STREET
CAMBRIDGE, MASS. 02138

February 11, 1970

Dr. Paul W. McDaniel, Director
Division of Research
U.S. Atomic Energy Commission
Washington, D. C. 20545

Dear Dr. McDaniel:

This letter is to give you a first reaction on the impact on our laboratory of the reduction in programmed funds for FY 71 compared to those available for FY 70. The size (more than 30%, from $3.475 M to $2.40 M) and suddenness (we had no indication of such a cut) of this reduction have created such a host of problems that only today, more than one week after your phone call telling me the news, do I feel able to provide you with an overall picture.

I appreciated your thoughtfulness in personally informing me of the reduction. We all know the difficult boundary conditions under which you and your staff are operating. I also know that you want me to most frankly tell you the effects of the programmed reduction on our laboratory and its program. These effects are of the utmost seriousness.

The tragedy of this sudden reduction in funds is that it comes at a time when

1) the colliding beam program has reached the exciting stage where all parts of the system are brought together as a whole,

2) the conventional physics program has just been built up to a new peak of results both in electroproduction and in photoproduction experiments with new facilities unique to CEA such as our high resolution two-arm spectrometer in beam 7.

Our Visiting Board has testified to the good condition of our laboratory and the quality of its work at its most recent meeting in December 1969. The members of the Visiting Board are: Prof. J. W. Cronin (Princeton); Dr. M. Goldhaber (Brookhaven); Prof. J. D. Jackson (Berkeley); Prof. B. D. McDaniel (Cornell); Prof. W. K. H. Panofsky (Stanford); and Dr. J. B. Fisk (Bell Laboratories), Chairman.

The substance of your letter left us no alternative but from now on to plan our activities for the reduced FY 71 level of support. On Tuesday, February 3, 1970, I made a statement to the entire laboratory announcing the new level of support and that it undoubtedly required a sizable reduction in personnel from our FY 70 level of 185 employees. On Thursday, February 12, 1970, we are giving termination notices effective June 30, 1970, to 58 employees. On the same day announcement of the abolishment of 3 administrative and technical positions will be made. 6 scientific staff positions must be eliminated as soon as our commitments are fulfilled.

The new level of support required a complete re-examination of our laboratory program for FY 71 and extraordinary decisions on how to make the transition to our new rate of activity. The Scientific Subcommittee, the CEA staff, CEA users and wise friends from our universities, all have been involved in nearly continous discussion during this last week. We have reached the following conclusions:

1) It is clear that we can no longer pursue in parallel two big programs such as our colliding beam development and the electro and photoproduction experiments. This is a tragedy in terms of loss in physics for we have done both successfully and effectively so far.

2) Even at the reduced rate of funding, CEA is a great scientific asset to our local community and the U.S. We must make every effort to keep it going during these lean times with the expectation that future successes will help restore more reasonable levels of support.

3) With this in mind and the belief that the most exciting physics accessible to our laboratory is likely to result from the colliding beam experiment, we have decided for the present to phase out all conventional physics before June 1, 1970, and to concentrate for a while all laboratory efforts on the colliding beam effort.

4) Although we will now carry out this decision with all the vigor that we can command, we have reached it with great reluctance. We continue to believe that under normal circumstances a balanced program will result in better physics and a better laboratory. The reduced level of activity essentially has forced us away from a long range point of view.

5) The unexpected suddenness with which we are being forced to make our transition to the new level of activity has created a set of most difficult problems. The number of "approved" experimental shifts is considerably larger than the number we can now provide before June 1, 1970. The number of shifts on the expectation of which the equipment has been assembled is very much larger. The Executive Committee on February 9, 1970, has empowered a group composed of Prof. F. Low (M.I.T.), Prof. Curry Street (Harvard), Prof. Don Yennie (Cornell) [Prof. Albert Silverman (Cornell) has since been added], to establish priorities among the already approved experiments on the basis of quality of physics. This will be a difficult and heartbreaking task.

It is not necessary to explain in detail at this time what difficulties this sudden and unexpected shift in our program is causing to students, research workers and professors. Much excellent physics is being postponed at best - much for many years to come. We are taking this difficult course in the belief that it is the one course which by speeding up the exciting colliding beam development (although at the loss of very much conventional physics) is most likely to insure continuation of our laboratory into hopefully better times with resumption of a more balanced program.

I can think of no better proof of the continued support of CEA by the local physics community than the unanimity with which the above course of action has been approved by all members concerned, particularly by those whose research, co-workers and students are most directly and disastrously affected by the sudden transition.

After we have had time to make further analysis, I will submit to you a more detailed plan on how to minimize the difficulties of our transition period and permit a more flexible program.

Let me now comment on some general problems which are being brought into a sharp focus by sudden changes in support of carefully built up institutions such as CEA. One of the greatest contributions of the United States to the advancement of science and one of the main reasons for our present eminence in this area has been the successful development of the team effort in the creative pursuit of fundamental knowledge. One of the primary

causes of this successful development has been the steady and enlightened support by the government based on long range plans for the benefit of the country. Creative ideas and discoveries cannot, like the development of a consumer product, be turned on or off on short notice. It takes years to build up productive groups of intellectual eminence. They can be destroyed on short notice. Few actions are more likely to have disastrous effects than sudden scientifically unjustified shifts in support and abandonment of the long range point of view of what is best for science.

Besides the importance of increasing our store of basic knowledge of nature, a most important mission is to develop the new generation of scientists on which the future of our country and the world will depend. Experience has shown that there is no better way to interest the best brains available than to engage them directly and as early as possible in the most exciting fields of endeavor. Again, only an enlightened long range point of view can produce the conditions necessary for attracting and keeping the best young people in science. During last spring's student unrest at Harvard, I was able to very effectively use CEA as a shining example of the enlightened attitude of our government toward the pursuit of fundamental knowledge. I enclose a copy of a letter of mine published in the May 13 issue of the Harvard Crimson as an illustration. Most unfortunately, some of my strongest arguments valid then are now no longer correct! What will the young people so seriously affected by these sudden decisions which we are forced to make think of the wisdom of putting their life's effort into science? What will their brothers and friends think?

We will in our new mode of operation do everything we know how to justify your goal "to continue to seek means of providing for the operation of this important facility at a more productive and desirable level". We are optimistic of success within reasonable schedules and financial conditions. Your support, and that of your staff, can and will be, I am sure, of great help in restoring the present low state of morale of all the workers of CEA upon whose dedication our future rests.

Sincerely yours,

Karl Strauch
Director, Cambridge Electron Accelerator
Professor of Physics
Harvard University

KS/mr

Enclosure

PRINCETON UNIVERSITY
PALMER PHYSICAL LABORATORY

Department of Physics

Palmer Physical Laboratory
Post Office Box 708
Princeton, New Jersey 08540

APR 7 1969

April 1, 1969

Dear Committee member:

Enclosed is a copy of the report to President Pitzer regarding the most recent meeting of the SPC. I had more than the usual amount of feedback and trust that my melding of opinion is satisfactory.

If any of you know any rich widows interested in contributing to colliding beams.....I think that's what we need now.

Best wishes to you all,

Val

Val L. Fitch

VLF/jlw

Enclosure

March 28, 1969

Professor Matthew Sands
SLAC, P.O. Box 4349
Stanford, California 94305

Dear Matt:

Thanks for your letter of March 24 regarding the elastic form factor. I have thought about it, and am afraid you are right and I am wrong.

I am very sorry that I did not pay enough attention to your remarks which you made to me during my last visit. If I had, I would have included that statement in that article. What I had in mind and what many people who make the same statement have in mind, is the fact that the strong fall-off of the elastic form factor excludes the finite probability of a bare proton.

I will use the next occasion to correct this mistake.
With best regards,

Yours sincerely,

Victor F. Weisskopf

STANFORD UNIVERSITY

STANFORD LINEAR ACCELERATOR CENTER

Mail Address
SLAC, P. O. Box 4349
Stanford, California 94305

Matthew Sands

March 24, 1969

Professor V. F. Weisskopf
Chairman, Department of Physics
Massachusetts Institute of Technology
Cambridge, Massachusetts 20139

Dear Viki:

I am sorry to see that you are propagating what I consider to be a misconception--although it seems to be shared by many high-energy theorists.

You say in "An Amateur's View" that the q^{-4} fall-off in the form factor of elastic electron scattering means that there is no core. Why do you believe this?

When one measures elastic scattering one insists that there be no excitations of internal modes or break-off of pieces. The elastic form factor says something about how the internal pieces are bound together but not about the dimensions of the pieces.

The "Rutherford" experiment (of Geiger and Marsden) did not measure "elastic" scattering on the atom but total scattering on a constituent (the nucleus). I do not believe the atom remains in one piece.

When one observes the elastic e - d scattering one cannot conclude from the rapid fall-off that the deuteron has no internal hard pieces. One can, in fact, see the internal pieces from the inelastic (called quasi-elastic) scattering.

Imagine that the nucleon was made up of a hard core with a pion cloud around it. If you hit the core hard, you leave the pion behind. The elastic scattering measurements subtract off such a contribution; it is included only in the "inelastic" form factor.

Why do you believe that the elastic form factor says there is no hard electrical core?

Warmest greetings!

Matt

Matthew Sands

MS:br

INFORMAL CONFERENCE ON 1500 GeV PHYSICS

We plan to hold a one-day meeting at Princeton, with the tentative date of May 26, 1969, on two related topics:

a) Physics in the 10^{12} e.v. energy range
b) Participation by Americans in research at the CERN ISR.

The meeting will be proceedings-free, unrecorded, and as informal as possible.

For topic (a) we plan to have not more than two or three invited talks, on the subjects of current experimental information relating to proton-proton reactions in the ISR energy range and the present status of experiment planning for the ISR.

Topic (b) will probably be dealt with in a round-table discussion.

We are sending this announcement generally only to one physicist at each university or laboratory, and would appreciate your advertising it to others.

Suggestions for changes in format or additional related topics are also welcome.

If you plan to attend the meeting, please let us know as soon as possible, preferably by May 1st.

Please address correspondence in connection with this meeting to

Dr. William ASH
Palmer Physical Laboratory
Princeton University
Princeton, New Jersey 08540.

We look forward to your participation.

Sincerely,

(William Ash)

Gerard K. O'Neill

(Gerard K. O'Neill)

Frascati, March 27, 1969

PRINCETON UNIVERSITY
PALMER PHYSICAL LABORATORY

Department of Physics

Palmer Physical Laboratory
Post Office Box 708
Princeton, New Jersey 08540

March 27, 1969

Dr. Kenneth S. Pitzer
President
Stanford University
Stanford, California

Dear President Pitzer:

The meeting of the Scientific Policy Committee for the Stanford Linear Accelerator, which was held at the Center on March 14, 15, 1969, reviewed a number of recent laboratory decisions as well as problems originating from the funding and spending restrictions recently imposed by the AEC. The Committee's comments on the various subjects follow. We wish to call your special attention to the proposal for implementing a colliding beam experiment discussed under the heading "Future Equipment Studies."

Program Advisory Committee Actions and Outside Users

The Committee made its regular review of the actions of the P.A.C. The utilization of SLAC facilities by outside users is continuously reviewed by the Committee. The intrinsic difficulties associated with the highly specialized techniques required in the use of SLAC facilities appear to have been overcome by the efforts of the SLAC staff. The Committee is pleased to note that outside use has now reached the point where 40-60% of the counter-spark chamber activity is by outside users and 70% of the bubble chamber pictures are taken for other than Stanford groups. The approved schedule runs into late Fall of 1969 and makes full utilization of the many secondary beam facilities.

Long-Range Planning

In accordance with its request, the Committee was presented with a description of the laboratory's long range plans. These have been presented to the AEC as construction budget assumptions for the next five years. Three construction items that had appeared either in previous plans or that now appear in this plan were discussed by the Committee:

(1) The "Stage 1 1/2" improvement program that had appeared in earlier plans has now been dropped for the present time in view of the promise for the future of the cryogenic accelerator.

(2) The design and construction of an improved accelerator at SLAC based on the cryogenic developments are shown in the plan as beginning in FY'71 with full authorization in FY'73. A small design and development effort serving to maintain close contact with the work going on at HEPL will be continued at SLAC during FY'70. The change in direction from the Stage 1 1/2 plan to the cryogenic plan seems to the committee to be desirable in view of recent rapid developments in the cryogenic accelerator technology.

(3) The full scale colliding beam facility that has appeared in many previous plans, and which has been strongly supported by the Committee, has been removed as a construction item. This has been replaced, however, by a project of reduced scope which the laboratory is prepared to implement in much the same way as other major experiments - by designing the beams within existing groups, by acquiring the required beam transport equipment, and by providing for the minor construction items using AIP funds. As such, this proposal is discussed in the following section.

Future Equipment Studies and the Colliding Beam Storage Rings

The Committee reviewed the laboratory's plans for major new experimental equipment. SLAC has been operating for over two years and the lead time for major new items of equipment is at least two years. The Committee shares the concern of the laboratory management that steps to acquire new equipment must be taken in the near future.

Three major projects were reviewed: The electron-positron colliding beam storage ring, the improvement of the 40" hydrogen bubble chamber by increasing the magnetic field to 70 kilogauss, and a large spectrometer with wire spark chambers for meson spectroscopy.

The Committee emphasizes that the colliding beam storage ring is the most important single item which the laboratory can add to its facilities. The very significant physics problems which can be attacked with the colliding beams simply cannot be approached in any other way. SLAC is unique in the U.S. as a location for the project.

As now proposed by SLAC the colliding beams have been reduced in energy (from a maximum of 3 GeV to 2 GeV per ring) from the full-scope design proposed in the past. This has allowed significant cost reduction and in our opinion represents a scientifically valid compromise.

The Committee feels that extraordinary efforts should be made to realize the colliding beam experiments at SLAC. The Committee also feels that it would be highly unfortunate if administrative procedures such as the rigid categorization of financial resources were to impede or prevent the project from going forward.

Computer Facilities at SLAC

The formation of the Laboratory Computer Policy Committee was discussed. This committee, which considers the problems arising with respect to the central computer facility (IBM 360/91) and with respect to on-line computation problems, will fulfill an important planning need.

C. Dickens briefed the Committee on the operating experience with the newly installed IBM 360/91 facility. So far this experience is encouraging, both with respect to the mean time between failures for both hardware and software, and with respect to the throughput of computational jobs.

W. Miller reviewed the laboratory's proposal for on-line computation. Considerable progress has been made in planning future acquisitions since the briefing held during the meeting of Feb. 9-10, 1968. It should be noted that on-line computers are considered by the laboratory as community property, available for assignment to inside and outside users.

Spectrometer Facilities Group

The objectives and organizational structure of the recently constituted Spectrometer Facilities Group were reviewed. The group was established for facilitating the use of end station A spectrometers. The establishment of this operations group should make it easier for all users, both inside and outside, to make effective use of this complex and unique facility.

Reports on Recent Experiments

It is always a pleasure for the Committee to hear brief reports on the fine experiments being performed. We heard this time of the total cross-section work of Caldwell et al., from UCSB; the details of the highly successful monochromatic γ-beam from electron-laser beam collisions; and an account of the work being done with the K_2^o beam through the bubble chamber with associated counters to acquire time-of-flight information.

Date and Agenda for Next Meeting

The Committee has agreed to meet next on September 26, 27, 1969. In addition to the regular review of PAC actions and machine operation the

Committee would like to be briefed on the FY'70 budgetary impact, the status of colliding beams at SLAC and recent experimental results. A brief report on the result of including disadvantaged people in the program at the laboratory would be interesting.

Sincerely,

Val L. Fitch

Val L. Fitch, Chairman

W. Fry	R. Sachs
N. Kroll	J. Sandweiss
B. D. McDaniel	K. Strauch
L. Madansky	H. Ticho
R. Rau	W. Wenzel

Absent: M. Gell-Mann
D. Nagle
V. Weisskopf

VLF/jlw

Pending

March 12, 1969

Dr. Harold K. Ticho
Department of Physics
University of California
Los Angeles, California 90024

Dear Harold:

Thanks very much for your letter of March 4 in regard to the problem of the NAL Users. I am glad that you are the chairman of the Users' Organization, since I am sure that the problems will be in good hands.

I believe it is a good idea to discuss the problems with HEPAP. Before making a definite date, however, I wonder whether you could give me a little more detailed account of the problems than is contained in your letter. I would then submit your letter to the HEPAP members and discuss with them the form in which HEPAP can contribute to the solution of your problems.

Sincerely yours,

Victor F. Weisskopf

UNIVERSITY OF CALIFORNIA, LOS ANGELES

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

DEPARTMENT OF PHYSICS
LOS ANGELES, CALIFORNIA 90024

March 4, 1969

Professor Victor F. Weisskopf
Massachusetts Institute of Technology
Department of Physics
Cambridge, Massachusetts 02139

Dear Vicki:

As you may have heard, I have been recently elected Chairman of the Executive Committee of the NAL Users Organization and it is in this capacity that I write to you.

At the last meeting of the Executive Committee there was an extended discussion of how prospective users of the 200 Bev accelerator can secure funds for the planning of experiments at NAL. In brief, an imbalance between in-house and user participation in the experimental program is bound to arise if, at the present time, users can participate only by curtailing their on-going programs. At the end of the discussion, I was charged to discuss with HEPAP, URA and NAL the means which are or might be made available to users to permit their participation in the preparation of experiments for NAL. It is my impression that what is needed most in the near future is a number of fellowship-type positions which would permit Universities to send post-doctoral personnel to NAL for extended periods of time to participate in the physics programs.

The Users Organization would be grateful to you for bringing this subject to the attention of HEPAP and for any advice which you can provide. If you regard it as useful, I shall be pleased to meet with you and/or with the members of HEPAP to explore this matter in more detail.

Sincerely,

Harold.

Harold K. Ticho,
Chairman

HKT/mlo

file copy

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF PHYSICS
CAMBRIDGE, MASSACHUSETTS 02139

March 12, 1969

TO: ALL HEPAP MEMBERS

Dear Friends:

You receive here enclosed the rest of the chapters of the Report in a version which, I hope, will be the final one. Please read it over carefully and let me know of any corrections you find necessary.

Let me draw your attention to three controversial points; they are in Chapter VI.

The first one on page 9, second paragraph is the omission of the following sentence. "It would seem to be appropriate if a small fraction of the annual operating funds could be provided for long-range development of instrumentation in the same spirit that advanced accelerator technology gets funded." We felt that such a proposal goes further into the direction of being told what to do with the money than would be good for university groups. We believed that university groups can do such studies without special funding.

The next point is the last sentence on page 10. With respect to this sentence, I would like to have the opinion of each of you and also an indication of how strongly you feel that it should be retained or omitted, whatever the case may be.

The third question is whether the second paragraph on page 17 is alright or whether one should also include the Phase I of the Berkeley development.

There may be other controversial points in this as well as in other chapters which I have not specifically mentioned.

I assume that you will pay special attention to Chapter II in which every statement is controversial.

This shipment does not contain any of the three appendices. I assume that you are in the possession of Appendix C, "An Analysis of Work With Bubble Chambers and Film Chambers . . ." which was distributed by Earle Fowler at the last HEPAP meeting. Appendix B, "High Energy Physics Manpower Survey" has been sent to you in the form of a draft dated 12/30/68. Appendix A, "New Accelerator Technology" is in the process of being xeroxed and will reach you in due time.

In spite of these remarks, I hope that the present version will be acceptable to you and I hope that we can soon finalize our Report. Reading it over again gives me the impression that it is an excellent Report; and we can be proud of its content. It may be that we have spent much too much time on this Report, but the result is still impressive and may even do some good in the end.

With best regards,

Yours sincerely,

Viki

Victor F. Weisskopf

file copy

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF PHYSICS
CAMBRIDGE, MASSACHUSETTS 02139

March 5, 1969

TO: All HEPAP Members & Hildebrand

Dear Friends:

I am sending you, hopefully, the final draft of the Preface and the first three chapters which, after all, comprise the most important part of our Report. The rest of the Report will be sent to you very soon, possibly within one week.

Please look it over carefully and let me know immediately if any important changes have to be made. Typographical changes and changes of a few words can be made when it will be finally transformed into the final edition. After you have received the entire Report, I would like to receive from each of you a letter expressing your approval if you feel like doing so.

I would like to inform you that I have sent the first three chapters to the AEC marked "draft" and also to DuBridge's office. The latter action was made with the unofficial approval of the Research Division.

Yours sincerely,

V. F. W.

Victor F. Weisskopf

February 28, 1969

Dr. William Wallenmeyer
Research Division
Atomic Energy Commission
Washington, D. C. 20545

Dear Bill:

Here enclosed you will find the first three chapters in their present form and the letter I wrote to DuBridge. I believe that it is important to inform DuBridge and his staff of the situation in high energy physics, and I hope I haven't infringed on ~~your~~ too many rules and regulations.

I also enclose in this shipment to you (not to DuBridge) the Preface of the Report which you have not yet seen. I would appreciate any critical remarks to this Preface and to the other three chapters.

With best regards,

Yours sincerely,

Victor F. Weisskopf

February 28, 1969

Dr. Lee DuBridge
Special Assistant to the President
for Science and Technology
Executive Office Building
Room 203
17th and Pennsylvania Ave., N.W.
Washington, D. C.

Dear Lee:

Here enclosed I am sending you what I think is the final draft of the first three chapters of the HEPAP Report concerning the future of high-energy physics in the United States. The remaining seven chapters are more detailed descriptions of the different phases in high-energy research; they are of lesser importance, for the problems of future planning and funding. Your office will receive them as soon as they are ready.

Please consider this as private information directed to you personally, since HEPAP is supposed to report to the Atomic Energy Commission. Hence, any official disclosures of the content of the report before having been officially transmitted to the AEC would be out of order. I am sure you understand the situation; I thought it to be of great importance, however, that your office is informed of the content of the report at the earliest possible date. I did not ask official permission for this, but did inform Bill Wallenmeyer who is the head of the High Energy Research Division of the AEC.

I hope this report will be useful to you. With best regards,

Yours Sincerely,

Victor F. Weisskopf

Proofed &
Mailed To
Hepage

UNLV

2/11/69

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

MAR 4 1969

FEB 26 1969

Professor Victor F. Weisskopf
Department of Physics
Mass. Institute of Technology
Cambridge, Massachusetts 02138

Dear Viki:

In your letter of February 13, 1969, referring to the FY 1970 budget submitted to Congress, you express the gratification of HEPAP with the inclusion of a substantial sum of construction funding for the 200 Bev project, but point out the deep concern of HEPAP with the alarming downward trend in the funding of the remaining base program - a decrease of over $12 million or about nine percent from the FY 1969 funding. We too are deeply troubled by the funding levels in the FY 1970 budget and recognize that they pose many serious problems for the high energy physics program as well as for other basic research programs. We will continue to seek opportunities to secure relief from this situation. However, I must point out that in all reality the likelihood of further decreases far outweighs the possibility for any increase.

As you are aware, we too place high priority on establishment of a colliding beams research program at SLAC and we continue to seek means to start the project as early as possible. Again, however, I am discouraged about the probability of providing any additional funds to SLAC in FY 1970 for this effort. On the other hand, we are most encouraged about the prospects for including a reduced scope colliding beams project in the FY 1971 budget and I would expect the Commission to give the project very high priority for that year. In the event that FY 1971 funding is the only alternative, I sincerely hope we can give the SLAC design group adequate support and assurance so that they will continue to push ahead for one more year.

I am directing your letter and a copy of my reply to the Commission for their information.

With warm regards and best wishes.

Sincerely,

Paul W. McDaniel, Director
Division of Research

MEPAP Internat'l

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
LABORATORY FOR NUCLEAR SCIENCE
CAMBRIDGE, MASSACHUSETTS 02139

February 19, 1969

Professor W. K. H. Panofsky, Director
Stanford Linear Accelerator Center
P. O. Box 4349
Stanford, California 94305

Dear Pief,

As was discussed in our telephone conversation, I am writing a brief summary of the reactions of the group at M. I. T. to your suggestions.

As we understand your ideas, the United States would propose to send the M. I. T. 500 liter bubble chamber to Serpukhov. As part of the proposal, the plan would be to first test the 500 liter chamber with liquid hydrogen in the U. S. It would be expected that Serpukhov personnel would take an active part in this test run. After the chamber arrived in Serpukhov, the Serpukhov personnel would be responsible for the operation of the chamber (U. S. personnel might be available for consulting and advice during the initial start up of the chamber at Serpukhov).

Of course, the Serpukhov people may prefer that the chamber first produce tracks at Serpukhov, without the preliminary U. S. test run. This would shorten the time for transferring the chamber to Serpukhov and would also decrease the expense to the U. S. This, however, would raise problems as to the amount of technical aid the U. S. could give to Serpukhov for the initial testing period, but this disadvantage may be outweighed by other considerations.

Professor W. K. H. Panofsky February 19, 1969

I have discussed the above ideas with the group at M. I. T. and with Peter Demos. The consensus is that M. I. T. would be very willing to cooperate with the suggested program. Peter Demos stressed the point that if all this came to fruition, it would be very desirable that M. I. T. receive a reasonable share of the film that the chamber might produce.

If I can be of further assistance, I would be happy to do anything to aid your plans.

With best regards,

Irwin A. Pless

Irwin A. Pless

IAP/jk

cc: Professor P. T. Demos

2/27

Repak

Corres

Re: Report

from HB

Monday, Feb. 17, 1969

Dear Vicki,

I worked on the chapter on University Participation during the week-end, and made a revised draft which you should receive in a day or two. I am now on a plane to Washington for a 3-day NSF fellowship panel meeting. Therefore, I have asked a secretary to send you the draft directly, even though I will not have a chance to proof-read it. (I hope it will be O.K.? My regular secretary is sick today and I had to get a different one to do it.)

My attempts to rewrite the chapter completely were a failure, so I ended up making only relatively minor alterations. If you think you can improve it further, I encourage you to do so.

I received your revised Chapter II this morning and ~~will try to~~ have read it over briefly. I still think the organization of the recommendations and the manner of presenting them could be improved and may try to finish the alternative draft I was working on. However, it can't possibly be done by Friday; I won't even be home by then.

With best regards,

Bob.

STANFORD UNIVERSITY

STANFORD LINEAR ACCELERATOR CENTER

Mail Address
SLAC, P. O. Box 4349
Stanford, California 94305

February 18, 1969

Professor V. W. Weisskopf, Chairman
Department of Physics
Massachusetts Institute of Technology
Cambridge, Mass. 02139

Dear Viki:

I have received your rewrite of Chapter II and would like to make a number of comments, some of which are substantive.

Page 1 - I think the term "impact" on line 5 of the first paragraph is poorly chosen. It could have positive or negative connotations. Some phrase indicating the inspirational or leadership qualities of the high energy physics work on the entire basic research program would be better.

The last sentence in the first paragraph understates the problem by not pointing out the difference between high energy physics support and other sciences. I would suggest the following alternative: "In the past four years the support of all our basic science has lagged behind the needs, both scientific and educational; however, although the balance of basic academic science has shown some growth during the past years the support of high energy physics has been essentially level and, if inflationary factors are taken into account, corresponds actually to a decreased level of effort. This has occurred in the face of new major facilities having gone into operation, and therefore this pattern has led to a point where growth and vigor have been notably restrained."

Second paragraph, page 1 - I suggest you add "exceedingly" before "important" on line 3.

Page 2, second paragraph - Again I think that in the last sentence the phrase "The present lack of adequate support" is understating the case. I suggest a substitution: "However, support for the other laboratories has actually decreased in the face of increasing needs; this is sapping the strength . . ."

Page 2, paragraph 3 - The phrase on line 2 "as second to none" is debatable. Equipment at DESY is considerably superior to CEA and much equipment at CERN is superior to AGS. I suggest deletion of the phrase.

Page 3, item 2 - I feel this paragraph underemphasizes the point which is persistently ignored, namely that without innovation and apparatus and without expansion of plant a base of equipment funding is needed to sustain a normal experimental program, and therefore the remarks made in this paragraph refer to funding above that base. In general I think this paragraph is much too mild considering the drastic decrease from FY'69 to FY'70 in equipment funding.

Page 5 - I am fairly unhappy about the way the recommendation on the bubble chamber at NAL is now written and I am very unsure as to what conclusion was actually reached at HEPAP. As I understand the situation it appears that what we are now in fact endorsing is completion of the 70' chamber construction and the 25' by BNL for ANL and moving the 12' chamber from ANL to NAL, all under the aegis of neutrino physics. As a minimum I feel that we should not agree to the difference in priority between the 25' chamber and the 12' chamber move implied in the recommendation but should endorse both of them in parallel. Otherwise I personally feel that we could well be accused of irresponsibility in giving high priority to construction of something new while we are not pushing for exploitation of the already authorized chamber.

Page 6 - Should item 4 on Cosmic Rays be moved to Section A of this chapter since it really relates to support of ongoing programs?

Page 7, item 5 - I think that the term "beneficial" in line 4 is too mild. There have been several developments (ERA, the streamer chamber) which have directly sprung from Soviet inventions. I also think that the term "beneficial" relating to contact with Western Europe is even more inadequate to describe the importance of this relationship.

Page 8 - The first sentence is confusing as to when we are talking about scientific research in general and high energy physics in particular. I suggest rewording such as "The following projections for the future development of high energy physics are made under the assumption of a moderate rate of growth of support of all our scientific research, and in particular of the growth of high energy physics sufficient to keep this fundamental subject alive and productive." O.K.

Page 9 - I suggest in paragraph 2 that we omit the phrase "However the ways in which storage rings contribute to high energy physics are still quite uncertain." In the time frame in which we are talking in relation to the 2000 GeV machine this uncertainty is no greater than that of many of the other factors relating to a 2000 GeV decision. If this phrase is omitted the next sentence should start with "However, these devices . . ." I do not like the phrase "Therefore we believe that an accelerator with an energy of about 2000 GeV will be essential for the

future" in the third paragraph on this page. I think one should say "will become essential after this decade" to be more correct.

Page 10 - The list of future techniques has ignored the superconducting microwave accelerator technology which has immediate potential for electron machines and long-range potential for proton machines also, at least according to the proponents. The last phrase on the bottom of page 10 "appear to be" should be changed to "will become" since obsolescence of existing facilities is certainly predictable.

Page 11 - I suggest changing the phrase in line 4 of the second paragraph as follows: ". . . will have many new interesting phenomena which require more intensive investigation than is possible at NAL. Because of this belief our projections include plans for revitalizing . . ." The English in the middle of page 11 is mixed up.

Page 12 - I think the cautionary remark in the last paragraph refers to the entire report rather than just to Section C, and therefore one should write "The remarks in this report represent in our collective judgment the best response to those opportunities now feasible in the field of high energy physics . . ."

I hope that you will not get too many conflicting opinions on this chapter so that we can put the project to bed.

With best regards,

W. K. H. Panofsky
Director

cc: B. Hildebrand
H. Blewett

THE UNIVERSITY OF MICHIGAN
ANN ARBOR

THE HARRISON M. RANDALL LABORATORY
OF PHYSICS

TEL. NO. 313—764-4437

February 18, 1969

Professor Victor F. Weisskopf
Department of Physics
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

Dear Viki:

Section II (Draft #2 of 2-14-69) is quite good now. Only a few minor suggestions:

The 'therefore we recommend' still sounds pompous. Perhaps if you didn't underline it.

B.1 p. 4, line 16: add 'the' before 'delayed' - otherwise you might be discussing future delays.

B.3 p. 5: Some lack of distinction here between e^+e^- ("pure" energy) and e^-e^-.

C. p. 12: Last paragraph. There are only two actual recommendations in C; the paragraph applies to the projections also.

Best regards,

Kent

Kent M. Terwilliger

KMT:aa

COMMENT BY C. N. YANG ON

FINAL DRAFT

Chapter 1

Besides minor changes, I suggest that one paragraph on page 10 and one on page 11 be deleted as indicated. Furthermore, some wordings are changed on page 11.

Chapter 2

The final version of February 14 has left out any mention of the superconduction electron linear accelerator through reshuffling of the paragraphs.

I suggest that the paragraph on page 9 about international collaboration for a 2000 GeV accelerator be deleted. Injection of international collaboration is likely to cause interminable delays. (We may be forced to that, but there is no need now to put on the record this possibility.)

Chapter 4

I have made some extensive revisions of this chapter. Mostly, I took away strong adjectives, made the discussion more addressed to general audiences, shortened it, and reorganized the order of presentation.

Chapter 8

Insertion of a paragraph on p. viii-4.

Chapter 9

Very good. I have minor suggestions on pp. 1, 5 and 6.

THE UNIVERSITY OF CHICAGO
CHICAGO · ILLINOIS 60637
THE ENRICO FERMI INSTITUTE
5630 ELLIS AVENUE
AREA CODE 312, 667-4700

Office of the Director

February 20, 1969

Professor V.F. Weisskopf
Department of Physics
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dear Viki:

I am writing in regard to draft number 2 of Chapter II of the HEPAP Report. I still find the style of our presentation of each recommendation rather unattractive. It seems to me that we could replace in each of these paragraphs the phrase "therefore we recommend" with simply the one word "recommendation:". That might remove some of the feeling of the flare of trumpets and the rolling of drums.

I have a few more specific comments as follows:

1) Page 3, Line 1: I would suggest replacing this clause by "in order to extract a return in research that is concomitant with the investments already committed." As it stands, this sentence gives the impression that we are holding back in the quality of our work.

2) Page 4, Beginning on Line 5, Paragraph B1: I do not think that this sentence will be understood to relate to delays that took place before authorization was forthcoming for NAL. I think it would be improved if the phrase "resulting from delayed construction authorization" were replaced by "resulting from delays in getting the project started".

3) Page 5, Paragraph 3: The order in which these recommendations are made does not seem to me to be good politics. Since the Argonne 12' chamber exists, it would seem that one should first suggest maintaining the option to move that chamber and then to supplement the statement with the recommendation for construction of a new chamber. I still have the feeling that we haven't given enough consideration to the reasons for constructing the new chamber, especially in view of all of the other problems that we face in regard to the funding of existing programs.

4) Page 8: You will note that there is repetition in the statement of our beliefs in the third paragraph and in the fifth paragraph, although the wording is slightly different. It seems to me that these two statements could be tied together with some saving of words.

5) Page 9, Line 2, Paragraph 3: The word "essential" is too strong. The phrase "will be in great demand in the future" might be better.

I think the whole document looks better now, although I am still worried about its length.

Sincerely,

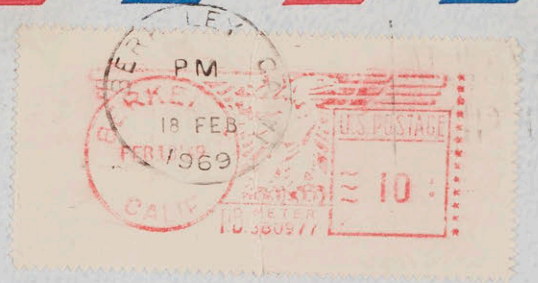
Bob

Robert G. Sachs

RGS/ls

cc: Mr. B. Hildebrand

E. J. Lofgren
UNIVERSITY OF CALIFORNIA
LAWRENCE RADIATION LABORATORY
BERKELEY, CALIF. 94720



VIA AIR MAIL

Professor V. F. Weisskopf
Massachusetts Institute of Technology
Department of Physics
Cambridge, Massachusetts 02139

SUGGESTIONS AND COMMENTS ON
CHAPTER II, DRAFT #2, 2/14/69

E. J. L.
February 18, 1969

With regard to form, I think that we should not underline therefore we recommend. We should inset the margin of the recommendations so that they stand out and we should place the numbers immediately adjacent so that it is easier to refer to a particular recommendation.

With regard to organization, B5, international exchanges, etc., is concerned with a current and continuing aspect of science and is therefore a bit out of place in section B. If the word "Funding" were taken out of the title of section A, the international exchanges would have a better place at the end of section A as A4.

Page 5, paragraph 3, first sentence

Delete first sentence and replace with:
"Colliding electron beams, that can be provided by storage rings, represent energy in a well defined form, ready to be transformed into many kinds of particles."

Page 9, last line

A comma is needed after the word "economy".

Page 10, last paragraph

Changes suggested as follows:

2. The National / high energy Laboratories and ~~National~~ Facilities, with their widely used installations and their experienced staffs, represent an irreplaceable asset to the high-energy-physics program of the United States, in terms of both productivity and diversity of approach. ~~Because~~ The new National Accelerator Laboratory, even if it were to be more fully exploited than is presently contemplated, can provide facilities only for considerably less than half of the nation's research groups. / For these reasons future modernization programs for some of the existing national laboratories ~~appear to be~~ are

Page 11, first paragraph

Changes suggested as follows:

We anticipate that the early results from research at NAL (and, perhaps even earlier, from results at the Soviet accelerator at Serpukhov) will show that the region around 100 Gev will have many new interesting phenomena and be worth intensive investigation. Because of this belief, our projections include the ~~possibility of revitalizing~~ revitalization of some of the existing high-energy laboratories through an increase in energy of proton and electron facilities into this range. ~~At present~~ It is anticipated that these modernization programs will make use of one or more of these new technologies, to establish ~~their~~ feasibility, and ~~their~~ scientific and economic advantages. Through such measures, our best laboratories ~~could~~ will be kept in a scientifically competitive condition, and the application of new technologies for this purpose ~~could~~ will, at the same time, provide means for evaluating the best method for reaching ~~the regions of~~ energies above 2000 Gev. Since the new technological developments are not yet sufficiently advanced, we cannot make definitive recommendations about the ways in which these aims can be realized.

SUGGESTIONS AND COMMENTS ON
CHAPTER II, DRAFT #2, 2/14/69

E. J. L.
February 18, 1969

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extras

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF PHYSICS
CAMBRIDGE, MASSACHUSETTS 02139

February 13, 1969

Dr. Paul McDaniel, Director
Division of Research
U. S. Atomic Energy Commission
Washington, D. C.

Dear Paul:

At the meeting of HEPAP in Cambridge on January 31 we were presented with the budget for FY 70 as submitted to Congress. Although we were gratified by the inclusion of a substantial sum for the construction of the 200 Bev accelerator, we are deeply concerned with the funding of the rest of the program. The figures submitted continue a downward trend in the funding. The negative effects of the previous year's budget developments will be amplified to an alarming degree.

The operational, equipment, and construction funds devoted to H.E.P., excepting the funds devoted to NAL, have been $141.566 million for FY 1969 (including the carry-over from previous years) but only $129.385 for FY 1970. This is a reduction of $12.18 million or almost 9 per cent. To this one must add the decrease in value of the dollar and one arrives at a cut in activities of approximately 13 to 14 per cent.

It was, in some ways, a miracle that the laboratories and universities could have maintained a record of very high-level research over the last few years despite the effective decrease in support. To a great extent, this is due to the fact that the results appearing in these years were the product of work carried out several years earlier. It will be impossible to maintain this record in the future in view of constantly diminishing support of current research at a time when newer facilities begin to get into full swing. May I call to your attention that the equipment budget will suffer a drop of $11.5 million from the funds available in FY 1969 to the ones allotted in 1970. This is especially deplorable in view of the precarious situation created by the abrupt decrease in the equipment budget during the recent years, as pointed out in our letter to you of December 20, 1968.

Again, the budget for 1970 does not allow the beginning of

construction of an electron storage ring at SLAC. HEPAP has repeatedly emphasized the importance of this project and has pointed out the loss for U. S. physics which results from the fact that we are no longer competitive with the rest of the world in this important research direction. The newly reduced project of SLAC requires only a relatively small amount of $1.8 million additional funding in FY 70. In view of the near-disaster situation in the present funding of the existing labs, we realize the difficulty of squeezing this amount from present allocations. All the more, we would like to encourage your office to seek means and ways to obtain this sum, in order to start a project which was strongly supported by the community of H.E. scientists since its inception five years ago.

With best regards,

Very sincerely yours,

Viki

Victor F. Weisskopf

CC: HEPAP Members

STANFORD UNIVERSITY

STANFORD LINEAR ACCELERATOR CENTER

Mail Address
SLAC, P. O. Box 4349
Stanford, California 94305

February 6, 1969

FEB 11 1969

Professor V. F. Weisskopf, Chairman
Department of Physics
Massachusetts Institute of Technology
Cambridge, Mass. 02138

Dear Viki:

We have drawn up a table from the information furnished to us at the last HEPAP meeting which documents the change in obligational authority from FY'69 to FY'70, not including the NAL accelerator. This demonstrates the statement that in fact the labs other than NAL may obligate only $12 million less than the year before.

I thought you might find this information useful in connection with the last paragraph in the fiscal implications chapter which Hildred is going to add and in case you discuss the status of high-energy physics further with DuBridge.

Best regards,

Pief

W. K. H. Panofsky
Director

enc.

cc: H. Blewett w/enc.

AEC U.S. HIGH-ENERGY PHYSICS PROGRAM

FY'70 Changes in Obligational Authority Relative to FY'69 (in thousands)

		FY 1969	Pres. Budget FY 1970	Change FY1970 → FY1969 Not including 200 BeV
A.	OPERATING			
	Total	$118,675	$124,100	
	PPA	7,940	8,035	
	CEA	8,025	7,960	
	BNL	21,325	22,000	
	ANL	17,400	17,600	
	LRL	17,600	17,700	
	SLAC	23,550	24,600	
	200 BeV	3,875	7,000	
	Gen. R&D	18,960	19,205	
	Total less 200 BeV	$114,800	$117,000	$ 2,200
B.	EQUIPMENT			
	Total	$ 21,766	$ 13,915	
	ANL	3,950	2,100	
	BNL	4,050	2,600	
	CEA	1,630	450	
	LRL	1,470	985	
	PPA	1,425	400	
	SLAC	7,300	2,600	
	200 BeV	730	4,400	
	Other	1,211	380	
	Total less 200 BeV	$ 21,036	$ 9,515	-$11,521
C.	AIP (Accelerator Improvement Projects)			
	Total	$ 5,730	$ 2,870	-$ 2,860
	ANL	1,775	650	
	BNL	1,295	700	
	LRL	1,440	680	
	CEA	95	125	
	PPA	180	75	
	SLAC	945	640	
D.	Total change in obligational authority:			-$12,181

UNIVERSITY OF CALIFORNIA

LAWRENCE RADIATION LABORATORY
BERKELEY, CALIFORNIA 94720

Hepap
Repl

February 6, 1969

Professor Victor F. Weisskopf
Massachusetts Institute of Technology
Department of Physics
Cambridge, Massachusetts 02139

Dear Viki,

I would like to suggest something like the enclosed paragraph as an antidote to the worry that scientific merit and initiative might be stifled. Other suggestions have been sent to Hildred.

I would also like to propose the name of Leroy Kerth as a non-HEPAP member of the computer sub-panel. He has had extensive experience in computers applied to experiments with spark chambers and counters and has a strong interest in computers but is not a computer man.

Sincerely,

Ed.

E. J. Lofgren

EJL:amn

Enclosure

COMMENTS AND SUGGESTIONS

E. J. Lofgren
February 5, 1969

Chapter V, Fig. 1

The corrections I gave in my comments of January 28 and some additional ones are summarized:

			Source
ZGS	12 GeV	.16 μa	Bruce Cork
PPA	3 GeV	.16 μa	Milt White
AGS	32 GeV	.165 μa	Jim Sanford
Bevatron	6.2 GeV	.165 μa	Tom Elioff
Nimrod	7 GeV	.092 μa	ORNL Report ORNL-AIC-1, High Energy Accelerators - 1967, prepared for Sixth Int. Conf on High-Energy Accel., Cambridge, Mass.
Cern	24 GeV	.07 μa	
(at 28 GeV current is lower ~ .04 μa)			

Note by Walker dated December 31, 1968 on Preservation of Individual Initiative

I do not think that the objective of this statement is clear. I do believe that there could be a problem if recommendations were taken too rigidly or if people believed that they were excessively rigid when in fact they were not. I would propose something like the following as the closing paragraph of Chapter II:

2/18

Keep +
mail to
hapap
(when time permits)

Mailed
3/5/69

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

FEB 6 1969

Professor Victor F. Weisskopf
Department of Physics
Massachusetts Institute of Technology
Cambridge, Massachusetts 02138

Dear Viki:

Thank you for your timely and encouraging telegram of January 31, 1969, concerning the 200 Bev Accelerator. The Commission has long recognized this new high energy facility as its most important construction project. I can assure you that the Commissioners and I will continue to make every effort to fund this project to meet the Laboratory Director's schedule.

Cordially,

Chairman

Total HEP Support

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

FEB 14 1969

Honorable Chet Holifield
Chairman
Joint Committee on Atomic Energy
Congress of the United States

Dear Mr. Holifield:

During the Fiscal Year 1969 Hearings on the Atomic Energy Commission (AEC) Request for Authorization of Appropriations, and in its Authorization Report, the Joint Committee expressed interest in receiving information on the total Federal support being given to the national high energy physics program. In response to this interest we have prepared a special data tabulation and a brief narrative description of the high energy physics programs of the Federal agencies which are contained as enclosures to this letter.

We hope that this information will be helpful in your deliberations concerning our FY 1970 authorization request. If we can be of further assistance in this matter, please let us know.

Cordially,

Chairman

Enclosures:
As stated

U.S. HIGH ENERGY PHYSICS PROGRAM FUNDING SUMMARY
ALL AGENCIES (Millions of Dollars)

	FY 1966 Actual	FY 1967 Actual	FY 1968 Actual	FY 1969 Estimate	FY 1970 President's Budget
Operating Expenses:					
Atomic Energy Commission	$ 97.4	$107.7	$113.3	$118.7	~~$124.1~~ 122.6
National Science Foundation 1/	5.8	6.5	~~7.5~~ 4/	~~10.6~~ 2/ 12.9	~~10.6~~ 3/ 13.4
Department of Defense	4.7	6.1	2.3	1.4	1.0
National Aeronautics & Space Administration	1.5	1.4	1.8	1.6	1.6
Total Operating Expenses	$109.4	$121.7	~~$124.9~~ 126.5	~~$132.3~~ 133.0	~~$137.3~~ 138.6
Capital Equipment: (Obligations)					
Atomic Energy Commission	$ 21.3	$ 21.4	$ 15.7	$ 21.8 4/	$ 13.9
National Science Foundation	1.4	0.8	0.9	~~0~~ 5/	~~0.2~~ 6/ .4
Department of Defense	0	0.1	0.1	0.1	0.1
National Aeronautics & Space Administration	0	0	0	0	0
Total Capital Equipment	$ 22.7	$ 22.3	$ 16.7	$ 21.9	~~$14.2~~ 14.4
Sub Total	132.1	144.0	143.2	154.9	153.0
Construction: (Obligations)					
Atomic Energy Commission	$ 30.1	$ 31.1	$ 23.9	$ 46.4	~~$104.9~~ 98.9
National Science Foundation	3.6	4.7	2.8	0	~~0~~ .4
Department of Defense	0	0	4.4	0	0
National Aeronautics & Space Administration	0	0	0	0	0
Total Construction	$ 33.7	$ 35.8	$ 31.1	$ 46.4	~~$104.9~~ 99.3
Total	165.8	179.8	174.3	201.3	252.3

1/ Increases indicated for NSF in FY 69 and FY 70 ~~and potential increases indicated below in notes 2, 3, 5 and 6~~, include NSF funding of research programs formerly supported by the DOD.

~~2/ May be increased to $11.3 million by actions being considered within NSF.~~

~~3/ May be increased to $13.4 million by actions being considered within NSF.~~

4/ Includes $6.1 deferred from FY 1968 under the "FY 1968 cut back."

~~5/ May be increased to $0.2 million by actions being considered within NSF.~~

~~6/ May be increased to $0.4 million by actions being considered within NSF.~~

changes per Dr. Haworth's letter of 4/3/69

BRIEF DESCRIPTION OF NON-AEC HIGH ENERGY PHYSICS PROGRAMS

NSF

The NSF program provides support for high energy physics experimental and theoretical groups at a large number of universities, for a few cosmic ray research programs concerned with elementary particle phenomena, and for the Cornell 10 Bev electron synchrotron. The NSF supported experimental user groups perform their research primarily at the AEC supported high energy accelerators. In FY 1969 the NSF program includes $6.3 million for user group support at 26 institutions, $1.2 million for theory groups at 40 institutions, and $0.7 million for cosmic ray programs. The Cornell synchrotron was completed in 1968 at a cost of $11.4 million. The current annual rate of support for this facility is $2.8 million.

DOD

Within the DOD high energy physics support has been almost entirely through the Office of Naval Research (ONR) and the Air Force Office of Scientific Research (AFOSR). The ONR program, which formerly included support of many university research groups, now consists only of support of a few theory groups plus the work at Stanford University related to development of a superconducting linear accelerator. ONR's future plans for the Stanford University program contemplate support only for the cryogenic development effort. It is anticipated that support of the high energy physics activities at Stanford University will be assumed by the NSF. (This work at Stanford University is completely independent of the AEC supported program at the higher energy SLAC accelerator.) The AFOSR program primarily provides support for a number of university particle theory programs. The program also includes support of several cosmic ray groups and one experimental user group.

NASA

The NASA program consists of elementary particle research employing cosmic rays as a source and concentrating on detectors flown in balloons or in satellites.

January 1969

MEMBERSHIP LIST OF ADVISTORY PANEL ON HIGH ENERGY PHYSICS

Professor Victor F. Weisskopf (Chairman of Panel)
Head, Department of Physics
Massachusetts Institute of Technology
Cambridge, Massachusetts

1. Dr. Rodney L. Cool
Associate Director
Brookhaven National Laboratory
zip: 11973
or use:

CERN
1211 Geneva 23
Switzerland

2. Professor Earle C. Fowler
Department of Physics
Duke University
Durham, North Carolina

3. Professor Leon Lederman
Nevis Laboratories
Columbia University
Irvington, New York 10021

4. Dr. Edward J. Lofgren
Lawrence Radiation Laboratory
University of California
Berkeley, California 94720

5. Dr. George E. Pake, Provost
Washington University
Saint Louis, Missouri

6. Professor W. K. H. Panofsky
Director, Stanford Linear Accelerator
Stanford University
Stanford, California 94305

7. Professor Robert G. Sachs
Enrico Fermi Institute
University of Chicago
5630 Ellis Ave., Chicago,
Ill. 60637

8. Professor Keith R. Symon
Department of Physics
University of Wisconsin
Madison, Wisconsin

9. Professor Robert L. Walker
Department of Physics
California Institute of Technology
Pasadena, California 91109

10. Professor C. N. Yang
Director of the Institute for Theoretical Physics
State University of New York
Stony Brook, New York

11. Professor Kent Terwilliger
Randall Laboratory of Physics
University of Michigan
Ann Arbor, Michigan

* * *

12. Dr. William Wallenmeyer
Research Division
Atomic Energy Commission
Washington, D. C. 20545

13. Dr. Bernard Hildebrand
Atomic Energy Commission
Washington, D. C. 20545

(Dr. Hildebrand is Executive Secretary for HEPAP)

✓ = current 10/69

10-68

MEMBERSHIP LIST OF ADVISORY PANEL ON HIGH ENERGY PHYSICS

Professor Victor F. Weisskopf (Chairman of Panel)
Head, Department of Physics
Massachusetts Institute of Technology
Cambridge, Massachusetts

Enrico Fermi Institute
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5630 Ellis Ave., Chicago, Ill
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1 Dr. Rodney L. Cool
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Saint Louis, Missouri

6 Professor W. K. H. Panofsky
Director, Stanford Linear
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Stanford, California 94305

7 Professor Robert G. Sachs
~~Associate Laboratory Director~~
~~for High Energy Physics~~
~~Argonne National Laboratory~~
~~Argonne, Illinois~~

8 Professor Keith R. Symon
Department of Physics
University of Wisconsin
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9 Professor Robert L. Walker
Department of Physics
California Institute of
Technology
Pasadena, California 91109

~~Professor Robert R. Wilson~~
~~Laboratory of Nuclear Studies~~
~~Cornell University~~
~~Ithaca, New York~~

10 Professor C. N. Yang
Director of the Institute for
Theoretical Physics
State University of New York
Stony Brook, New York

11 Professor Kent Terwilliger
Randall Laboratory of Physics
University of Michigan
Ann Arbor, Michigan

12. Dr. William Wallenmeyer

13 Dr. Bernard Hildebrand

Research Division
Atomic Energy Commission
Wash., D.C. 20545

7/1/68 R. S. Sachs
Enrico Fermi Institute
University of Chicago
5630 Ellis Ave.
Chicago, Ill. 60637

HEPAP

Dr. Rodney L. Cool
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Nevis Laboratories
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Imperial College
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London, SW 7, England

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Laboratory of Nuclear Studies
Cornell University
Ithaca, New York

Professor C.N. Yang
Director of the Institute for
Theoretical Physics
State University of New York
Stony Brook, New York

per 10-68 attached

Confidential

ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE
CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

1211 GENÈVE 23, Suisse

LE DIRECTEUR GENERAL

Professor N.N. Bogolubov
Joint Institute for Nuclear
Research
Head Post Office
P.O. Box 79
MOSCOW USSR

JAN 31 1969

REF.: CERN/13.054

Genève, 27 January, 1969

Dear Professor Bogolubov,

Thank you very much for your letter of 19 December 1968. As I already mentioned in my telegramme, there was an enthusiastic response to your proposals and, as regards dates, the first weekend in September seems to be the most convenient one, since it would then follow the accelerator conference.

Regarding the list of participants, I assume that the arrangements will be similar to those of the last conference, i.e. we agree on a certain number of European participants and send you a list of their names in due course. We feel that about 12 people would be a reasonable representation of Western Europe, these including scientists from the leading European laboratories, corresponding to your proposal of the composition of the Soviet participation. We will therefore send you later a list of people from the Federal Republic of Germany, Great Britain, France, Italy and CERN. This would also be in accordance with your proposal of participants from the United States. I believe that Professor V.F. Weisskopf, in his capacity as Chairman of the High Energy Physics Advisory Panel, should be present. Furthermore, to have a reasonable balance, if some of the physicists from the United States whom you had on your list are unable to attend, it seems desirable that the corresponding laboratory be represented by a substitute.

./.

The programme as you formulated it corresponds closely to our plans and we will ensure that physicists constructing accelerators in Western Europe are appropriately represented. Concerning the length of the seminar, two full working days seems suitable.

Looking forward to hearing from you in due course, and with my best regards,

I am,

Yours sincerely,

Bernard P. Gregory

Bernard P. Gregory

P.S. On organisational matters, I have asked Professor W. Thirring to be responsible from our side for discussing the details of the programme with Professor Blokhintsev and his colleagues, while Dr. W.O. Lock will coordinate the administrative details for us, as in the previous years.

cc. Department Directors
Prof. L. Van Hove
Dr. W.O. Lock
Prof. W.F. Weisskopf

Confidential

Telex to: Professor N.N. Bogolubov, Director, Joint Institute for Nuclear Research, Moscow Region, USSR Telex No. 521.

THANK YOU FOR YOUR LETTER OF 19 DECEMBER CONCERNING GEORGIA SEMINAR ON PERSPECTIVES IN HIGH ENERGY PHYSICS STOP I AGREE FULLY WITH YOUR PROPOSALS STOP I HAVE HAD POSITIVE REACTION FROM PROFESSOR WEISSKOPF CONCERNING WIDENING ATTENDANCE AT SEMINAR STOP FOR DATE I SUGGEST FIRST WEEKEND IN SEPTEMBER AFTER ACCELERATOR CONFERENCE STOP LETTER FOLLOWS STOP BEST REGARDS

GREGORY
CERNLAB

WOL/dac
23.1.69

№ 2481/30

CERN/11267
27.12.68

December 19, 1968 г.

cc Directeurs de Département

cc. Prof L. Van Hove pour information

8.1.68. Ext

Prof. N.N.Bogolubov
Director
Joint Institute for Nuclear Research
Head Post Office, P.O.Box 79
Moscow, USSR

Prof. B.P.Gregory
Director-General
CERN, Geneva 23
Switzerland

Dear Professor Gregory,

Referring to our discussions during your stay at Dubna, I would like to suggest to hold the next Seminar on Perspectives in High Energy Physics in September next year in Georgia and put forward some ideas concerning this seminar for your consideration.

Weeke ~5678/64

We could prepare review reports on the trends in the physics of strong, weak and electromagnetic interactions. In addition, there will possibly be some other reports since we suppose to invite Prof. A.A. Logunov of Serpukhov, Prof. I.V. Chuvilo, Director of Institute of Theoretical and Experimental Physics, Prof. G.I.Budker of Novosibirsk and Prof. A.L.Alikhanian of Yerevan.

Besides those main reports, it seems appropriate to discuss the most promote perspectives in accelerator technique In this case I could ask Prof. Hints and Dr. Sarantsev to make reports at the seminar. It is desirable that a rather detailed report on the European Laboratory with a 300-GeV accelerator would be presented bearing in mind the fact that within a few months a final decision will probably be taken and the construction will be started.

2

Perhaps it would be useful to invite some leading scientists of major US research centres, e.g. Prof. E.M.Macmillan, Prof. W.K.H.Panofsky, Prof.M.Goldhaber and Prof.R.Wilson. I would like to know your viewpoint on this. As to the number of participants, I think it should be the same as at previous seminars, i.e. about 30.

I take this opportunity to let you know that Prof. D.I. Blokhintsev, Prof.A.N.Tavkhelidse and Dr. Yu.A.Shcherbakov will be responsible from our side for preparing the seminar.

Since the seminar will be held in the USSR, the Joint Institute will be in charge of all the organising matters.

With best personal regards,

Sincerely yours,

N. Bogolubov

N.N.Bogolubov

3

cc. Department Directors
Prof. L. Van Hove
Dr. W.O. Lock
Prof. W.F. Weisskopf

Confidential

Telex to: Professor N.N. Bogolubov, Director, Joint Institute for Nuclear Research, Moscow Region, USSR Telex No. 521.

THANK YOU FOR YOUR LETTER OF 19 DECEMBER CONCERNING GEORGIA SEMINAR ON PERSPECTIVES IN HIGH ENERGY PHYSICS STOP I AGREE FULLY WITH YOUR PROPOSALS STOP I HAVE HAD POSITIVE REACTION FROM PROFESSOR WEISSKOPF CONCERNING WIDENING ATTENDANCE AT SEMINAR STOP FOR DATE I SUGGEST FIRST WEEKEND IN SEPTEMBER AFTER ACCELERATOR CONFERENCE STOP LETTER FOLLOWS STOP BEST REGARDS

GREGORY
CERNLAB

WOL/dac
23.1.69

№ 2481/30

CERN/11267
27.12.68

December 19, 1968 г.

Prof. N.N.Bogolubov
Director
Joint Institute for Nuclear Research
Head Post Office, P.O.Box 79
Moscow, USSR

cc Directeurs de Département
cc. Prof. L. Van Hove pour information
8.1.68.

Prof. B.P.Gregory
Director-General
CERN, Geneva 23
Switzerland

Dear Professor Gregory,

Referring to our discussions during your stay at Dubna, I would like to suggest to hold the next Seminar on Perspectives in High Energy Physics in September next year in Georgia and put forward some ideas concerning this seminar for your consideration.

Weeke ~ 5678/64

We could prepare review reports on the trends in the physics of strong, weak and electromagnetic interactions. In addition, there will possibly be some other reports since we suppose to invite Prof. A.A. Logunov of Serpukhov, Prof. I.V. Chuvilo, Director of Institute of Theoretical and Experimental Physics, Prof. G.I.Budker of Novosibirsk and Prof. A.L.Alikhanian of Yerevan.

Besides these main reports, it seems appropriate to discuss the most promote perspectives in accelerator technique In this case I could ask Prof. Mints and Dr. Sarantsev to make reports at the seminar. It is desirable that a rather detailed report on the European Laboratory with a 300-GeV accelerator would be presented bearing in mind the fact that within a few months a final decision will probably be taken and the construction will be started.

2

Perhaps it would be useful to invite some leading scientists of major US research centres, e.g. Prof. E.M.Macmillan, Prof. W.K.H.Panofsky, Prof.M.Goldhaber and Prof.R.Wilson. I would like to know your viewpoint on this. As to the number of participants, I think it should be the same as at previous seminars, i.e. about 30.

I take this opportunity to let you know that Prof. D.I. Blokhintsev, Prof.A.N.Tavkhelidze and Dr. Yu.A.Scherbakov will be responsible from our side for preparing the seminar.

Since the seminar will be held in the USSR, the Joint Institute will be in charge of all the organizing matters.

With best personal regards,

Sincerely yours,

N. Bogolubov

N.N.Bogolubov

3

Confidential

ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE
CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

1211 GENÈVE 23, Suisse

LE DIRECTEUR GÉNÉRAL

Professor N.N. Bogolubov
Joint Institute for Nuclear
Research
Head Post Office
P.O. Box 79
MOSCOW USSR

JAN 31 1969

REF.: CERN/13.054

Genève, 27 January, 1969

Dear Professor Bogolubov,

Thank you very much for your letter of 19 December 1968. As I already mentioned in my telegramme, there was an enthusiastic response to your proposals and, as regards dates, the first weekend in September seems to be the most convenient one, since it would then follow the accelerator conference.

Regarding the list of participants, I assume that the arrangements will be similar to those of the last conference, i.e. we agree on a certain number of European participants and send you a list of their names in due course. We feel that about 12 people would be a reasonable representation of Western Europe, these including scientists from the leading European laboratories, corresponding to your proposal of the composition of the Soviet participation. We will therefore send you later a list of people from the Federal Republic of Germany, Great Britain, France, Italy and CERN. This would also be in accordance with your proposal of participants from the United States. I believe that Professor V.F. Weisskopf, in his capacity as Chairman of the High Energy Physics Advisory Panel, should be present. Furthermore, to have a reasonable balance, if some of the physicists from the United States whom you had on your list are unable to attend, it seems desirable that the corresponding laboratory be represented by a substitute.

./.

Téléphone : (022) 41 98 11 Télégramme : CERNLAB-GENÈVE Télex : GENÈVE - 22548

The programme as you formulated it corresponds closely to our plans and we will ensure that physicists constructing accelerators in Western Europe are appropriately represented. Concerning the length of the seminar, two full working days seems suitable.

Looking forward to hearing from you in due course, and with my best regards,

I am,

Yours sincerely,

Bernard P. Gregory

Bernard P. Gregory

P.S. On organisational matters, I have asked Professor W. Thirring to be responsible from our side for discussing the details of the programme with Professor Blokhintsev and his colleagues, while Dr. W.O. Lock will coordinate the administrative details for us, as in the previous years.

V. F. Weisskopf

JAN 29 1969

BROOKHAVEN NATIONAL LABORATORY
ASSOCIATED UNIVERSITIES, INC.
UPTON, L.I., N.Y. 11973
TEL. AREA CODE 516 YAPHANK 4-6262

DIRECTOR'S OFFICE

January 24, 1969

Professor A. Logunov, Director
Institute for High Energy Physics
Serpukhov, USSR

Dear Professor Logunov:

Thank you for your letter of October 17, 1968. The group of U. S. physicists I mentioned in my May 3, 1968 letter (Rodney L. Cool, Thomas H. Fields, Wolfgang K. H. Panofsky, William A. Wenzel and Luke C. L. Yuan) are planning to come to Serpukhov to discuss with you and your colleagues the possibilities and mechanics of collaboration on experiments with the Serpukhov 76 GeV accelerator. Professor Panofsky will be the leader of this group.

If convenient to your schedule, they will plan to arrive in Moscow on February 28 and stay in the USSR until March 5. Please reply directly by cable to Professor Panofsky at the Stanford Linear Accelerator Center if this is acceptable.

With best regards,

Sincerely yours,

Maurice Goldhaber
Director

Statement by Herman Feshbach, M.I.T. Professor of Physics and Chairman of the steering committee of the Union of Concerned Scientists:

"The aims of the Union of Concerned Scientists were unfortunately misrepresented to the press due to inaccurate statements by unauthorized persons. It is not the purpose of the Union of Concerned Scientists to confront M.I.T. as an institution or any member of the M.I.T. community. It is not correct that Dr. Jerome B. Wiesner, M.I.T. Provost, has been scheduled as a speaker for the activities that are being planned for March 4. Also, the Union of Concerned Scientists has not called for a research strike at M.I.T. as reported. The true aims of the UCS are presented in the statement delivered to the press on Thursday, January 23. That statement said: 'The main goal of the UCS is to devise means for turning research applications away from the present emphasis on military technology towards the solution of pressing environmental and social problems. A program of speeches and panels on March 4 will examine specific issues and suggest means for further action.'"

January 24, 1969

HEPAP Corr.

Yale University *New Haven, Connecticut 06520*

Office of the Chairman
Physics Department
217 Prospect Street

JAN 29 1969

January 23, 1969

Professor V. F. Weisskopf
Department of Physics
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

Dear Viki:

Thank you very much for your letter. At the moment the question of my relations with Brookhaven is quite hazy and the reasons for the laboratory considering forcing a change are even hazier. Maurice told me that he objected to my "irregular" relation with the laboratory and the inference I took from our discussion was that the primary reason for his proposed actions was the rectification of this irregularity. He also emphasized this point in his discussions with Leipuner. However, the laboratory does have other problems, financial and administrative, and Maurice and Rod Cool seem to believe that certain aspects of the termination of our group would alleviate these problems.

I have asked to see Maurice so as to clarify just what it is that I am doing that he considers irregular. But I have not been able to see him again. Presumably Rod will come back for a visit quite soon and we will discuss the whole situation together at that time. I will keep you informed as the area of policy concerning the relations of laboratory scientists and outside scientists.

I certainly agree that it would not be politic for you to interfere with specific situations. However, if the laboratory procedes, however specific the case may be, on the basis of a general pdicy towards outside groups, that policy might be challenged before the AUI trustees and you might be interested then in commenting on the policy. Of course, I hope that no such confrontation occurs.

Sincerely yours,

Bob

Robert K. Adair
Chairman

RKA/he

Hepap

from W. K. Panofsky

(2)

COMMENTS ON JANUARY 10 DRAFT OF HEPAP REPORT

JAN 29 1969

Chapter 1 - No comments; some typos; should the "spearhead" diagram be put in as a picture with caption?

Chapter 2 - Item 1 - No particular comments; I still feel it is somewhat lengthy.

Item 6 - Page 5 - I suggest a sentence on the bottom of the page to read "On the basis of these conclusions we recommend that the National Laboratories should have a strong in-house staff but the size of this staff should not . . ."

Item 7, page 6 - I think the sentence "Therefore equipment funds play the same role as operating funds for a sizeable program" is confusing. They do not play the same role in detail but some parts of the equipment funds are required in the same way in terms of maintaining an ongoing experimental program. This should be reworded.

Yes

Item 10, page 9 - The second paragraph should be reworded carefully to permit interpretation for several new technology machines in the near-100 GeV, that is the wording should permit both conversions of existing machines and the construction of a single new technology accelerator in that range. This means that the virtue of using new technology in preserving the value of the investment in existing accelerators should be included in the conclusions.

new formulation

Item 11, page 10 - I suggest that the last sentence in the first paragraph should relate to proposed important experiments rather than just proposing experiments; the government agencies have long ago discounted the importance of proposal backlog per se as a measure of the needs of the field.

Recommendation 14, page 12 - The last sentence is worded do diplomatically that it would be very hard to understand. I feel that we should find a more straightforward wording such as "Within present budgetary restrictions and in the context of the entire high-energy physics program we have not seen conclusive justification for large scale projects.

Yes

Item 15, page 13 - I do not understand where this conclusion and recommendation come from. Although the way it is written it is essentially "motherhood" recommendation, the fact that it has to be put in would seem to indicate that present committees are doing something drastically wrong. I think we should discuss evidence to ascertain whether this is so.

put to Univ. rel. discuss

Item 16, first paragraph, top of page 14 - This wording seems to imply that preparation for use of the 200 BeV machine is the only incentive for wishing to use the Serpukhov machine. Actually both the merit of the actual physics to be obtained, combined with the fact that the Soviets need Western experience plus the value of international contacts are additional reasons.

Yes

Hilbred has a new comment

Chapter V, page 5 - Suggest deleting the last sentence starting at "They do" in the second paragraph. It doesn't add very much and may be confusing since the term "accelerators" as used there may or may not include colliding beam devices, depending on definition.

Chapter V, page 7 - top line - the phrase "With programs of interest and significance" is too weak and might include reference to the educational value and important experiments.

Chapter V, page 8, last sentence in first pargraph of item 7 - This conclusion is confusing as to what is intended and to some extent ruins the point since nobody argues against the interdependency. Probably a sentence like "In order to preserve the close and effective working relationship between the universities and the national laboratories it will be necessary both for the universities to be flexible relative to established academic procedure, and for the national laboratories to continue to be willing to deviate from practices designed for short-term efficiency." , or something like that. The last sentence of item 7 could well be left out since by definition there is no "ideal" compromise and since this and subsequent chapters have elaborated sufficiently on the problem.

Chapter V, page 9 - In the last paragraph the phrase " . . . should not be dictated by fiscal considerations but rather . . ." should be left out so that the sentence reads "However, such shutdowns should be controlled by the natural decrease of interest." I feel that otherwise the sentence would be misinterpreted indicating that the panel is recommending an "expense be damned" attitude.

The sentence beginning at the bottom of page 9 and ending on page 10 is difficult to understand because the contrast is not clear. I suggest:

"While building a new accelerator in an intermediate energy range may be more expensive than installing new beams at a higher energy accelerator for the same purpose, the cost to establish such beams will be higher than the continued cost of operation of a smaller, already operating machine."

Chapter V, page 10A - It might be worth while to make a reference to the manpower appendix.

Chapter V, page 11 - Towards the end of the second paragraph the panel appears to recommend "full construction funds" for NAL at the very beginning. I think this is too strong a position: what we should recommend is adequate construction funding so that construction progress and planning will not be constrained by availability of funds. Beginning with the financing of SLAC the custom of appropriating (in contrast to authorizing) full construction funds has been discontinued. The reason is of course principally politics, since in this way appropriation levels can be reduced. It is very difficult to complain if the year-by-year construction authorizations are non-constraining.

Chapter V, page 17, line 3 - Suggest underlining "economic." Also the next sentence on line 3 might be reworded to read "Accelerator performance that is being considered for the next decade could be attained with conventional technology . . ."

Table I, following page 20 - The Orsay accelerator should not be included in this table; since in fact it does not operate at energies substantially different from the whole group of accelerators at Stanford, Tokyo, Caltech and Frascati. The Orsay machine has not operated for research above 1.3 GeV. Its energy goal is 2.2 GeV. About 2 GeV has been reached in tests.

My understanding is that Figure 1 is going to be changed on the basis of new intensity data to be submitted by Lofgren.

Chapter VI, page 8, second paragraph - The last sentence should end as follows " . . . , and in general, particles required for a particular experiment have to be selected in kind and in energy and separated from the totality of those produced."

Chapter VI, page 11, - I find the entire paragraph on the top two-thirds of the page written in a fairly confusing way in terms of understanding what specifically is being recommended. First, what does "these developments" in line 6 refer to? The paragraph complains about the lack of funds for more speculative instrumental developments, a situation which presumably could be improved by more liberal amounts of money. On the other hand, I am very reluctant to agree with the suggestion that a separate source of funds be established for long-range development of instrumentation; if this were established as a separate category out of Washington it would in fact impair the ability of the university groups to make their own decisions. It is very difficult to avoid the conclusion that at any level of funding, and hopefully an improved one, the division of resources between new instrumentation and support of ongoing experimental program is to be left with the local groups.

Chapter VI, page 12 - This material is somewhat redundant with earlier material on the same subject.

Chapter VI, page 17 - The logic of the first paragraph is somewhat obscure since it fails to specifically relate the shortage of beam transport equipment to the status of the laboratories.

Chapter VI, page 17 - Suggest omitting the sentence starting with the last line of the page and ending at the top paragraph on page 18. The fact that our recommendations are tentative is stated several times and stating separately that the laboratory management may shift these recommendations is somewhat inconsistent to the subsequent material which is assigned lower

priority to other items.

Chapter IX - The first two pages are somewhat too flowery in language although I have no comments on substance.

Chapter IX, page 7 - Delete "much" at the end of the first paragraph.

Chapter IX, page 9 - The last sentence of the first paragraph is obscure and I do not even understand it well enough to make an alternate suggestion.

Chapter IX, page 12 - The last sentence is not understandable from the standpoint of purpose. First, some research is carried out by in-house staff of all national laboratories (not usually); does the sentence recommend that more of this should be done in collaboration with university users than is now the case, and if so, what is the basis of the recommendation in question?

Chapter IX, page 14 -In the second sentence it is stated "Probably the use of about 25% of the accelerator's research time is about right.",in reference to outside groups. Without knowing the technical circumstances in which NAL's work will in fact be carried out I think this statement is presumtuous, although it has become a customary figure to mention. As a maximum one could give this percentage as a target figure rather than as a figure which is "about right."

Chapter IX, page 15 - Although I agree strongly with the sentiment in the first paragraph I think it could even be strengthened by not only emphasizing the effort and dedication of the operational staff but also its creative contributions. A statement such as "Frequently more ingenuity is involved in designing and building a particle beam with specialized characteristics, often involving major innovation, than in the use of the beam for very important experiments but using conventional detection technology.

Chapter IX, page 16 - The sentence starting on line 6 is obscure.

Chapter XI, page 7 - The top paragraph should be brought up to date.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF PHYSICS
CAMBRIDGE, MASSACHUSETTS 02139

January 27, 1969

TO: All HEPAP Members

Dear Friends:

During the last two weeks I had some second thoughts and misgivings in regard to Chapter II, "Conclusions and Recommendations." These misgivings concern both form and content.

In regard to the form, I felt that this chapter should contain ideas which are of interest to the outsiders, that is to those who are providing us with money. Items which are in fact directed towards the community itself should not be included and should be incorporated into the relevant chapters. I feel that our colleagues will read all chapters whereas the outsiders will only read the Introduction, the Conclusions and perhaps, the financial chapter.

The misgivings as to content are as follows:

I believe that we should be more positive in respect to the necessity of going on in our quest for higher energy. Hence, the next step after the 200 Gev accelerator must appear as an item of high priority. Furthermore, I was worried about the following point:

Our previous position in regard to the 100 Gev accelerator was somewhat ambiguous. There may occur a physics need for such a machine or not. If there will be a need, such a machine should be built with any technique available, even an old fashioned one, if this turns out to be the best at that time. The tie-up with a pilot plan for new technology seems to me a questionable procedure.

I may be completely wrong on these issues but Cool and I thought it may be useful to reformulate a new Chapter II on that basis for your consideration. Such attempt is included here and will certainly be an important item of discussion at the next meeting.

With best regards,

Yours sincerely,

Victor F. Weisskopf

CC: Dr. Hildebrand
Dr. Wallenmayer

II. CONCLUSIONS AND RECOMMENDATIONS

A. General:

High energy physics is a vital part of basic research in the United States. It is one of the spearheads of science towards the discovery of the fundamental laws of nature and the innermost structure of matter. Its role in higher education has been stimulating and productive. About half of the graduate students, in the field of elementary particle physics, have gone into other work after receiving a doctorate and present indications are that this fraction will increase. The variety and depth of their training has made them sought after in many areas. Experience shows that the opening of entirely new fields in physics, applied science and engineering has often required the creative and innovative abilities of physicists trained in frontier activities although the new field may be unrelated to the work at the frontier.

All basic science has suffered from a lack of funds in recent years. The sums assigned to high energy physics have been insufficient to exploit the existing facilities and to keep up the vigor and excellence that was developed in the previous decade. United States leadership in the field is dependent upon this excellence; the present levels of funding prevent us from keeping up the former pace and the effects have now become apparent. The highly trained scientists and the first-rate facilities for high energy physics that are available in the United

States are being used inefficiently. Their high potential productivity will be wasted and the main discoveries in this field may be made elsewhere.

Therefore, we recommend that the general funding level of basic science be appropriate to maintain high energy physics in the United States at a vigorous level at the forefront of research. We recommend as a guideline that the rate of growth for the high energy physics program be commensurate with that of higher education to provide adequate research opportunities in this field for the increasing student and professorial population.

In our study of the high energy physics program, we have made a selection of steps designed to strengthen this field to the best of our judgment. The following recommendations, if adopted, are designed to be consistent with an average rate of growth of about 10 per cent per annum.

B. Existing Facilities:

1. The large backlog of possible experiments of high interest at our accelerator facilities, and the slowdown in construction of modern up-to-date equipment provide ample evidence for the severe shortage of funds available for high energy physics. Much more research of great value could be done with a relatively small increase in the operating and equipment funds for the accelerator laboratories and the university-based user groups. These funds have been too low for several years to allow an effective exploitation of the existing facilities.

Therefore, we recommend that high priority be assigned

to appropriate increases in the annual budgets of the existing high energy facilities and in those of the research groups at universities, at the earliest time that the national fiscal situation permits, in order to extract a better return from the investment already committed.

2. A supply of new major-equipment items is required at each laboratory to maintain a successful research effort even without any substantial expansion of the program. The quality of the program is vitally dependent upon up-to-date apparatus and new ideas require innovative devices. Therefore, equipment funds play the same role as operating funds for a viable program. This must be recognized, both with regard to existing laboratories and to new laboratories during their period of growth when both equipment and operating funds must be expected to increase. Current levels of equipment budgets are not sufficient to take care of these needs.

Therefore, we recommend that equipment budgets be raised to meet the needs of existing experimental programs to provide for future research facilities under construction, and to allow for the development of new devices aimed at significantly improving present experimentation or contributing to future higher energy programs.

3. There has been an increased rate of growth of higher education in the United States in recent years; universities have been expanding and new universities opening. With this growth, has been a corresponding desire to start new high energy physics research groups at the universities to train the influx of students and to fulfill the research needs of the faculty.

Of the large number of proposals received, it has been possible to fund only a few of such new groups. The high quality of some of the unfunded proposals indicates that the rate of funding should be increased to keep in step with the expanding educational system.

Therefore, we recommend that in an enlarged annual budget for high energy physics, allowance should be made to fund a greater number of new university research groups. At the same time, the activities and output of all existing research groups should be reviewed every three or four years by ad hoc reviewers.

C. Facilities Under Construction

1. A re-assessment of the present state of elementary particle physics research confirms the conclusion that, for the immediate future of the program, the prompt realization of the 200 Gev accelerator facility under construction at the National Accelerator Laboratory is of highest priority. The unfortunate effects on the high energy program resulting from delayed construction authorization can be partially offset both by the present design which allows future expansion of its energy to about 400 Gev and a planned rapid construction schedule.

Therefore, we recommend strongly that the funds for the construction should be made available in accordance with the schedule proposed by the NAL staff to meet the goal of initial operation by mid-1972.

Forthermore, we recommend that future budgetary projections provide funds to increase the accelerator energy to its

maximum capability (400 Gev, or more) when it has operated successfully at 200 Gev and after some experience has been acquired in research at this energy.

2. The bubble chamber is an instrument particularly suitable for exploration of strong interactions in a new domain of energy. Moreover, detailed technical studies have demonstrated their unique value as a tool for both qualitative and quantitative research on neutrino interactions. There is little doubt that the study of neutrino interactions at high energy and large momentum transfer will be a major research field at NAL. Because of their exploratory capability and the predictably great interest in their use, adequate facilities of this type should be available at NAL at an early stage.

Therefore, we recommend that funds be provided to construct a new large cryogenic bubble chamber for use at NAL and also to preserve technical and budgetary flexibility to move the 12-foot bubble chamber from ANL to NAL at a suitable time.

D. Future Facilities

1. Based upon present knowledge, an extrapolation to the future requirements for proton accelerators leads to the strong conclusion that a new step to energies substantially higher than those which NAL can provide, will be required for further exploration of the innermost structure of matter. This conclusion is not qualitatively different from that of the 1965 Ramsey Panel. Progress in the development of new accelerator

techniques and the history of events in the intervening years have altered some of the quantitative conclusions. Since the NAL accelerator will have the potentiality of reaching the 400 Gev range, a new accelerator should have the capability of 2000 Gev or more to provide a significant advance in research potential.

We give highest future priority to an increase in the energy parameter because it will provide unique capability to extend the range for crucial experiments and for continued exploration of an unknown region.

On the other hand, we must be prepared that the new phenomena which will be discovered in the energy range between 30 and 400 Bev, may be of such variety and interest that the NAL facilities may not be sufficient for an intensive quantitative investigation of these phenomena. The experience at lower energy ranges certainly leads us to expect that a strengthening in depth of the program requires more proton beam facilities in the 100-200 Bev range. We doubt this need could be fulfilled only with an enlargement of experimental facilities at NAL. The need could be met either by an improvement program to increase the energy of an existing accelerator, or by construction of a new accelerator.

Accelerator technology is now in an exceedingly promising state, with a number of new developments being studied intensively. Among the promising techniques are:

a. The electron ring accelerator;

b. The superconducting alternating-gradient synchrotron;

c. The cryogenic alternating-gradient synchrotron;

d. Several varieties of accelerators with superconducting DC magnetic fields.

These techniques, together with their application to detection equipment and beam transport, give promise of higher energy capability at reduced cost, as well as improved performance characteristics. Within a few years it should be possible to assess their relative merits for future construction projects as compared to conventional existing techniques. It is obvious therefore, that no new accelerator construction program or major conversion program should begin without careful assessment of the relevant new developments.

Based upon the above conclusions, we therefore recommend:

a. Vigorous support for research and development of promising new accelerator technology;

b. Priority be given within the future program for steps leading to an accelerator in the 2000 Bev range in the late seventies or early eighties;

c. Serious consideration of providing additional sources of protons in the 50 - 200 range, either by new accelerator construction or by a major conversion program.

2. The relative emergency of the research need for higher energy electrons is somewhat difficult to assess at this

time. The research programs at SLAC and Cornell are most promising but still at an early stage. It is reasonable to expect, however, that results in the next few years will in all probability lead to a need for higher energy within the next decade.

At the same time, the development of superconducting, microwave linear accelerators is being intensively developed. This technique shows considerable promise both for increasing energy at lower cost and also for increasing the duty cycle which has long been a severe technical limitation for linear accelerators.

Therefore, we recommend as a future program:

a. Vigorous support of research and development of new electron accelerator technology;

b. Projections of budgetary requirements during the coming decade make allowance for increasing electron energy, quite possibly through conversion of an existing accelerator.

3. Colliding electron beams, that can be provided by storage rings, represent energy in its purest and best defined form, ready to be transformed into particles. Although the first successful experimentation, using electron-electron collisions, took place in the United States, present work is going on, almost entirely in Western Europe and the Soviet Union.

Experiments that can be performed with electron-positron colliding beams are of great importance for the progress of particle physics. The by-pass modification of the Cambridge Electron Accelerator is an excellent first step in this direction

but higher intensities will be required for a systematic program of research. The proposed addition of storage rings to the Stanford Linear Accelerator (SLAC) was highly recommended by this Panel in an earlier report but its construction has not been authorized.

Therefore, we recommend the continued, vigorous support of the C.E.A. by-pass project together with the construction of further electron-positron, colliding-beam facilities at SLAC as previously recommended.

4. There is no program for proton storage rings in the United States although it would offer a unique opportunity to explore a region of energies that is inaccessible, at reasonalbe cost, to accelerators based on even the most exciting new technological ideas. At the present state of development, intersecting storage rings at NAL for protons of about 100 GeV each appear feasible. Experience with the 25 GeV CERN storage rings now under construction together with further technical advances may even raise this limit. Two 100 GeV colliding beams would correspond, for some classes of experiments, to a 28,000 GeV conventional accelerator. Such machines are not only "a window into the future" for high energy physics, but could prove to be the best future method to use in our quest for knowledge at the highest energies; clearly, they merit our interest.

Therefore, as a future projection, we recommend serious consideration of the addition of a colliding-beam facility to the accelerator at the National Accelerator Laboratory as a

logical step to extend the high energy frontier. Its authorization should be dependent upon the experience gained at the CERN-ISR (expected to start operation in 1971) both with respect to technical feasibility and research possibilities.

F. Other Conclusions and Recommendations

1. Cosmic rays offer a unique opportunity to carry out experiments at ultra-high energies and although this source is limited in scope, very exciting results have been obtained by this means. The past and present accomplishments and the connections with astrophysics and cosmology would appear to justify an expanded effort to explore the still unknown processes in our Universe. Recent development of new methods and equipment, and the possibilities for experimentation outside our atmosphere enhance this belief. Existing proposals incorporating these new techniques would more than double the present effort.

Therefore, we recommend a substantial increase in the budget for cosmic ray particle physics. The budget is so modest that the impact of a substantial increase on the overall high energy physics program would be very small. Proposals for new large-scale projects should be judged in the context of the entire high energy physics program and its budgetary restrictions.

2. The free interchange of ideas with Western European physicists has had a very beneficial effect upon the high energy physics program of the United States. The limited interchange with Soviet Bloc physicists has also been beneficial and might prove

to be more so if access can be arranged for physicists from the United States to the Soviet accelerator at Serpukhov where experience would be gained at higher energy than is now available anywhere else; an experience that would be valuable in the preparation for experiments at the 200-GeV accelerator.

Therefore, we recommend that international exchanges and cooperative experimental activities in high energy physics be strongly encouraged. In particular, we recommend support of continuing negotiations aimed at participation of physicists from the United States in the work at the Serpukhov Laboratory in the Soviet Union.

Furthermore, we recommend that high energy physics continue to be pursued as an international science with free communication among all nations; high energy physics laboratories in the United States should be open to qualified scientists of all countries.

JAN 27 1959

Columbia University in the City of New York

DEPARTMENT OF PHYSICS
NEVIS LABORATORIES

Irvington-on-Hudson, N.Y. 10533
P.O. Box 137
914 LY 1-8100

Dear Hepaper,

Enclosed is a suggested change in "10." of Recommendation which reflects the opinion of Cool and me and perhaps others that high energy is still good... better than medium.

See you soon

Lew

Suggested changes in recommendations, thrust of which is clear upon reading. Stimulated in part by letter from R. Cool.

10. In an attempt to project the probable future needs for high energy facilities beyond the 200-400 GeV accelerator at the NAL, we must follow our deep prejudice that higher energy will continue to dominate the needs of this science. The prejudice is based upon history and everything we now understand about particle physics. It parallels the astronomers' desire for evermore powerful telescopes and the biologists continuing requirements for sharper and high magnification.

The incorporation of the prejudice into our study is made difficult both by the uncertainty of the best technical approach, the magnitude of the cost breakthrough and the results of higher energy explorations that will be forthcoming from CERN's ISR and the 200 BeV accelerator. If the hopes expressed in paragraph 9 do indeed materialize and result in a cost breakthrough making possible a substantial decrease in the dollars per BeV, and if this were to be combined with a severely limited scope laboratory, then explorations of a new frontier in energy would be possible within the overall budget limitations we have set ourselves.

We therefore recommend that budget projections for the next decade make provisions for the possibility that a new project towards energies considerably higher than 400 BeV may become technically and economically feasible.

+ Suggested deletion on p. 9.

Third line from bottom - eliminate the words "or two".

1. via air mail Special delivery
2. also copies delivered to Somerset Hotel

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF PHYSICS
CAMBRIDGE, MASSACHUSETTS 02139

January 27, 1969

TO: All HEPAP Members

Dear Friends:

During the last two weeks I had some second thoughts and misgivings in regard to Chapter II, "Conclusions and Recommendations." These misgivings concern both form and content.

In regard to the form, I felt that this chapter should contain ideas which are of interest to the outsiders, that is to those who are providing us with money. Items which are in fact directed towards the community itself should not be included and should be incorporated into the relevant chapters. I feel that our colleagues will read all chapters whereas the outsiders will only read the Introduction, the Conclusions and perhaps, the financial chapter.

The misgivings as to content are as follows:

I believe that we should be more positive in respect to the necessity of going on in our quest for higher energy. Hence, the next step after the 200 Gev accelerator must appear as an item of high priority. Furthermore, I was worried about the following point:

Our previous position in regard to the 100 Gev accelerator was somewhat ambiguous. There may occur a physics need for such a machine or not. If there will be a need, such a machine should be built with any technique available, even an old fashioned one, if this turns out to be the best at that time. The tie-up with a pilot plan for new technology seems to me a questionable procedure.

I may be completely wrong on these issues but Cool and I thought it may be useful to reformulate a new Chapter II on that basis for your consideration. Such attempt is included here and will certainly be an important item of discussion at the next meeting.

With best regards,

Yours sincerely,

Viki

Victor F. Weisskopf

CC: Dr. Hildebrand
Dr. Wallenmayer

II. CONCLUSIONS AND RECOMMENDATIONS

A. General:

High energy physics is a vital part of basic research in the United States. It is one of the spearheads of science towards the discovery of the fundamental laws of nature and the innermost structure of matter. Its role in higher education has been stimulating and productive. About half of the graduate students, in the field of elementary particle physics, have gone into other work after receiving a doctorate and present indications are that this fraction will increase. The variety and depth of their training has made them sought after in many areas. Experience shows that the opening of entirely new fields in physics, applied science and engineering has often required the creative and innovative abilities of physicists trained in frontier activities although the new field may be unrelated to the work at the frontier.

All basic science has suffered from a lack of funds in recent years. The sums assigned to high energy physics have been insufficient to exploit the existing facilities and to keep up the vigor and excellence that was developed in the previous decade. United States leadership in the field is dependent upon this excellence; the present levels of funding prevent us from keeping up the former pace and the effects have now become apparent. The highly trained scientists and the first-rate facilities for high energy physics that are available in the United

States are being used inefficiently. Their high potential productivity will be wasted and the main discoveries in this field may be made elsewhere.

Therefore, we recommend that the general funding level of basic science be appropriate to maintain high energy physics in the United States at a vigorous level at the forefront of research. We recommend as a guideline that the rate of growth for the high energy physics program be commensurate with that of higher education to provide adequate research opportunities in this field for the increasing student and professorial population.

In our study of the high energy physics program, we have made a selection of steps designed to strengthen this field to the best of our judgment. The following recommendations, if adopted, are designed to be consistent with an average rate of growth of about 10 per cent per annum.

B. Existing Facilities:

1. The large backlog of possible experiments of high interest at our accelerator facilities, and the slowdown in construction of modern up-to-date equipment provide ample evidence for the severe shortage of funds available for high energy physics. Much more research of great value could be done with a relatively small increase in the operating and equipment funds for the accelerator laboratories and the university-based user groups. These funds have been too low for several years to allow an effective exploitation of the existing facilities.

Therefore, we recommend that high priority be assigned

to appropriate increases in the annual budgets of the existing high energy facilities and in those of the research groups at universities, at the earliest time that the national fiscal situation permits, in order to extract a better return from the investment already committed.

2. A supply of new major-equipment items is required at each laboratory to maintain a successful research effort even without any substantial expansion of the program. The quality of the program is vitally dependent upon up-to-date apparatus and new ideas require innovative devices. Therefore, equipment funds play the same role as operating funds for a viable program. This must be recognized, both with regard to existing laboratories and to new laboratories during their period of growth when both equipment and operating funds must be expected to increase. Current levels of equipment budgets are not sufficient to take care of these needs.

Therefore, we recommend that equipment budgets be raised to meet the needs of existing experimental programs, to provide for future research facilities under construction, and to allow for the development of new devices aimed at significantly improving present experimentation or contributing to future higher energy programs.

3. There has been an increased rate of growth of higher education in the United States in recent years; universities have been expanding and new universities opening. With this growth, has been a corresponding desire to start new high energy physics research groups at the universities to train the influx of students and to fulfill the research needs of the faculty.

Of the large number of proposals received, it has been possible to fund only a few of such new groups. The high quality of some of the unfunded proposals indicates that the rate of funding should be increased to keep in step with the expanding educational system.

Therefore, we recommend that in an enlarged annual budget for high energy physics, allowance should be made to fund a greater number of new university research groups. At the same time, the activities and output of all existing research groups should be reviewed every three or four years by ad hoc reviewers.

C. Facilities Under Construction

1. A re-assessment of the present state of elementary particle physics research confirms the conclusion that, for the immediate future of the program, the prompt realization of the 200 Gev accelerator facility under construction at the National Accelerator Laboratory is of highest priority. The unfortunate effects on the high energy program resulting from delayed construction authorization can be partially offset both by the present design which allows future expansion of its energy to about 400 Gev and a planned rapid construction schedule.

Therefore, we recommend strongly that the funds for the construction should be made available in accordance with the schedule proposed by the NAL staff to meet the goal of initial operation by mid-1972.

Forthermore, we recommend that future budgetary projections provide funds to increase the accelerator energy to its

maximum capability (400 Gev, or more) when it has operated successfully at 200 Gev and after some experience has been acquired in research at this energy.

2. The bubble chamber is an instrument particularly suitable for exploration of strong interactions in a new domain of energy. Moreover, detailed technical studies have demonstrated their unique value as a tool for both qualitative and quantitative research on neutrino interactions. There is little doubt that the study of neutrino interactions at high energy and large momentum transfer will be a major research field at NAL. Because of their exploratory capability and the predictably great interest in their use, adequate facilities of this type should be available at NAL at an early stage.

Therefore, we recommend that funds be provided to construct a new large cryogenic bubble chamber for use at NAL and also to preserve technical and budgetary flexibility to move the 12-foot bubble chamber from ANL to NAL at a suitable time.

D. Future Facilities

1. Based upon present knowledge, an extrapolation to the future requirements for proton accelerators leads to the strong conclusion that a new step to energies substantially higher than those which NAL can provide, will be required for further exploration of the innermost structure of matter. This conclusion is not qualitatively different from that of the 1965 Ramsey Panel. Progress in the development of new accelerator

techniques and the history of events in the intervening years have altered some of the quantitative conclusions. Since the NAL accelerator will have the potentiality of reaching the 400 Gev range, a new accelerator should have the capability of 2000 Gev or more to provide a significant advance in research potential.

We give highest future priority to an increase in the energy parameter because it will provide unique capability to extend the range for crucial experiments and for continued exploration of an unknown region.

On the other hand, we must be prepared that the new phenomena which will be discovered in the energy range between 30 and 400 Bev, may be of such variety and interest that the NAL facilities may not be sufficient for an intensive quantitative investigation of these phenomena. The experience at lower energy ranges certainly leads us to expect that a strengthening in depth of the program requires more proton beam facilities in the 100-200 Bev range. We doubt this need could be fulfilled only with an enlargement of experimental facilities at NAL. The need could be met either by an improvement program to increase the energy of an existing accelerator, or by construction of a new accelerator.

Accelerator technology is now in an exceedingly promising state, with a number of new developments being studied intensively. Among the promising techniques are:

a. The electron ring accelerator;

b. The superconducting alternating-gradient synchrotron;

c. The cryogenic alternating-gradient synchrotron;

d. Several varieties of accelerators with superconducting DC magnetic fields.

These techniques, together with their application to detection equipment and beam transport, give promise of higher energy capability at reduced cost, as well as improved performance characteristics. Within a few years it should be possible to assess their relative merits for future construction projects as compared to conventional existing techniques. It is obvious therefore, that no new accelerator construction program or major conversion program should begin without careful assessment of the relevant new developments.

Based upon the above conclusions, we therefore recommend:

a. Vigorous support for research and development of promising new accelerator technology;

b. Priority be given within the future program for steps leading to an accelerator in the 2000 Bev range in the late seventies or early eighties;

c. Serious consideration of providing additional sources of protons in the 50 - 200 range, either by new accelerator construction or by a major conversion program.

2. The relative emergency of the research need for higher energy electrons is somewhat difficult to assess at this

time. The research programs at SLAC and Cornell are most promising but still at an early stage. It is reasonable to expect, however, that results in the next few years will in all probability lead to a need for higher energy within the next decade.

At the same time, the development of superconducting, microwave linear accelerators is being intensively developed. This technique shows considerable promise both for increasing energy at lower cost and also for increasing the duty cycle which has long been a severe technical limitation for linear accelerators.

Therefore, we recommend as a future program:

a. Vigorous support of research and development of new electron accelerator technology;

b. Projections of budgetary requirements during the coming decade make allowance for increasing electron energy, quite possibly through conversion of an existing accelerator.

3. Colliding electron beams, that can be provided by storage rings, represent energy in its purest and best defined form, ready to be transformed into particles. Although the first successful experimentation, using electron-electron collisions, took place in the United States, present work is going on, almost entirely in Western Europe and the Soviet Union.

Experiments that can be performed with electron-positron colliding beams are of great importance for the progress of particle physics. The by-pass modification of the Cambridge Electron Accelerator is an excellent first step in this direction

but higher intensities will be required for a systematic program of research. The proposed addition of storage rings to the Stanford Linear Accelerator (SLAC) was highly recommended by this Panel in an earlier report but its construction has not been authorized.

Therefore, we recommend the continued, vigorous support of the C.E.A. by-pass project together with the construction of further electron-positron, colliding-beam facilities at SLAC as previously recommended.

4. There is no program for proton storage rings in the United States although it would offer a unique opportunity to explore a region of energies that is inaccessible, at reasonalbe cost, to accelerators based on even the most exciting new technological ideas. At the present state of development, intersecting storage rings at NAL for protons of about 100 GeV each appear feasible. Experience with the 25 GeV CERN storage rings now under construction together with further technical advances may even raise this limit. Two 100 GeV colliding beams would correspond, for some classes of experiments, to a 28,000 GeV conventional accelerator. Such machines are not only "a window into the future" for high energy physics, but could prove to be the best future method to use in our quest for knowledge at the highest energies; clearly, they merit our interest.

Therefore, as a future projection, we recommend serious consideration of the addition of a colliding-beam facility to the accelerator at the National Accelerator Laboratory as a

logical step to extend the high energy frontier. Its authorization should be dependent upon the experience gained at the CERN-ISR (expected to start operation in 1971) both with respect to technical feasibility and research possibilities.

F. Other Conclusions and Recommendations

1. Cosmic rays offer a unique opportunity to carry out experiments at ultra-high energies and although this source is limited in scope, very exciting results have been obtained by this means. The past and present accomplishments and the connections with astrophysics and cosmology would appear to justify an expanded effort to explore the still unknown processes in our Universe. Recent development of new methods and equipment, and the possibilities for experimentation outside our atmosphere enhance this belief. Existing proposals incorporating these new techniques would more than double the present effort.

Therefore, we recommend a substantial increase in the budget for cosmic ray particle physics. The budget is so modest that the impact of a substantial increase on the overall high energy physics program would be very small. Proposals for new large-scale projects should be judged in the context of the entire high energy physics program and its budgetary restrictions.

2. The free interchange of ideas with Western European physicists has had a very beneficial effect upon the high energy physics program of the United States. The limited interchange with Soviet Bloc physicists has also been beneficial and might prove

to be more so if access can be arranged for physicists from the United States to the Soviet accelerator at Serpukhov where experience would be gained at higher energy than is now available anywhere else; an experience that would be valuable in the preparation for experiments at the 200-GeV accelerator.

Therefore, we recommend that international exchanges and cooperative experimental activities in high energy physics be strongly encouraged. In particular, we recommend support of continuing negotiations aimed at participation of physicists from the United States in the work at the Serpukhov Laboratory in the Soviet Union.

Furthermore, we recommend that high energy physics continue to be pursued as an international science with free communication among all nations; high energy physics laboratories in the United States should be open to qualified scientists of all countries.

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

January 24, 1969

JAN 28 1969

TO: HIGH ENERGY PHYSICS ADVISORY PANEL MEMBERS

Enclosed are copies of the drafts of the letter and cable from Goldhaber to Logunov on possible U.S.-U.S.S.R. collaboration at Serpukhov. I understand the cable will be sent on January 24, 1969, and the letter will be mailed on January 27, 1969.

Bernard Hildebrand

Bernard Hildebrand
Executive Secretary
High Energy Physics
Advisory Panel

Enclosures:
As stated

DRAFT OF PROPOSED LETTER FROM DIRECTOR OF BNL

TO DIRECTOR OF SERPUKHOV LABORATORY, USSR

Dear Professor Logunov:

Thank you for your letter of October 17, 1968. The group of U.S. physicists I mentioned in my May 3, 1968 letter (Rodney L. Cool, Thomas H. Fields, Wolfgang K. H. Panofsky, William A. Wenzel, Luke C. L. Yuan) are planning to come to Serpukhov to discuss with you and your colleagues the possibilities and mechanics of collaboration on experiments with the Serpukhov 76 GeV Accelerator. Professor Panofsky will be the leader of this group.

If convenient to your schedule, they will plan to arrive in Moscow on February 28 and stay in the USSR until March 5. Please reply directly by cable to Professor Panofsky (Stanford Linear Accelerator Center), if this is acceptable.

With best regards.

Sincerely yours,

M. Goldhaber

DRAFT OF PROPOSED CABLE FROM DIRECTOR OF BNL

TO DIRECTOR OF SERPUKHOV LABORATORY, USSR

PROFESSOR LOGUNOV

PLEASED TO ACCEPT YOUR INVITATION OF OCTOBER 17, 1968. U.S. PHYSICISTS MENTIONED IN MY MAY 3, 1968 LETTER PIAN ARRIVE MOSCOW FEBRUARY 28 FOR TECHNICAL EXPLORATORY DISCUSSIONS OF COLIABORATIVE EXPERIMENTS WITH SERPUKHOV ACCELERATOR. GROUP PIANS STAY IN U.S.S.R. UNTIL MARCH 5. IF DATES ACCEPTABLE PLEASE CABLE DIRECTLY TO PROFESSOR PANOFSKY WHO WILL BE LEADER OF GROUP. CONFIRMING LETTER ON WAY.

M. GOLDHABER

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Hepap
Washington

JAN 17 1969

JAN 21 1969

TO HIGH ENERGY PHYSICS ADVISORY PANEL MEMBERS

Enclosed are letters exchanged recently between Professor V. F. Weisskopf and Dr. P. W. McDaniel on the SLAC 1.5 BeV Storage Ring. This subject is on the Agenda for the forthcoming HEPAP meeting at Cambridge, January 31 - February 1, 1969.

Bernard Hildebrand

Bernard Hildebrand
Executive Secretary
High Energy Physics
Advisory Panel

Enclosures:
As stated

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

JAN 10 1969

Professor Victor F. Weisskopf
Head, Department of Physics
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

Dear Viki:

Thank you for your letter of December 20, 1968, which presents the position of the High Energy Physics Advisory Panel (HEPAP) relative to the SLAC proposal to cut down on its previously planned research activities in order to initiate colliding beams experiments at 1.5 BeV + 1.5 BeV center-of-mass energy as rapidly as possible. We consider the HEPAP comments on the importance of this project extremely significant.

Let us plan to consider this subject further at the January 31 - February 1, 1969, HEPAP meeting at Cambridge.

Sincerely,

Paul

Paul W. McDaniel, Director
Division of Research

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF PHYSICS
CAMBRIDGE, MASSACHUSETTS 02139

December 20, 1968

Dr. Paul McDaniel, Director
Division of Research
U.S. Atomic Energy Commission
Washington, D.C.

Dear Paul:

At its last meeting, HEPAP discussed a recent SLAC proposal to construct an electron-positron storage ring of 1.5 GeV, which is one-half the energy of the previous proposal. The cost of this project (about $8.7 million) is about one-half of the previous one. SLAC considers its new project of such importance that it proposes to cut its other research activities such that, in the first year of construction, it would contribute $1.2 of the $3 million which would be needed in that period.

The discussions at our meeting reinforced the opinion of the panel that the experiments to be performed with high intensity electron-positron storage rings are of utmost importance for the progress of particle physics. They deal with the most fundamental questions of that field. Colliding electron beams represent energy in its purest and best defined form, ready to be transformed into particles.

We reiterate our previous statements deploring the fact that there is no colliding beam instrumentation under construction in the United States with the exception of the CEA by-pass.

Two different types of problems are attacked by this method: One concerns tests of quantum electrodynamics, the other concerns the creation of hadrons. The former type of experiments do not require the high intensity of the SLAC project and probably could be satisfactorily carried out at CEA, if the by-pass project reaches its projected goal. For the latter type of experiment, however, the beam intensity of the CEA by-pass is expected to be marginal and the intensity of the SLAC project

most probably will be necessary for the acquisition of relevant data. It would be more desirable to plan for a storage ring of 3 BeV but very important results can be obtained already with 1.5 BeV. The present SLAC project could be extended to higher energy at a later date.

Because of the great importance of this project, HEPAP urges you to include the necessary $1.8 million into the FY 70 budget. If it is impossible to add this sum to the budget, the panel is ready to discuss, at a future meeting, any possibility which you may propose for providing these funds by cutting back other selected programs.

Sincerely yours,

Victor F. Weisskopf

Victor F. Weisskopf

c

file copy

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF PHYSICS
CAMBRIDGE, MASSACHUSETTS 02139

January 17, 1969

TO: All HAPAP Members file

FROM: Victor F. Weisskopf

Enclosed are xerox copies of the following items*

1. S. J. Lindebaum letter of December 20, 1968 and attachments; (see Brookhaven for original)
2. Joint letter from Cronin, Fitch, Frankel and Mann, dated December 30, 1969; (filed PPA)
3. VFW's reply to Princeton letter dated January 10, 1969. (filed PPA)

CC: Dr. Hildebrand
Dr. Wallenmayer

*Mailed in VFW's absence

Thurs

1-30

Professor W:

At the end of your Friday HEPAP meeting, you might wish to announce that

"Saturday's meeting will take place in the Seminar Room, 3rd floor, etc . . ."

Also, for your information:

Student Center, 2nd floor Cafeteria serves luncheon on Saturday's from 11:30 until 2:00 p.m.

C

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

January 13, 1969

JAN 16 1969

TO: HIGH ENERGY PHYSICS ADVISORY PANEL MEMBERS

JANUARY 31 - FEBRUARY 1, 1969 HEPAP MEETING - CAMBRIDGE, MASSACHUSETTS

I. The meeting will be held at:

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Laboratory for Nuclear Science
(77 Massachusetts Ave., Cambridge, Mass.)

Kolker Room (#414), 4th Floor

January 31 - Friday - 9:30 a.m.-5:30 p.m.
February 1 - Saturday - 9:30 a.m.-4:00 p.m. – Seminar Room, CTP

II. The AGENDA includes:

FRIDAY

9:30-10:30 a.m. - FY 1969 and FY 1970 BUDGET.

1. Status Report by P. W. McDaniel and W. A. Wallenmeyer.
2. Panel Consideration of SLAC 1½ Bev High Intensity Colliding Beam Budgetary Needs.

10:30-11:00 a.m. - International Collaboration - Panel Consideration of U.S.-U.S.S.R. Experimental Collaboration on the Serpukhov Accelerator.

11:00-12:30 p.m. - HEPAP Report.

12:30-2:00 p.m. - Informal Luncheon with Laboratory for Nuclear Science Hosts.

2:00-3:00 p.m. - Electron Ring Acceleration Status Report by D. Keefe.

3:00-5:30 p.m. - HEPAP Report.

SATURDAY

9:30 a.m.-12:30 p.m. - HEPAP Report.

12:30 p.m.-1:30 p.m. - Informal Luncheon. - Student Center 2nd Floor Cafeteria (11:30 to 2:00 pm)

1:30 p.m.-4:00 p.m. - HEPAP Report.

III. HOTEL RESERVATIONS have been made for H. Blewett and HEPAP members at the SOMERSET HOTEL (400 Commonwealth Ave., Boston, Massachusetts - 617-267-9000) for the nights of January 30 and 31, 1969. The D. Keefe reservation is for January 30, only.

Please leave a message with Miss Barbara Seek (202-973-3624) relative to reservation changes.

Bernard Hildebrand

Bernard Hildebrand
Executive Secretary
High Energy Physics
Advisory Panel

Enclosure:
Ltr. dated 10/17/68 fm. A. Logunov
to M. Goldhaber

Mr. M.Goldhaber
Brookhaven National Laboratory
Associated Universities, INC.
Upton, L.I., N.Y. 11973

October, 17, 1968.

Dear Professor M.Goldhaber,

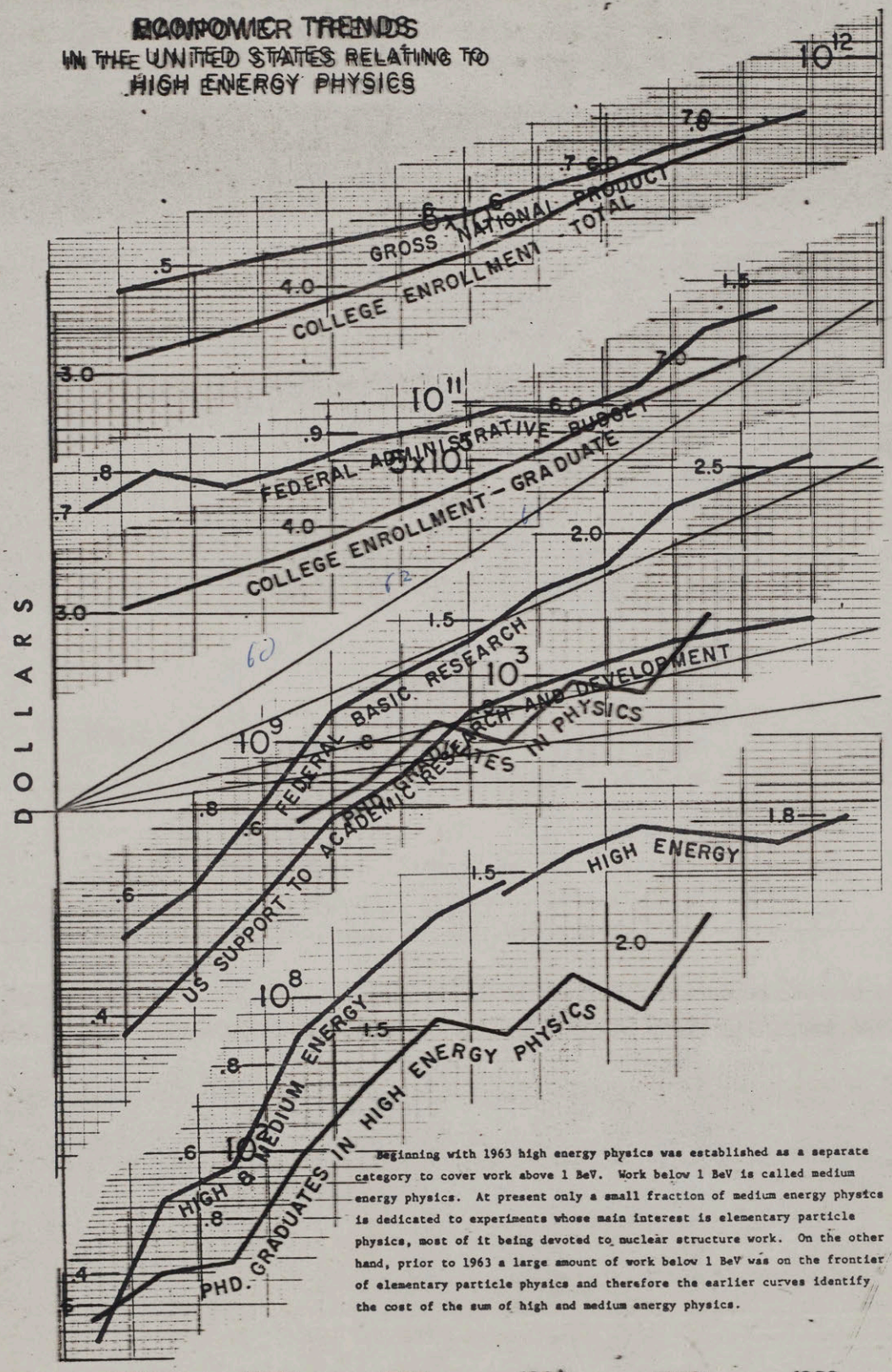
Unfortunately I have been absent from the Institute for a considerable period of time, so I have received your letter just now, still it is a great pleasure for me.

It seems to us, that according to the memorandum on our collaboration that was signed by our State Committee of Atomic Energy and the USA Commission of Atomic Energy, it is possible to hold the meeting of the experts in our joined experiments at the Serpukhov accelerator. As far as the date of the meeting is concerned, we suggest it should take place here at the Institute for High Energy Physics in February 1969.

Faithfully yours

Prof. A.Logunov
The Institute for High Energy Physics
Moscow Region
USSR.

ECONOMIC TRENDS
IN THE UNITED STATES RELATING TO HIGH ENERGY PHYSICS



Beginning with 1963 high energy physics was established as a separate category to cover work above 1 BeV. Work below 1 BeV is called medium energy physics. At present only a small fraction of medium energy physics is dedicated to experiments whose main interest is elementary particle physics, most of it being devoted to nuclear structure work. On the other hand, prior to 1963 a large amount of work below 1 BeV was on the frontier of elementary particle physics and therefore the earlier curves identify the cost of the sum of high and medium energy physics.