

2nd set  
May, 1969

Additional Material for pages 108-109

re: SECRECY, SPRING 1939 (2)

- "Approach to England; Last Appeal to France" COMPTON MEMO
- Letter, Wigner to Paul Dirac  
Handwritten copy. March 30, 1939
- Telegram, Weisskopf to Blackett March 31, 1939
- Telegram, Weisskopf to Hans von Halban March 31, 1939  
Several copies with various corrections, ~~probably by Weisskopf.~~  
*all saved by [unclear]*
- Letter, Weisskopf to Blackett  
Undated, but it must have been written from March 31 to April 2. (KW)
- Telegram, Joliot, Halban and Kowarsky to L.S. April 5, 1939
- Telegram, L.S. to Joliot April 6, 1939  
Typed and handwritten versions.
- Letter, L.S. to Joliot April 7, 1939  
Handwritten by L.S., probably later.  
Marked "Approximate."  
\*
- Telegram, Joliot to L.S. April 7, 1939
- Telegram, L.S. to Joliot  
Undated, but shortly after April 7, 1939 (KW)
- Telegram, Blackett to Weisskopf April 8, 1939  
We have the original telegram, also a copy handwritten by L.S.
- Letter, Joliot to L.S. April 19, 1939

\* The manuscript referred to in Szilard's April 7th letter to Joliot is "Instantaneous Emission of Fast Neutrons in the Interaction of Slow Neutrons with Uranium!" by Leo Szilard and Walter Zinn, Physical Rev. 55:799-800 (April 15, 1939).

Approach to England; Last Appeal to Franco

On March 20, 1939, we learned that Joliot had also observed the neutron emission from uranium and had published his observations in England on March 18. <sup>Note #21</sup> He actually started on these experiments some time in January.

Great efforts were made thereupon to persuade the French and English physicists to stop publications on this subject. The negotiations were carried out by Wigner, Weisskopf, and myself. Teller tried to persuade the physicists at Columbia University to wait before publishing the outcome of these negotiations.

A telegram was sent by Weisskopf to Halban in Joliot's laboratory reminding Joliot of my letter and advising him that we were approaching the British physicists. Another telegram was sent by Weisskopf to Blackett in England suggesting that the British withhold all publications on this subject. A letter was sent by Wigner to Dirac in Cambridge, England, to the same effect. Blackett cabled to Weisskopf that the collaboration of the Royal Society could be expected, but Joliot's reply was not satisfactory. Joliot's cable pointed out that articles had appeared in the American press in February which were based on statements by Roberts in Tuve's laboratory and let the cat out of the bag. To this cable of Joliot I replied that we had in the meantime secured the collaboration of Tuve's laboratory and I urged Joliot to agree to a collaboration in this matter. The answer of Joliot to my telegram was negative.

The text of all these telegrams as well as Joliot's final letter is inclosed.

PALMER PHYSICAL LABORATORY  
PRINCETON UNIVERSITY  
PRINCETON NEW JERSEYNew York  
April 30, 1939

To Dirac (K.W.)

Dear Paul:

I am writing to you in a rather serious matter this time. The enclosed letter, sent by Szilard to Joliot on February 2nd is self explanatory. Experiments undertaken since that time by Fermi and by Szilard did not help to dispell the fear which prompted Szilard's letter. In realisation of the danger mentioned in this letter, all efforts are made here to delay publications relating to this subject as these could possibly enhance the danger of a grave misuse by certain powers. The papers of Szilard and of Fermi, although received by the Physical Review some time ago, are withheld from publication and it is intended that they be printed only in the form of reprints to be distributed among the most interested laboratories in England, the U.S., France and Denmark. Similar arrangements are intended for all papers on this subject by other workers in the United States.

Halban - Joliot - Kowarski's letter to Nature prompted the physicists who loyally cooperated here to inquire today by cable concerning Joliot's attitude in this matter. Bohr undertakes to communicate with Copenhagen and a cable is sent simultaneously to Blackett. The proposition made in these communications is to use for the publication of all papers, relating to this subject, the method foreseen for this purpose for workers in the U.S. and described above.

What we would like to ask you at this time is to get in touch with Blackett and to actively support him in his endeavours if you find our position to be the reasonable one.

It is my impression that there is some urgency in the matter. Although there exists apparently a great willingness for cooperation here, it is realised that the interests of the scientific workers in the U.S. may be prejudiced to some extent if America obeyed alone by the proposed procedure.

Hoping to hear from you soon and with best regards to all,

Sincerely

J. J. J.

From Wigner (K. W.)

CLASS OF SERVICE DESIRED	
DOMESTIC	CABLE
TELEGRAM	FULL RATE
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NIGHT LETTER	SHIP RADIOGRAM

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# WESTERN UNION

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1207-A

CHECK
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Send the following message, subject to the terms on back hereof, which are hereby agreed to

March 31st 19 39

To BLACKETT PHYSICS DEPARTMENT VICTORIA UNIVERSITY

Street and No. \_\_\_\_\_

Place MANCHESTER

PHYSICISTS HERE HAVE SENT PAPERS TO PHYSICAL REVIEW ON SUBJECT RELATED  
 TO HALBAN JOLIOU LETTER TO NATURE STOP AUTHORS AGREED TO DELAY  
 PUBLICATION IN VIEW OF REMOTE BUT NOT NEGLIGIBLE CHANCE OF GRAVE MISUSE  
 IN EUROPE STOP IT IS SUGGESTED THAT PAPERS BE SENT TO PERIODICALS AS  
 USUAL BUT PRINTING BE DELAYED UNTIL IT IS CERTAIN THAT NO HARMFUL  
 CONSEQUENCES TO BE FEARED STOP RESULTS WOULD BE COMMUNICATED IN  
 MANUSCRIPTS TO COOPERATING LABORATORIES IN AMERICA ENGLAND FRANCE AND  
 DENMARK STOP IS IT POSSIBLE FOR YOU TO OBTAIN COOPERATION OF NATURE AND  
 PROCEEDINGS ? WIGNER WRITING XXX DIRAC STOP ~~WIGNER~~ WEISSKOPF FINE  
 HALL PRINCETON NJ

Sender's address  
for reference

WESTERN UNION GIFT ORDERS SOLVE THE PERPLEXING  
QUESTION OF WHAT TO GIVE.

Sender's telephone  
number

Bk. f. 3 ⑤

1207-A

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DOMESTIC	CABLE
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DAY LETTER	DEFERRED
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NIGHT LETTER	SHIP RADIOGRAM

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PRESIDENT

NEWCOMB CARLTON  
CHAIRMAN OF THE BOARD

J. C. WILLEVER  
FIRST VICE-PRESIDENT

Send the following message, subject to the terms on back hereof, which are hereby agreed to  
March 31, 1939 (K.W.) 19

To HANS VON HALBAN  
Street and No. 11 RUE GUYMELER  
Place SCEAUX SEINE

KINDLY INFORM JOLIOT THAT PAPERS RELATING TO SUBJECT OF YOUR JOINT NOTE TO NATURE HAVE BEEN SENT BY VARIOUS PHYSICISTS TO PHYSICAL REVIEW BEFORE PUBLICATION OF YOUR NOTE STOP AUTHORS AGREED HOWEVER TO DELAY PUBLICATION FOR REASONS INDICATED IN SZILARDS LETTER TO JOLIOT FEBRUARY SECONDS AND THESE PAPERS ARE STILL HELD UP STOP NEWS FROM JOLIOT WHETHER HE IS WILLING SIMILARLY TO DELAY PUBLICATION OF RESULTS UNTIL FURTHER NOTICE WOULD BE WELCOME STOP IT IS SUGGESTED THAT PAPERS BE SENT TO PERIODICALS AS USUAL BUT PRINTING BE DELAYED UNTIL IT IS CERTAIN THAT NO HARMFUL CONSEQUENCES TO BE FEARED STOP RESULTS WOULD BE COMMUNICATED IN

Sender's address for reference WESTERN UNION GIFT ORDERS SOLVE THE PERPLEXING QUESTION OF WHAT TO GIVE. Sender's telephone number

MANUSCRIPTS TO COOPERATING LABORATORIES IN AMERICA ENGLAND FRANCE AND DENMARK STOP CONF. UNICATING BLACKETT AND DIRAC IN ATTEMPT TO UNHINDER COOPERATION OF NATURE AND PROCEEDINGS ROYAL SOCIETY STOP PLEASE CABLE WEISSKOPF FINE HALL PRINCETON NJ

Sender's address for reference WESTERN UNION GIFT ORDERS ARE APPROPRIATE GIFTS FOR ALL OCCASIONS. Sender's telephone number

March 31, 1939  
(K.W.)

Bk.f.3 ⑥

3

D

HANS VON HALBAN

11 RUE GUYENNE

SCEAUX SEINE

KINDLY INFORM JOLIOT THAT PAPERS RELATING TO  
SUBJECT OF YOUR JOINT NOTE TO NATURE HAVE BEEN  
SENT BY VARIOUS PHYSICISTS TO PHYSICAL REVIEW  
BEFORE PUBLICATION OF YOUR NOTE STOP AUTHORS  
AGREED HOWEVER TO DELAY PUBLICATION FOR REASONS  
INDICATED IN SCILLARDS LETTER TO JOLIOT FEBRUARY  
SECOND AND THESE PAPERS ARE STILL HELD UP BUT  
NEWS FROM JOLIOT WHETHER HE IS WILLING SIMILARLY  
TO DELAY PUBLICATION OF RESULTS UNTIL FURTHER  
NOTICE WOULD BE WELCOME STOP IT IS SUGGESTED  
THAT PAPERS BE SENT TO PERIODICALS AS USUAL BUT  
BE HELD UP UNTIL IT IS CERTAIN THAT NO HARMFUL  
CONSEQUENCES TO BE FEARED STOP RESULTS WOULD BE  
COMMUNICATED IN MANUSCRIPTS TO COOPERATING  
LABORATORIES IN AMERIKA ENGLAND FRANCE AND DENMARK  
STOP COMMUNICATING BLACKETT AND DIRAC IN ATTEMPT  
TO GET COOPERATION OF NATURE AND PROCEEDINGS ROYAL  
SOCIETY STOP PLEASE CABLE

WEISSKOPF

FINE HALL PRINCETON NJ

March 31, 1939

(A.W.)

Bk. 3

(7)

4

HANS VON HALBAN

11 RUE GUYNEMER

SCEAUX

SEINE

KINDLY INFORM JOLIOT THAT PAPERS RELATING TO  
SUBJECT OF YOUR JOINT NOTE TO NATURE HAVE BEEN  
SENT BY VARIOUS PHYSICISTS TO PHYSICAL REVIEW  
BEFORE PUBLICATION OF YOUR NOTE STOP AUTHORS  
AGREED HOWEVER TO DELAY PUBLICATION FOR REASONS  
INDICATED IN ~~SE~~ SE IL ARDS LETTER TO JOLIOT FEBRUARY  
SECOND AND THESE PAPERS ARE STILL HELD UP STOP  
NEWS FROM JOLIOT WHETHER HE IS WILLING SIMILARLY  
TO DELAY PUBLICATION OF RESULTS UNTIL FURTHER  
NOTICE WOULD BE WELCOME STOP IT IS SUGGESTED  
THAT PAPERS BE SENT TO PERIODICALS AS USUAL BUT  
PRINTING BE DELAYED  
~~BE HELD UP~~ UNTIL IT IS CERTAIN THAT NO HARMFUL  
CONSEQUENCES TO BE FEARED STOP RESULTS WOULD BE  
COMMUNICATED IN MANUSCRIPTS TO COOPERATING  
LABORATORIES IN AMERICA ENGLAND FRANCE AND DENMARK  
STOP COMMUNICATING BLACKETT AND DIRAC IN ATTEMPT  
TO GET COOPERATION OF NATURE AND PROCEEDINGS ROYAL  
SOCIETY STOP PLEASE CABLE

WEISSKOPF

FINE HALL PRINCETON NJ





(Between March 31 and April 2  
1939)  
K.W.

Bk f. 3 (44)

Victor Weisskopf  
University of Rochester

Dear Blackett, (March 31, 1939)

I hope you were not too much upset about my telegram. But I believe that you realize the great danger which would arise, if one really could construct a bomb with uranium. The probability that this is possible might be small, but the product of the probability with the graveness of the consequences is high.

I enclose here first a letter which Scillard has written to Joliot Febr. 2. Joliot has not answered this letter and we do not know Joliot's attitude to the whole situation after his recent publication. I have sent to Halban a similar telegram as to you urging him to cooperate.

Further I enclose a note which Scillard has sent to Physical Review but the publication of which is being delayed. There are other papers from Columbia sent in and kept back, which could be sent to you if the cooperation begins to work. I am also enclosing a letter from Scillard to myself which gives you further details about about his experiments.

I would like tell you how far the cooperation here for delaying "dangerous" manuscripts has developed so far. We know that the group around Tve is now willing to cooperate. Lawrence is coming here on April 3rd. and we shall discuss the matter with him then. Tate (editor of Phys. Rev.) is being approached and it is suggested that authors who may send in manuscripts concerning "dangerous" neutron

emissions be advised to communicate with us. We shall send you a xrb cable when a definite procedure has been decided upon in connection with Phys. Rev.

Much love to your family.

Very truly yours

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TELEPHONE, YOUR TELEGRAMS TO POSTAL TELEGRAPH



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Form 11 N33 43 DL 4 EXTRA=PARIS FRANCE 4 VIA WB WASHINGTON DC 1235P

DR LEO SZILARD=  
DEPT OF PHYSICS COLUMBIA UNIV NYC=

APR 5 1939

BIEN RECU LETTRE SZILARD MAIS PAS CABLE ANNONCE STOP PROPOSITION  
DU 31 MARS TRES RAISONNABLE MAIS VIENT TROP TARD STOP AVONS  
APPRIIS SEMAINE DERNIERE QUE SCIENCE SERVICE AVAIT INFORME PRESSE  
AMERICAINE 24 FEVRIER SUR TRAVAUX ROBERTS STOP LETTRE SUIT.

JOLIO HALBAN KOWARSKY

126P

31 24

COPY

-2-

April 6, 1939

JOLIO  
COLLEGE DE FRANCE PARIS

REPLYING YOUR CABLE WEISSKOPF STOP ROBERTS PAPERS CONCERNING DELAYED  
NEUTRON EMISSION WHICH IS MUCH WEAKER THAN HE THINKS AND HARMLESS  
STOP HOWEVER TUVES GROUP WAS RECENTLY APPROACHED AND PROMISED  
COOPERATION STOP WE HAVE SO FAR DELAYED PAPERS IN VIEW OF POSSIBLE  
MISUSE IN EUROPE STOP KINDLY CABLE AS SOON AS POSSIBLE WHETHER  
INCLINED SIMILARLY TO DELAY YOUR PAPERS OR WHETHER YOU THINK THAT  
WE SHOULD NOW PUBLISH EVERYTHING STOP

KINGS CROWN HOTEL SZILARD

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Send the following message, subject to the terms on back hereof, which are hereby agreed to

To Robert Rolley de France Paris Apr. 6

Street and No. REPLYING YOUR CABLE WEISSKOPF ~~PLEASE~~

Place IN REPLY TO YOUR CABLE WEISSKOPF

ROBERTS PAPERS DEAL WITH DELAYED NEUTRON  
EMISSION WHICH <sup>IS</sup> ~~WELCASUBA~~ (HARMLESS AND  
<sup>ALSO</sup> MUCH WEAKER THAN HE THINKS AND  
STOP HOWEVER ~~TUVE'S GROUP~~ WAS RECENTLY ~~APPROACHING~~  
~~TUVE'S GROUP~~ APPROACHED AND PROMISED COOPERATION STOP ~~WE~~  
~~OTHERS AND~~ I HAVE SO FAR DELAYED ~~PUBLICATION~~  
~~OF~~ PAPERS IN VIEW OF POSSIBLE MISUSE IN  
EUROPE STOP KINDLY CABLE <sup>AS SOON AS POSSIBLE</sup> ~~YOUR DECISION~~ <sup>YOUR</sup> DECISION  
WHETHER ~~HOWARD~~ INCLINED SIMILARLY TO DELAY  
~~YOUR~~ ~~HOWARD~~ PAPERS OR WHETHER YOU <sup>THINK</sup> ~~WANT~~ THAT

Sender's address  
for reference

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QUESTION OF WHAT TO GIVE.

Sender's telephone  
number

To \_\_\_\_\_

Street and No. \_\_\_\_\_

Place FOR

~~REPLYING YOUR CABLE WEISSKOPF~~ WE SHOULD NOW  
OUR PAPERS BE ~~REPLYING YOUR CABLE WEISSKOPF~~ PUBLISHED  
WITHOUT REGARD <sup>LESS OF</sup> TO POSSIBLE <sup>EVERYTHING</sup> CONSEQUENCES STOP  
KINGS CROWN HOTEL SZILARD

EVERYTHING

King's Crown Hotel



420 WEST 116TH STREET  
NEW YORK

OPPOSITE COLUMBIA UNIVERSITY

Apr. 7. - 39.

Dear Professor Joliet,

enclosed you will find a  
manuscript, for your  
personal information, which  
has been sent to Phys. Rev.  
on March 16<sup>th</sup>. Its publica-  
tion has so far been delayed  
for reasons <sup>of</sup> which you know. -

A definite policy in this  
respect was not agreed  
upon until March 20<sup>th</sup>  
and I was on the point of  
sending you a cable about  
it on that day, when I  
learned of your Note to Nature.

I sent you a cable yesterday  
and when we shall have your  
reply we shall discuss here  
again this question of postpo-  
ning publications.

With best wishes

Yours sincerely

Leo Tolstoy

Appropositive



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Form 16

N54 14 CABLE VIA FRENCH=PARIS 1850 APR 7 1939

LC SZILARD=

KINGSCROWN HOTEL NY=

( SZILARD CARE KINGS CROWN HOTEL 420 W 116 ST )=

QUESTION ETUDIEE SUIIS D AVIS MAINTENANT PUBLIER AMITIES=

JOLIOT

3 15P

Bk. f. 3.

JOLIOU COLLEGE DE FRANCE PARIS

HAVING RECEIVED YOUR CABLE IT HAS BEEN DECIDED TO PUBLISH PAPERS  
PREVIOUSLY SENT TO PHYSICAL REVIEW GREETINGS SZILARD

CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable symbol above or preceding the address.

# WESTERN UNION

1201

SYMBOLS

- DL = Day Letter
- NL = Night Letter
- LC = Deferred Cable
- NLT = Cable Night Letter
- Ship Radiogram

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(33)

The filing time shown in the date line on telegrams and day letters is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

Received at Lower Pine Ridge, Princeton, NJ  
NAN307 VIA RCA=CD LLANFROTHENPOSTOFFICE 25 8 1939 APR 8 PM 9 39

NLT WEISS-KOPF=

FINE HALL PRINCETON(NJ) USA=

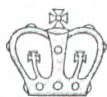
YOUR SUGGESTION PASSED TO NATURE AND ROYAL WHO WILL SURELY  
COOPERATE STOP AWAITING LETTER WITH DETAILS=  
BLACKETT.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

UNDER  
KNOTT MANAGEMENT

TELEPHONE  
UNIVERSITY 4-2700

*Kings Crown Hotel*



420 WEST 116<sup>TH</sup> STREET  
NEW YORK

OPPOSITE COLUMBIA UNIVERSITY

~~*Kings*~~

~~*Room 212 99167*~~

*Blanchett Telegram Wisconsin  
Apr 20*

*June suggestion passed by  
Nabure and Prugel who  
will surely cooperate  
shop awaiting letter with  
details Blanchett*

S b s bk flr 3

# COLLÈGE DE FRANCE

Laboratoire de Chimie Nucléaire

Paris, le 19 avril 1939

Place Marcellin-Berthelot  
PARIS (V<sup>e</sup>)

Téléph. : ODÉON 81-60

Monsieur L. SZILARD  
Kings Crown Hotel  
420 West 116th street  
New - York

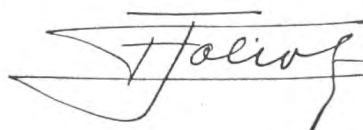
Mon cher Szilard,

J'ai bien reçu votre lettre du 7 avril et votre intéressante note sur la libération des neutrons. Nous avons continué les recherches sur cette question et vous trouverez ci-joint le texte manuscrit d'une note que nous avons envoyé à Nature. Il est malheureusement trop tard pour que nous puissions ajouter en référence votre communication, cependant nous ne manquerons pas de le faire dans un article général qui sera publié prochainement.

J'étais très embarrassé en ce qui concerne l'ajournement des publications sur ce sujet, étant certainement l'un des premiers à comprendre vos raisons. Cependant vous pouvez comprendre que nous ne sommes pas, ainsi que ceux que vous avez pu prévenir, les seuls à nous occuper de cette question, et rapidement nous avons pu lire dans des publications scientifiques et dans la presse d'information, en France et à l'étranger, des articles où étaient clairement expliquées les conséquences énergétiques du phénomène en question. Ce sont les seules raisons qui ont motivé les termes de mon dernier câble. Je suis certainement d'accord avec le principe d'une entente, mais pour qu'elle soit efficace il faut qu'elle soit étendue à tous les laboratoires susceptibles de s'occuper de la question.

Je vous serais reconnaissant de bien vouloir faire part de ces considérations aux collègues américains que vous avez pu touchés.

Avec mes sincères salutations,



2nd set  
May 1969 ✓

Additional Material for pages 109-110

re: SECRECY, SPRING 1939 (continued) (3)

"Collapse of Secrecy - April 1939" (from Compton memo)

Letter, L.S. to Pegram  
Typed copy March 27, 1939

Letter, Zimm to Pegram (Undated, probably near March 27, 1939)  
Typed copy

Also, handwritten originals of above two letters.

Letter, L.S. to Blackett (Not sent) April 11, 1939

Telegram, L.S. to Blackett April 14, 1939

Letter, L.S. to Blackett April 14, 1939

Letter, Wigner to L.S. April 17, 1939  
Szilard had this first paragraph of Wigner's April 17th letter copied as a separate document. The entire letter, handwritten, is included with the material on the second beryllium block, p. 108.

Letter, Weisskopf to L.S. April 17, 1939-kw,

~~Letter, Joliot to L.S. April 19, 1939~~

[now known to A.H. Compton  
Nov. 12, 1942]

Bk f. 3

(34)

5

### COLLAPSE OF SECRECY - APRIL 1939

After Joliot's final refusal to collaborate, all my colleagues at Columbia University expressed themselves in favor of publishing our papers. I continued to take the stand that irrespective of Joliot's policy, we ought not to publish our own work. Pegram, the head of the department, was undecided. It seemed impossible to reconcile the two opposing views, and Professor I. Rabi at Columbia, who was not himself involved in this work, gave me a friendly warning that if I continued to take such an irreconcilable stand, I would probably be left without facilities for further work at Columbia. At the suggestion of Fermi, we finally agreed to leave the decision up to Pegram, the head of the department.

Having expressed our views orally to Pegram, Dr. Zinn and I put down our <sup>(opposing)</sup> views also in writing in the form of letters addressed to Pegram. A copy of Dr. Zinn's letter and my own is enclosed. <sup>Mar 27, 1939</sup> Before we could hand over these letters, Dr. Pegram decided, after one week of deliberation, to release our papers for publication.

I informed Blackett in England, <sup>Apr 14, 1939</sup> and Wigner, that the policy of secrecy has been abandoned. <sup>Apr 17, 1939</sup> Wigner's reply to my communication was to urge me to advise the United States Government of the situation. A photostatic copy of his letter is enclosed. ~~II~~

These letters by Szilard and Zinn did not actually reach Professor Pegram since in the meantime Professor Pegram decided to release the papers for publication. The hand-written originals are in my files.

L. Szilard

C  
O  
P  
Y

March 27, '39

Dear Professor Pegram:

It seems we shall have to decide today about delaying the letter which Zinn and I sent to the Physical Review. I feel that if we delay this letter now, and if you write to Tate along the lines which Fermi suggested on his return from Washington, we may have a chance, although not a very great one, to get others to cooperate. If we publish now, we cannot ask others to withhold future, perhaps more important, papers. Zinn, I believe, is of somewhat different opinion. It seems that in the circumstances you, as head of the department, will have to take the responsibility for deciding this difficult question, one way or another. I am very sorry to have to worry you with this awkward decision, but it happens only once in a lifetime.

Yours sincerely,

Leo Szilard



BK. f. 3 (36)

These letters by Szilard and Zinn did not actually reach Professor Pegram since in the meantime Professor Pegram decided to release the papers for publication. The hand-written originals are in my files.

L. Szilard

C  
O  
P  
Y

C  
O  
P  
Y

Dear Professor Pegram:

Dr. Szilard has shown me the note he has written concerning the publication of our letter. I dislike very much imposing on you to the extent of asking you to decide this question. However, Szilard and I do take opposite views. My opinion may be summed up as follows:

Withholding publication cannot now keep the matter from becoming generally known among physicists here and abroad. A small rumor to certain people would start them off on experiments just as quickly as a full publication.

Joliot's paper already provides them for an excuse to begin work.

Our fears apparently are not shared by the French workers and I can hardly believe that they are ignorant of the possibilities. Withholding publication can, at most, delay the discoveries we fear for some months, in which case secrecy would be impossible. On the other hand, publication would accelerate research work in several laboratories and I feel that this country will not be put on the "spot" by its research workers failing to do their job.

Finally, withholding publication sets a new and undesirable precedent among physicists.

Despite the above arguments I would be influenced a great deal by Professor Fermi's opinion. My reason for this is that he inevitably will be forced to accept the major part of blame or honor which might result from these publications. Columbia University also has a vital interest in the matter from this viewpoint and therefore I am inclined to give your opinion great weight.

W. H. Zinn

March 27, 1939  
(K.W.)

Dear Prof. Pegram:

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Not sent,  
since Pegram had  
already decided to  
publish

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major part of blame or  
honor which might result  
from these publications.

Columbia University also  
has a vital interest in the  
matter from this viewpoint  
and therefore I am inclined  
to give your opinion great  
weight.

W. H. Prinn

March 27<sup>th</sup> - 39

Bk. f. 3

(42)

Not sent,  
since P. O. program had  
already been decided to  
publish

Dear Professor Pegoan,  
It seems we shall  
have to decide today  
about delaying the letter  
which Tim and I sent  
to Phys. Rev. -

I feel that if we delay  
this letter now, and if  
you write to Taha along  
the lines which Fermi  
suggested on his return  
from Washington, we  
may have a chance,  
though not a very great  
one, to get others to  
cooperate. If we publish  
now, we can not ask  
others to withhold future,  
perhaps more important  
papers.

Liam, I believe, is of somewhat different opinion.

It seems that in the circumstances you as Head of the Department will have to take the responsibility for deciding this difficult question one way or another.

I am very sorry to have to worry you with this awkward decision but it happens only once in a life time.

Yours sincerely  
Len P. Ford

*Not sent*

Hotel King's Crown  
420 West 116th Street  
New York City

April 11th, 1939

Dear Blackett:

Your cable to Weisskopf has been sent on to me from Princeton for our information at Columbia. There will be another discussion of the whole matter this afternoon with Pegram who is in charge of the Physics Department, and I shall send you a cable to-morrow to let you know what is being done here.

I am sending this letter with the Columbus, which is sailing today, and am therefore necessarily limited to a few remarks. I hope these remarks will be sufficient for the present. The Aquitania is sailing on Saturday, and by then I can prepare a more detailed account if it should prove necessary to do so.

~~The following~~

The number of neutrons emitted per fission seems to be larger than one, but I personally am not certain of this point. Others are more firmly convinced of this at present than I am. There is a concensus of opinion that the reaction, if it goes via thermal neutrons, will not be sufficiently violent to cause concern.

If no paraffin or water is used the neutrons are probably slowed down by inelastic collisions to about 100 000 volts. It is then at present anybody's guess whether capture of these neutrons will or will not be sufficiently small to make the

reaction possible. The fission cross section which we are measuring for neutrons of about 100 000 volts is small, so that the amount of material required is quite large. It is not too large however for practical applications, if carried by boat rather than by plane.

The following is strictly for your personal information only: It is this reaction via these non-thermal neutrons which is causing concern. At first sight one might think that in the presence of neutrons ( and neutrons may always be present, for instance due to cosmic rays) the reaction could not lead to very high pressures because as soon as the pressure increases the density decreases, and the reaction is stopped due to this decrease in density. This is a fallacy; it requires only simple tricks to get around this difficulty and to arrange matters so that extremely high pressures can be reached. I can explain this more fully some other time. All this, of course, presupposes that capture does not overcompensate fission in the region of 100 000 volt neutrons.

This is all for today. With best wishes,

yours sincerely,



(Leo Szilard)



1 Bk. S. 3

PROFESSOR BLACKETT VICTORIA UNIVERSITY MANCHESTER

~~RE~~

ACTION PROPOSED

~~REFERRING CABLE WEISKOPE STOP CABLES FROM JOLIOU OPPOSE~~  
WEISKOPE'S CABLE

WAS ~~DELAYING PUBLICATIONS STOP THEREFORE PROPOSED ACTION WAS~~  
DROPPED

~~STOPPED~~ HERE YESTERDAY AND ~~SOME~~ PAPERS WILL APPEAR ~~IN NEXT~~

~~ISSUE~~ PHYSICAL REVIEW STOP LETTER FOLLOWS SZILARD

Apr. 14

Hotel King's Crown  
420 West 116th Street  
New York City

April 14th, 1939

Dear Blackett:

Referring to your cable which I received from Weisskopf I have to inform you of the following: A cable correspondence with Joliot showed that Joliot is not inclined to delay his future papers and apparently is of the opinion that it is too late for the proposed action which might have been a reasonable solution if it had been applied at an earlier date. Influenced by Joliot's stand and also by papers which have been printed in the C. R., it has been decided here to publish the papers which have been sent to Physical Review some time ago and which were so far held up. A cable will be sent to you today or to-morrow to inform you that no action along the lines suggested by Weisskopf will at present be pursued in this country. I personally regret this decision for reasons which I have to explain to you some other time, this being a hurried note only. It is conceivable that there will be a change of attitude, and if that happens undoubtedly you will be informed as soon as possible.

With best wishes,

yours sincerely,

(Leo Szilard)

1

COPY OF WIGNER'S LETTER TO SZILARD

April 17, 1939

Dear Szilard:

Thank you for letting me have the news concerning the abandonment of any policy in the publication matter. I cannot help feeling, on the one hand, that this was, under the conditions, a wise decision as nothing really could be achieved in this matter. On the other hand I do feel, and I do feel it very strongly, that the U.S. Government should be advised of the situation. This is indicated, among many other reasons, by the necessity of preparing it to a possible sudden threat. Let me know, please, whether you have already taken steps in this direction and whether you intend to take some in the near future.

THE UNIVERSITY OF ROCHESTER

COLLEGE OF ARTS AND SCIENCE

ROCHESTER, NEW YORK

DEPARTMENT OF PHYSICS

April 17.

Lieber Szilard,

Danke für Ihren Brief. Sie haben hoffentlich  
Blackett vom Zusammenbruch der Kooperation  
telegraphisch mitgeteilt.

Ich bin sehr neugierig auf die Resultate  
Ihrer weiteren Versuche. Ich bin Donnerstag u.  
Freitag in Washington, Samstag u. Sonntag in  
New York. Die langsame Bombe dürfte nicht  
fehlen auf Grund von Diskussionen zwischen Teller, Poles,  
Bethel u. mir.

Feyl. J. J. J.

Herr Wissenschaft!

2nd set  
May, 1969 ✓

Additional Material for page 110

re: "PEGRAM...DECIDED THAT WE SHOULD NOW PUBLISH EVERYTHING."

Szilard expresses his regret in:

- |                                 |                |
|---------------------------------|----------------|
| Letters, L.S. to Ben Liebowitz, | April 18, 1939 |
| L.S. to Cox                     | April 18, 1939 |
| L.S. to Richards                | April 18, 1939 |

see also: in material on Strauss Correspondence,  
L.S. to Strauss, April 14, 1939

Strauss to L.S. April 17, 1939

The manuscript referred to is: "Instantaneous Emission of Fast Neutrons in the Interaction of Slow Neutrons with Uranium" by Leo Szilard and Walter H. Zinn, PHYSICAL REVIEW 55:799-800, (April 15, 1939).

K.W.

April 18th, 1939

Dear Ben:-

The enclosed Manuscript, I am  
sorry to say, will appear in the next  
issue of Physical Review.

Yours,

(Leo Szilard)

[To: Weisskopf: 1.10.39]

April 18th, 1939

Dear Cox:-

Enclosed you will find a manuscript which will be printed in the next issue of Physical Review. Unfortunately it was so far not possible to get the co-operation of Paris, and Pegram decided after some hesitation to let the papers come out in these circumstances. Please pass the manuscript on to Whitaker when you have finished with it.

With kind regards,

yours,

(Leo Szilard)

April 18th, 1939

Dear Richards:-

It has now been decided to let the papers come out in the next issue of Physical Review, and I wanted you to be informed of this fact.

With kind regards,

yours,

(Leo Szilard)



2nd set ✓  
May, 1969

Additional material for page 109.

re: Guest at Columbia for three months

Letter, George B. Pegram to L.S.

April 6, 1939 ✓

bkf 2

D

Columbia University  
in the City of New York

DEPARTMENT OF PHYSICS

April 6, 1939

Dr. Leo Szilard,  
Pupin Physics Laboratories,  
Columbia University.

Dear Dr. Szilard:

I told you that I would write you a letter to put on record my invitation to you to be a guest of the Department of Physics until June 1, 1939 to work on certain researches with Dr. Zinn and to have the privileges that are appropriate for a guest in our laboratory. Laboratory keys have already been issued to you, and I enclose with this a card by the use of which you can obtain a key to the outer door of the building by calling at Room 111 Low Memorial Library so that you may have access to the laboratory at times when the outer door is closed. The key obtained with this card is to be returned on leaving the building.

Sincerely yours,



George B. Pegram

GBP:H

2nd set ✓  
May 1969

Additional Material for page 110

re: GOLDHABER. "I was in constant communication with Goldhaber...  
and he was pledged to secrecy."

Letter, Goldhaber to L.S.

April 12, 1939 ✓

Letter, L.S. to Goldhaber

April 18, 1939 ✓

UNIVERSITY OF ILLINOIS  
DEPARTMENT OF PHYSICS  
URBANA

April 12, 1939

Dear Szilard,

Thank you for the paper. It reached me just before I was leaving for a trip to Madison, Wisconsin, together with Rabi.

I suppose you would have detected delayed neutrons with the He chamber if these neutrons had an energy of  $\sim 5$  M.e.v. as Roberts et al. estimate. This makes either Roberts' estimate of the cross section for production of the 'delayed neutron' emitter much too large or your multiplication value too small. Roberts' estimate seems on the face of it unlikely high. - Have you any idea how fast your <sup>multiplication</sup> neutrons are?

Of course, it is a good idea to keep results secret until it is settled whether the U-bomb is possible, in reasonable dimensions, or not. Let us hope not. But if yes, it is important to be a step ahead of the dictator countries, though I fear it means only a step ahead. Have you thought of definite steps of buying off all U-<sup>(etc.?)</sup> supplies? A map of their distribution on the earth looks a

little discouraging, though it is only a qualitative one, which I looked up. — I fear you will not be too successful with the attempt to keep results secret. The first indications that people in Berlin are doing similar work appear in Naturwiss. <sup>(arrived to - day)</sup> in an article of Droste who with Reddemann is looking for further neutrons, when D+D neutrons are used on U. He mentions this at the end of a letter. As soon as the first papers from Germany appear, I am sure, many of those who have agreed to secrecy will see no further good in it, ~~but~~ <sup>and</sup> though they are right as far as the ultimate results are concerned, the immediate effect of secrecy is very important. Have you any results on Th?

Talking of 'secrets': Please keep this a secret for the time being. I have become engaged to Trude Schuff, and working on the hypothesis that there will be no war within the next few weeks (a very weak hypothesis, I fear) I have just been an invitation (from Luovis) to come here on a visitor's visa. When she is here we can get married and then she can immigrate non-quota via Canada. This seems the only workable plan in a hurry.

I have written to Fowler.

Kind regards  
Yours M. Goldhaber

Bk f 2      x

Hotel King's Crown  
420 West 116th Street  
New York City

April 18th, 1939

Dear Goldhaber:-

Congratulations!

I assume that you are going to the Washington meeting. If so, wouldn't you like to spend a few days in New York? I am sure you could help us with our experiments if you were here. So try to arrange matters so that you pass through New York either on your way to Washington or on your way back to Urbana.

Though I have written to Joliot early in February, as you will see from the enclosed letter, it was not possible to arrange a co-operation with Paris. Essentially for this reason Pegram has finally decided to let the papers appear, and you will see them in the next issue of Physical Review.

Let me know your plans and also if you succeeded in getting the visitors visa for T. S.

Yours,

(Leo Szilard)

P.S. Please could you send me as soon as possible 50 to 100 reprints of our joint indium paper?

2nd set  
May, 1969 ✓

Additional Material for page lll.

re: "PLACZEK'S HELIUM" (paragraph 1)

also "WE WROTE UP OUR PAPER..." (paragraph 2, and Note 23)

Letter, Fermi to L.S.

June 26, 1939 ✓

The second paragraph actually uses the term "Placzek's helium."

Letter, Fermi to L.S.

July 1, 1939 ✓

These two Fermi letters appear to refer to the paper mentioned on page lll, i.e.

Letter, Placzek to L.S.

The date is unclear. This letter was shown to Dr. Maurice Goldhaber in late 1968 while he was visiting La Jolla. He agreed that its date was probably 1939. It might be 30/vi 39, or June 30, 1939.

Ann Arbor, June 26 1939

Dear Szilard,

I have read the changes in the text of the letter that you suggest. I have no objection to including a paragraph to stress the fact that reduction of the absorption before thermal energy might make a chain reaction possible.

My reasons are: a) that the fact is very probably true. b) That it seems to me not impossible that by using either a suitable geometry or even Placzek's helium at 10000 atmospheres pressure one should eventually succeed.

It seems to me, however, that we cannot claim that this result follows from our experiments only. Since it could be just as well deduced from Joliot's data. It is perfectly true that he probably did not realize entirely the dependence of the resonance absorption on the concentration and on the geometry. But it doubtlessly follows from his letter that according to him the production of neutrons exceeds the absorption at thermal energy only since it exceeds the total absorption (thermal + resonance).

One could perhaps change the last paragraph as follows:

The fact that more neutrons are emitted than are absorbed at thermal energies ~~is independent of the special conditions of the experiment.~~ 1.5 neutrons emitted, according to our measurement, per neutron absorbed at thermal energy, is however independent of the ~~special conditions of the experiment.~~ This fact shows that if it will ~~be~~ prove possible to slow down the neutrons to thermal energy preventing in some way their absorption at resonance a chain reaction will probably be maintained.

of Joliot's experiment and of ours.

Sincerely yours

*Enrico Fermi*



BK. + 4. ②  
1-9

UNIVERSITY OF MICHIGAN  
ANN ARBOR

DEPARTMENT OF PHYSICS

July 1 1939

Dear Szilard:

Thank you for sending me the copies of the last edition of the letter. I have no changes to suggest and it seems to me that everything is clearly explained.

So far I had no opportunity of performing any experiment because the cyclotron is at present out of order. But as soon as it starts working again I want to repeat first of all the last experiments that we did on the absorption of the resonance neutrons because the results that we got seem to me rather crazy!

I am thinking of several possibilities for reducing the absorption at resonance during the slowing down process, and I shall let you know if I reach any conclusion.

Yours

*Enrico Fermi*  
Enrico Fermi

shc 10/2  
[Weart]  
? 30 Nov 1939  
30/11 34.

London 8.2.1939,

Herrn. Geschwinn

ist auf den Umstand zurückzuführen, dass  
meine Käll weder verschwunden ist, u. zw., wie  
ich vermute, im Bette des Zimmers 315.

Vielleicht können Sie so freundlich sein,  
dies bezüglichliche Recherchen anzustellen und  
im positiven Falle das gebührende Objekt  
mir nach Indiana zu senden zu lassen.

Es würde Ihnen dann einen leserlichen Dank-  
brief schreiben können.

Vorliegende Gelegenheit kann ich gleich  
benützen, um Ihnen eine Formel für  
den  $\bar{v}$  mit zu schicken, die für jede Masse  
gültig bleibt. Es ist

$$\bar{v} = \frac{2Nc^2}{1 - \cos \alpha} \quad (1)$$

Nun ist  $N = \frac{\ln \frac{E_0}{E}}{\ln \frac{E_0}{E_1}} = \frac{\ln \frac{E_0}{E}}{1 + \frac{1-d}{2} \ln(1-d)}$

(Mittelwert des  $\ln \frac{E_0}{E}$  nach einem Stoß)

$$(2) \quad \alpha = \frac{4M}{(M+1)^2}$$

Maximale Energieüber-  
lent.

Weitern ist der mittlere Wert des Absorptionskoeffizienten

$$\overline{\mu} = \frac{2}{3M} \quad (3)$$

Somit hat man:

$$\overline{\mu} = \frac{6M}{(3M-2) \left( 1 + \frac{1-\alpha}{2} \ln(1-\alpha) \right)} \cdot c^2 \ln \frac{E_0}{E} = f \cdot c^2 \ln \frac{E_0}{E} \quad (4)$$

Für Wasserstoff ( $M=1$ ) wird der Faktor  $f$

$$f = 1,$$

für  $M \gg 1$  wieder

$$f = M,$$

wie es sein muss.

Für die Zersetzungsenergie folgende Tabelle:

	M	f
H	1	6
D	2	4,15
He	4	5,65
C	12	13,4
	$\gg 1$	M

Für C ist also der Grenzwert  $M$  schon eine gute Näherung.  
(13,4 gegen 12)

Je mehr ich mir überlegen das Uran überlasse,  
desto wichtiger scheint mir es zu sein die charakteristische Bor-  
self-absorption Kurve zu machen, bevor man die  
Verlangsamung mit C oder D probiert, denn erst  
auf Grund dieser Kurve wird man imstande sein, die  
Versuchsbedingungen vernünftig zu wählen und so letz-  
ten Endes Zeit sparen.

Respektvoll  
Dr. G. Placzek

2nd set  
May, 1960 ✓

Additional Material for pages 111-113 (1)

re: EINSTEIN'S LETTER, AUGUST 2nd, 1939

I. Szilard's Narratives

In addition to Szilard's oral REMINISCENCES, we have two of his written reviews of the events:

- 1) "First Approach to the President of the United States.  
August - October 1939"  
Taken from Szilard's Memo to A.H. Compton, Nov. 12, 1942.  
(see note re SECRECY, pages 108-109.)
- 2) "Memorandum about the Einstein Letter." Aug. 19, 1955  
On page 2 of this Memorandum appears an interesting detail not found anywhere else in the files:  
"As I remember, Einstein dictated a letter in German which Teller took down and I used this German text as a guide in preparing two drafts of a letter to the President..."

First Approach to the President of the United States

August - October 1939

In July 1939 I reached the conclusion that the chain reaction might be set up in a uranium/graphite system, and that this possibility had to be considered as an imminent danger. In a conference with Wigner and Teller, we examined the situation and came to the conclusion that we ought to approach the United States Government through some new channel. For this purpose we enlisted the assistance of Professor Einstein, to whom we explained the situation in great detail. I also approached Dr. Alexander Sachs, at that time economic advisor and vice-president of the Lehman Corporation.

Professor Einstein wrote a letter addressed to the President in which I enclosed a memorandum. These documents were handed to Dr. Alexander Sachs who submitted them to the President in a personal interview together with a memorandum of his own. In response the President appointed Dr. Briggs as chairman of a committee subsequently called the Uranium Committee.

The enclosed copy of a letter written by Dr. Sachs to Dr. Wigner relates this phase of the development. Copies of my memorandum and Professor Einstein's letter to the President are also enclosed.

The last paragraph of my memorandum raised again the question of secrecy. This question was further stressed at the meeting held under the chairmanship of Dr. Briggs, October 21, 1939, but as far as I know, Dr. Briggs report to the President contained no recommendation concerning this point.

Hist-G (665 3)  
August 19, 1955

*about*  
Memorandum on the Einstein Letter

Fission of uranium was discovered in Germany by Hahn and Strassman in the late fall of 1938, but the possibility of setting up a chain reaction in uranium did not directly follow from this discovery. The news of Hahn's discovery was brought to Princeton by Niels Bohr who arrived about the same time as Hahn's paper. I first heard about this discovery from Dr. E. P. Wigner in Princeton in January 1939 and saw at once that if neutrons are emitted in the fission of uranium a chain reaction might be possible. I pointed this out to Wigner who agreed at once. The same thought occurred independently to Fermi and to Joliot and each of us proceeded to set up an experiment that would show if neutrons were in fact emitted. These experiments were completed early in March, and showed that uranium emitted about two neutrons for ~~one~~ <sup>each</sup> neutron absorbed that causes fission. Right after this Fermi and I teamed up at Columbia University to investigate the possibility of setting up a chain reaction in a uranium-water system. At the end of June 1939 these experiments were completed and gave a negative result. At this point Fermi left New York to give a summer course in Ann Arbor.

Early in July I began to investigate the theoretical possibility of setting up a chain reaction in a graphite-uranium system. This looked at once very promising and I bombarded Fermi with letters urging that we take immediate action to set up large scale experiments. I also urged the head of the Physics Department at Columbia, G. W. Fegrus, that we arrange <sup>work</sup> for experiments that I needed right away but soon it became clear that nothing much would be done until after the vacations some time in October.

At that point I took up the matter with E. P. Wigner in Princeton, who like me believed that war was imminent and we both became greatly concerned that Germany might obtain large quantities of uranium from Belgium. We felt that we ought to advise the Belgian Government of this danger. At this point I remembered that Einstein knew the Queen of the Belgians and we decided to ask him that he help us contact the Belgian Government. Einstein had not been aware of the possibility of a chain reaction in uranium but as soon as he heard my story he at once grasped the implications and was instantly ready to help and if necessary to stick his neck out - as they say. Before contacting the Belgian Government it seemed desirable to advise the State Department of

P.T.O.

the step we proposed to take, and Wigner suggested that we draft a letter to the Belgian Government, send a copy to the State Department and give the State Department two weeks in which to object if they are opposed to Professor Einstein sending such a letter. This is where the matter was left when Wigner and I left Einstein's house on Long Island.

Somehow, this procedure seemed to be an awkward one and so I decided to consult friends with more experience in things practical than we were. I went to see in New York Dr. Gustaf Stolper and told him of our need to establish contact in this matter with the U. S. Government. He recommended that I talk to Dr. Alexander Sachs. Dr. Sachs seemed very much interested and said that he would be willing to take a letter in person to President Roosevelt if Professor Einstein were willing to write such a letter. Dr. Wigner in the meantime left for the west coast, but Dr. Edward Teller who spent the summer teaching at Columbia was available. Teller drove me out to Long Island to Einstein's house.

As I remember, Einstein dictated a letter in German which Teller took down and I used this German text as a guide in preparing two drafts of a letter to the President, a short one and a longer one, and left it up to Einstein to choose which he liked best. He chose the longer draft of which you will find enclosed

~~a copy~~

I also prepared a memorandum to accompany Einstein's letter and both the letter and the memorandum were transmitted to the President by Dr. Sachs in October 1939. In response to Einstein's letter, the President appointed a committee under the chairmanship of Lyman J. Briggs, Director of the National Bureau of Standards, which first met on October 21, 1939. This was the beginning of the government's active interest in the work on uranium.

2nd set  
May, 1959 ✓

This should be with  
secrecy 2

Additional Material for page 113.

re: "Wigner said this was such a serious business that we could not assume the responsibility for handling it, we must contact and inform the government." 2

Part of letter, Wigner to L.S. April 17, 1939  
(Szilard himself had this portion copied; the complete letter is with the page 108 material.) (This part also included in page 109-110 material)

Letter, Wigner to L.S. May 9, 1939

Letter, Wigner to L.S. May 19, 1939

Letter, L.S. to Wigner May 21, 1939



COPY OF WIGNER'S LETTER TO SZILARD

April 17, 1939

Dear Szilard:

Thank you for letting me have the news concerning the abandonment of any policy in the publication matter. I cannot help feeling, on the one hand, that this was, under the conditions, a wise decision as nothing really could be achieved in this matter. On the other hand I do feel, and I do feel it very strongly, that the U.S. Government should be advised of the situation. This is indicated, among many other reasons, by the necessity of preparing it to a possible sudden threat. Let me know, please, whether you have already taken steps in this direction and whether you intend to take some in the near future.

PALMER PHYSICAL LABORATORY  
PRINCETON UNIVERSITY  
PRINCETON NEW JERSEY

May 9, 1939

Dear Szilard:

The numerical integration of our equations appears to be more difficult than we had anticipated. Some progress is made in the work but it will last some ~~x~~ time before we can have the final solutions.

Mr. Kent is the friend of Veblen's on whom I called in Aberdeen when we drove down together. Veblen advised me repeatedly to get in touch with him in case we need some help from the army. In fact, it appears to me that writing to him is one way to devolve the present responsibility from our shoulders to those of the proper people. Veblen knows Kent very well and says that he is thoroughly trustworthy.

I propose to write the letter, the copy of which I include, to Kent. There is no point at all in trying to keep the matter confidential any more. Let me know, please, whether you agree with the desirability of my sending this letter. In case I do not hear from you within three days,

May 9, 1939 (cont'd)

I shall assume that you agree with me and mail the letter. Thus, in this case you need not bother writing to me in ~~the~~ this connection.

I may mention, perhaps, that I heard from Bohr that the interview which appeared in the New York Herald Tribune and to which you have brought my attention, ~~xxx~~ ~~ix~~ is due, almost in its entirety, to Dunning and not to Bohr.

Sincerely

Wigwam

I forget to mention that there is a differential analyzer in Aberdeen.

May 19, 1939

Bk. f. 2 (33)

Dear Szilard:

Eisenbud has completed the numerical integration of the equation which we discussed during your last visit in Princeton. The parameter he has chosen was such that the initial radius of the sphere was twice the critical radius. It seems that if our assumptions were correct, the maximum temperature reached is only slightly above 10000 degrees. Of course, this temperature would be higher for higher radii of the original sphere.

I am going to Washington to-morrow morning and intend to return about the 22nd. I have a letter from Kent in which he asks me to stop in Aberdeen on my way back and see him. A Mr. Dederick writes me about the possibilities of solving our differential equation by a differential analyzer.

In view of the result of Eisenbud's integration and the more recent results obtained by Fermi and by you, <sup>(as related by Rabi)</sup> ~~it~~ I do not know whether ~~this~~ <sup>it</sup> is necessary for me to visit Aberdeen. I would be more in the position to decide this, however, if I could have a letter from you, with your further ideas on the subject and such additional results as may be available concerning your and Fermi's experiments. Could you let me have a letter from you to Teller's address (2610

Garfield Street, Washington D.C.) concerning these matters ?  
I would much appreciate it.

In case you would advise me to stop in Aberdeen on my return trip, I would be glad to know whether you would be willing to come along with me to Kent? Of course, your counsel would be much more valuable than mine could be. There are trains to Aberdeen, via Pennsylvania railroad, although they are not very good. As far as I can see, the best one leaves at 5:30 p.m. Penna station and arrives there at 8:39 so that it would be necessary for you to spend the night in Aberdeen. (I expect to do the same.) My visit is contemplated for the 22nd but the date could be changed by one or even two days either direction.

Hoping to hear from you soon, sincerely

*Wigwam*

Hotel King's Crown  
420 West 116th Street  
New York City

May 21st, 1939

Dear Wigner:-

It appears to me that it might be a good thing that you should establish contact with Kent and visit him in Aberdeen. <sup>some time,</sup> I would like to go along with you, but we are starting to-morrow on the experiment in which we use 500 pounds of uranium oxide, and therefore I shall not be able to leave New York during the coming week. If necessary I could visit Mr. Kent at some later date, preferably after June 20th.

I am at a loss to find out what it is that Rabi told you, as the position is not changed in any way since I last saw you. There is in my opinion a 50% chance that a chain reaction might go with slow neutrons without separation of isotopes, though Fermi would perhaps put the chance smaller. Perhaps we shall know in about ten days from the experiment with the 500 pounds uranium oxide.

I am rather anxious to see you as soon as possible, and if you do not come up to New York this week I would come up to Princeton one of these days <sup>perhaps Wednesday</sup> in the late afternoon. If you go from Washington straight to Princeton we could have a talk there ~~before you visit Aberdeen~~ before you visit Aberdeen. I shall telephone to you to Princeton on Tuesday to find out whether you are back.

Please ask Teller to write down for you the calculations which he has made about the slow neutron reaction. We can then compare it with ours when we talk about these things at Princeton.

Am I correct in assuming that the temperature reached which you give as slightly above 10 000 degrees is the temperature which a hydrogen atom would have by virtue of its velocity acquired during the explosion? If this assumption is correct then temperatures of about a million centigrades could be reached by using a mixture of bismuth and water instead of water alone. A bismuth atom, having the same velocity as a hydrogen atom, has a temperature which is 200 times larger than that of a hydrogen atom. We can talk about this and perhaps more immediate dangers when I see you at Princeton.

Please give my kind regards to Teller.

Yours

2nd set ✓  
May. 1969

Additional Material for page 114 (1)

re: Request for funds from the Navy.

Letter, Ross Gunn to L.S.

July 10, 1939

Reply, L.S. to Gunn

July 13, 1939



REPLY IN DUPLICATE  
AND REFERENCE TO

WILL BE APPRECIATED

NAVAL RESEARCH LABORATORY

ANACOSTIA STATION

RG/ejh

WASHINGTON, D. C.

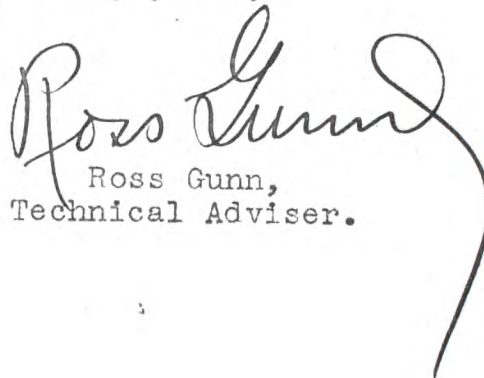
10 July 1939

Dr. Leo Szilard,  
Department of Physics,  
Columbia University,  
New York, N.Y.

Dear Dr. Szilard:

The matter which we discussed at the Princeton meeting of the Physical Society has been carefully considered. As I indicated to you at that time, it seems almost impossible, in light of the restrictions which are imposed on Government contracts for services, to carry through any sort of an agreement that would be really helpful to you. I regret this situation but see no escape. We are anxious, however, to cooperate with you in every respect and appreciate your assistance on this important problem.

Very truly yours,

  
Ross Gunn,  
Technical Adviser.

*Handwritten:* Bk.f.5 (61)  
*Signature:* [Illegible]

July 13th, 1939

Mr. Ross Gunn  
Naval Research Laboratory  
Anacostia Station  
Washington, D.C.

Dear Mr. Gunn:-

This is to thank you for your letter of July 10th. I am sorry to hear that restrictions which are imposed on Government contracts for services make it impossible to carry through an agreement which might be useful in speeding up our work.

Very truly yours,

(Leo Szilard)

2nd set  
May, 1969 ✓

Additional Material for page 114 (2)

re: Events from August 2nd, 1939 (date of Einstein's letter to F.D.R.)  
leading up to the first meeting of the  
Briggs uranium committee, October 21st, 1939, in Washington.

Letter, Einstein to L.S. Undated. Must date from Aug. 3 to Aug. 8 (KW)  
Handwritten. He encloses, signed, both versions of the F.D.R.  
letter, but prefers the fuller one.

Letter, L.S. replies to Einstein. Aug. 9, 1939  
In this brief exchange we get an unusually direct glimpse  
into the feelings involved. Szilard will take Einstein's  
advice to heart, and try to overcome his admitted inner  
resistance.

Letter, L.S. to Wigner Aug. 9, 1939  
Reports on plan to send letter to White House instead of  
the Belgian Ambassador.

Letter of transmittal, L.S. to Sachs Aug. 15, 1939  
and  
Memorandum, Szilard to the President Aug. 15, 1939  
~~Both of these documents have already been published as~~  
Appendix I to the REMINISCENCES.

Letter, L.S. to Gano Dunn Sept. 13, 1939  
Szilard wrote of Mr. Dunn on page 2 of his August 2nd letter  
to Einstein (included in EINSTEIN LETTER, III, material).

Letter, Margaret Flynn, Secretary to Mr. Dunn, to L.S. Sept. 14, 1939  
Marked by Szilard, "Struggle".

Letter, Wigner to L.S. Sept. 26, 1939

Letter, L.S. to Wigner Sept. 27, 1939

Letter, L.S. to Einstein Sept. 27, 1939  
In both this letter and Wigner's letter of September 26th,  
above, Szilard's concern for a supply of 50 tons of  
uranium oxide is urgent. He foresees Belgium being overrun.  
(It was actually overrun in May, 1940.)

(see next page)

Additional Material for page 114 (2)

re: "...we decided we'd give Sachs two more weeks..." Specifically mentioned in:

Letter, L.S. to Einstein Oct. 3, 1939

The meeting with Sachs and Wigner mentioned in this letter had taken place on Friday, September 29th, according to Szilard's invitation to Wigner of Sept. 27th, above.

Shortly after this, Szilard formed a much more favorable view of Sachs, as recorded in his report to Pegram following the October 21st uranium meeting (with page 115 material).

re: "...Sachs began to bestir himself, and we received a phone call from him in October..."

Letter, Sachs to the President (3 pp.) Oct. 11, 1939

Presented personally to the President by Sachs, along with Einstein's letter <sup>of August</sup> and Szilard's Memorandum of August 15th.

Letter, L.S. to Einstein Oct. 17, 1939

In this letter Szilard describes details of Sachs's meeting with Roosevelt that I have not seen elsewhere. (KW)

re: "I told Sachs that, apart from Wigner and me, I thought that Edward Teller ought to be invited... This was done."

Letter, Sachs to Wigner Oct. 17, 1939

Letter, Sachs to Teller Oct. 17, 1939

Letter, Briggs to L.S. Undated. see below.

The date of this informal invitation is uncertain.

The first meeting with Briggs which we know of was the official gathering on Saturday, October 21, 1939; but that was scheduled for 9.30 a.m., not 2 p.m. (see letters to Wigner and Teller from Sachs, Oct. 17, 1939)

Also, this letter was found in a folder marked "Search for Help, Febr to July 39".

Did Szilard have earlier unofficial contact with Briggs, or is this just a misfiled invitation to an afternoon session of the October 21st meeting?

K.W.

Lieber Herr Sciland!

Ihre habe gleich beide Briefe untergeschrieben, würde  
 aber ebenfalls dem ausführlicheren den Vorzug geben.  
 Eine Einführung am Lindbergh liegt auch bei. Nur aber  
 hoffe ich, dass Ihre endlich die immerhin Widerstände überwindet,  
 es ist immer bedenklich, wenn man etwas gar zu  
 geschrit machen will!

Mit herzlichem Gruss Ihre

A. Einstein

Walter de Linné

Bk. f 5

(66)

den 9. August 1939

Sehr geehrter Herr Professor!

Ich schreibe Ihnen nur, um zu bestaetigen, dass Ihr Brief mit den Beilagen uns erreicht hat. Wir werden versuchen, Ihre Mahnung zu beherzigen und so gut es geht unsere inneren Widerstaende, die zugegebenermassen vorhanden sind, zu ueberwinden. Uebrigens wollen wir es gar nicht gar zu gescheit machen und sind schon zufrieden, wenn wir es nicht gar zu durra machen. Ich werde Ihnen laufend berichten, wie es weitergeht.

Ihr

Hotel King's Crown  
420 West 116th Street  
New York City

August 9th, 1939

Dear Wigner:

As Teller has already told you it has been decided, following up your initiative, to withhold the letter to the Belgian Ambassador and to substitute for the letter to the State Department a rather different letter to the President. This letter, which is written by E. and has been sent to me to be forwarded, will not be sent by post but handed over to a vice-president of the Lehman Corporation who promised that he will see to it that it gets attention. The only suggestion made in that letter is that the president appoint a person who could serve - perhaps in an inofficial capacity - as a permanent link between the Administration and the physiscists and fulfill a double function, i.e. make recommendations to Government departments and see to it that private funds are provided for accelerating the experimental development.

It seems to me important that you should not talk about this to any third person. I shall let you know if anything develops out of this attempt. Perhaps you could drop me a line' letting me know what your present address is.

Yours



## APPENDIX I

A. LETTER OF TRANSMITTAL, SZILARD TO DR. ALEXANDER SACHS,  
AUGUST 15, 1939

Dear Dr. Sachs:

Enclosed I am sending you a letter from Prof. Albert Einstein, which is addressed to President Roosevelt and which he sent to me with the request of forwarding it through such channels as might appear appropriate. If you see your way to bring this letter to the attention of the President, I am certain Prof. Einstein would appreciate your doing so; otherwise would you be good enough to return the letter to me?

If a man, having courage and imagination, could be found and if such a man were put—in accordance with Dr. Einstein's suggestion—in the position to act with some measure of authority in this matter, this would certainly be an important step forward. In order that you may be able to see of what assistance such a man could be in our work, allow me please to give you a short account of the past history of the case.

In January this year, when I realized that there was a remote possibility of setting up a chain reaction in a large mass of uranium, I communicated with Prof. E. P. Wigner of Princeton University and Prof. E. Teller of George Washington University, Washington, D.C., and the three of us remained in constant consultation ever since. First of all it appeared necessary to perform certain fundamental experiments for which the use of about one gram of radium was required. Since at that time we had no certainty and had to act on a remote possibility, we could hardly hope to succeed in persuading a university laboratory to take charge of these experiments, or even to acquire the radium needed. Attempts to obtain the necessary funds from other sources appeared to be equally hopeless. In these circumstances a few of us physicists formed an association, called "Association for Scientific Collaboration," collected some funds among ourselves, rented about one gram of radium, and I arranged with the Physics Department of Columbia University for their permission to carry out the proposed experiments at Columbia. These experiments led early in March to rather striking results.

At about the same time Prof. E. Fermi, also at Columbia, made experiments of his own, independently of ours, and came to identical conclusions.

A close collaboration arose out of this coincidence, and recently Dr. Fermi and I jointly performed experiments which make it appear probable that a chain reaction in uranium can be achieved in the immediate future.

The path along which we have to move is now clearly defined, but it takes some courage to embark on the journey. The experiments will be costly



since we will now have to work with tons of material rather than—as hitherto—with kilograms. Two or possibly three different alternatives will have to be tried; failures, set-backs and some unavoidable danger to human life will have to be faced. We have so far made use of the Association for Scientific Collaboration to overcome the difficulty of persuading other organisations to take financial risks, and also to overcome the general reluctance to take action on the basis of probabilities in the absence of certainty. Now, in the face of greater certainty, but also greater risks, it will become necessary either to strengthen this association both morally and financially, or to find new ways which would serve the same purpose. We have to approach as quickly as possible public-spirited private persons and try to enlist their financial co-operation, or, failing in this, we would have to try to enlist the collaboration of the leading firms of the electrical or chemical industry.

Other aspects of the situation have to be kept in mind. Dr. Wigner is taking the stand that it is our duty to enlist the co-operation of the Administration. A few weeks ago he came to New York in order to discuss this point with Dr. Teller and me, and on his initiative conversations took place between Dr. Einstein and the three of us. This led to Dr. Einstein's decision to write to the President.

I am enclosing memorandum which will give you some of the views and opinions which were expressed in these conversations.

I wish to make it clear that, in approaching you, I am acting in the capacity of a trustee of the Association for Scientific Collaboration, and that I have no authority to speak in the name of the Physics Department of Columbia University, of which I am a guest.

Yours sincerely,

B. MEMORANDUM, SZILARD TO THE PRESIDENT,

AUGUST 15, 1939

Much experimentation on atomic disintegration was done during the past five years, but up to this year the problem of liberating nuclear energy could not be attacked with any reasonable hope for success. Early this year it became known that the element uranium can be split by neutrons. It appeared conceivable that in this nuclear process uranium itself may emit neutrons, and a few of us envisaged the possibility of liberating nuclear energy by means of a chain reaction of neutrons in uranium.

Experiments were thereupon performed, which led to striking results. One has to conclude that a nuclear chain reaction could be maintained under certain well defined conditions in a large mass of uranium. It still remains to prove this conclusion by actually setting up such a chain reaction in a large-scale experiment.

This new development in physics means that a new source of power is now being created. Large amounts of energy would be liberated, and large quantities of new radioactive elements would be produced in such a chain reaction.

In medical applications of radium we have to deal with quantities of grams; the new radioactive elements could be produced in the chain reaction in quantities corresponding to tons of radium equivalents. While the practical application would include the medical field, it would not be limited to it.

A radioactive element gives a continuous release of energy for a certain period of time. The amount of energy which is released per unit weight of material may be very large, and therefore such elements might be used—if available in large quantities—as fuel for driving boats or airplanes. It should be pointed out, however, that the physiological action of the radiations emitted by these new radioactive elements makes it necessary to protect those who have to stay close to a large quantity of such an element, for instance the driver of the airplane. It may therefore be necessary to carry large quantities of lead, and this necessity might impede a development along this line, or at least limit the field of application.

Large quantities of energy would be liberated in a chain reaction, which might be utilized for purposes of power production in the form of a stationary power plant.

In view of this development it may be a question of national importance to secure an adequate supply of uranium. The United States has only very poor ores of uranium in moderate quantities; there is a good ore of uranium in Canada where the total deposit is estimated to be about 3000 tons; there may be about 1500 tons of uranium in Czechoslovakia, which is now controlled by Germany; there is an unknown amount of uranium in Russia, but the most important source of uranium, consisting of an unknown but probably very large amount of good ore, is Belgian Congo.

It is suggested therefore to explore the possibility of bringing over from Belgium or Belgian Congo a large stock of pitchblend, which is the ore of both radium and uranium, and to keep this stock here for possible future use. Perhaps a large quantity of this ore might be obtained as a token reparation payment from the Belgian Government. In taking action along this line it would not be necessary officially to disclose that the uranium content of the ore is the point of interest; action might be taken on the ground that it is of value to secure a stock of the ore on account of its radium content for possible future extraction of the radium for medical purposes.

Since it is unlikely that an earnest attempt to secure a supply of uranium will be made before the possibility of a chain reaction has been visibly demonstrated, it appears necessary to do this as quickly as possible by performing a large-scale experiment. The previous experiments have prepared the ground to the extent that it is now possible clearly to define the conditions under

which such a large-scale experiment would have to be carried out. Still two or three different setups may have to be tried out, or alternatively preliminary experiments have to be carried out with several tons of material if we want to decide in advance in favor of one setup or another. These experiments cannot be carried out within the limited budget which was provided for laboratory experiments in the past, and it has now become necessary either to strengthen—financially and otherwise—the organizations which concerned themselves with this work up to now, or to create some new organization for the purpose. Public-spirited private persons who are likely to be interested in supporting this enterprise should be approached without delay, or alternatively the collaboration of the chemical or the electrical industry should be sought.

The investigations were hitherto limited to chain reactions based on the action of *slow* neutrons. The neutrons emitted from the splitting uranium are fast, but they are slowed down in a mixture of uranium and a light element. Fast neutrons lose their energy in colliding with atoms of a light element in much the same way as a billiard ball loses velocity in a collision with another ball. At present it is an open question whether such a chain reaction can also be made to work with *fast* neutrons which are not slowed down.

There is reason to believe that, if fast neutrons could be used, it would be easy to construct extremely dangerous bombs. The destructive power of these bombs can only be roughly estimated, but there is no doubt that it would go far beyond all military conceptions. It appears likely that such bombs would be too heavy to be transported by airplane, but still they could be transported by boat and exploded in port with disastrous results.

Although at present it is uncertain whether a fast neutron reaction can be made to work, from now on this possibility will have to be constantly kept in mind in view of its far-reaching military consequences. Experiments have been devised for settling this important point, and it is solely a question of organization to ensure that such experiments shall be actually carried out.

Should the experiments show that a chain reaction will work with *fast* neutrons, it would then be highly advisable to arrange among scientists for withholding publications on this subject. An attempt to arrange for withholding publications on this subject has already been made early in March but was abandoned in spite of favorable response in this country and in England on account of the negative attitude of certain French laboratories. The experience gained in March would make it possible to revive this attempt whenever it should be necessary.

September 13th, 1939

Mr. Gano Dunn  
80 Broad Street  
New York City

Dear Mr. Dunn:

I wonder if you still remember me. About six years ago you were kind enough frequently to help me with your advice. This was in connection with a new type of household refrigerator which Professor Einstein and I jointly devised and for which we tried to find interest in this country.

Today I am writing to you about a very different matter: Experiments on uranium, with which I have been connected during the last six months, lead to the conclusion that a nuclear chain reaction could be maintained under certain specific conditions in a large mass of uranium. Large quantities of energy would be liberated and great amounts of new radioactive elements would be generated in such a chain reaction. The experiments have now reached a point which makes it necessary to proceed on an almost industrial scale, working with tons of the material rather than the minute quantities hitherto used.

It would seem that this is a matter which requires the cooperation of a number of people and organizations, and it would

hardly seem proper to put the matter in the hands of one single industrial corporation and to look upon it primarily from a business point of view.

I would very much appreciate having an opportunity to discuss this matter with you and to have your advice.

Yours very sincerely,

(Leo Szilard)

P.S. Enclosed you will find a reprint of the first of a series of papers dealing with this subject.

Bk. f. 5

63

GANO DUNN  
80 BROAD STREET  
NEW YORK

Thursday  
September 14, 1939

Mr. Leo Szilard  
Kings Crown Hotel  
420 West 116th Street  
New York

Dear Sir:

Your letter of September 13th and the reprint on the subject of uranium have been received during Mr. Dunn's absence in Maine on vacation.

Immediately upon his return, which will be the latter part of the month, they will be called to Mr. Dunn's attention.

Very truly yours,

*Margaret Flynn*  
Secretary to Mr. Dunn.

F.

*Handwritten notes:*  
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*Drugg Co*

September 14, 1939  
Thursday

60 BROAD STREET  
NEW YORK

Mr. Lee Swilard  
Kings Crown Hotel  
430 West 116th Street  
New York

Dear Sir:

Your letter of September 13th and the reprint on the subject of uranium have been received during Mr. Dunn's absence in Maine on vacation. Immediately upon his return, which will be the latter part of the month, they will be called to

Very truly yours,

*W. J. Dunn*  
Secretary to Mr. Dunn.

Ne szerettem, hogy olyan "kéményes" irak, de azt hiszem, hogy így világosabban meg tudom mondani, amit gondoltam. Tarkas, aki itt van szintén azt gondolja, hogy jobb a helyzet, ha előbb valami irak jöttél Comptonhoz, mielőtt beszélne vele. <sup>Wigner</sup>

far as this is concerned, the prospect for a success would be greater if Fermi did act. However, this could be done, perhaps by you also. I am under the impression, however, that it would be better if you wrote a short memorandum on this question which you could send to Compton (or I could send to him in your name). I believe that this would make a better impression on him and further possible future relations with him to a greater extent. It would be also easier for him to follow up this particular matter as he would be able to consult the memorandum whenever necessary. From a conversation with you, if he had no opportunity to acquaint himself with the matter before, he would probably obtain only a somewhat confused picture which is undesirable.

I hope that I succeeded in making myself clear and that you will agree with me and see my point. Sincerely

Wigner

EUGENE P. WIGNER

120 PROSPECT AVENUE, PRINCETON, NEW JERSEY

1939 september 26

*Handwritten signature: Pauli, Antonides*

Dear Szilard:

I am afraid that there is some misunderstanding between us. When you were in Princeton a few days ago, I got the impression that the work at Columbia University is near to a standstill and that the next step should consist in large scale experiments for which both funds and proper equipment is lacking at Columbia. I understood that you are considering the fore to shift the place of further work to some other location and that it is in this connection that you wanted to talk to Compton. It was under this impression that I wrote the letter the copy of which you will find enclosed.



After having written this letter, I was considering the matter again. I found that the procedure is not a practicable one. Compton would be naturally very careful and even if it could be made clear to him that it is desirable to continue the experiments at a new location, it is quite doubtful whether or not he would be able to entrust them (and the management of funds) to you. And, of course, we cannot blame him for this, *as he is not well acquainted with you.*

I am somewhat doubtful whether it would be at all possible to induce Compton to find money for ~~you~~ experiments conducted by you as he would naturally (and quite incorrectly) feel that the experiments, if your cooperation with Fermi is broken up, may better be conducted by a third person. But if it is possible to induce Compton to this, the proper procedure certainly would

be that a third person (perhaps I) should see him and present to him at this occasion a memorandum written by you. As I said, however, I am even in this case quite doubtful that this is a matter worth trying, it looks so difficult.

I should mention, perhaps, that I was also considering to secure Compton's help for experiments to be done at Columbia. I felt, however, that such a step should be undertaken by Fermi and if he is unwilling to do this for some reason (which would be quite regrettable) you should have at least a letter from him endorsing you. Otherwise, everybody would ask the question ~~for what~~ as to the reason for your acting instead of Fermi.

When I just talked to you over the telephone, I understood that all you want to propose to Compton is the purchase of 50 tons of Uranium oxide. I think that even as

*Handwritten: just. provokes*

Bk. f. 5

64

Hotel King's Crown  
420 West 116th Street  
New York City

September 27th, 1939

Dear Wigner:

Many thanks for your special delivery letter. The misunderstanding probably arose over the telephone after I saw you in Princeton. I have shifted my grounds to some extent since I last saw you. Perhaps we can talk about this on Friday if you come to New York. It would be nice if you could come. Friday at 4 p.m. I have an appointment with Dr. Sachs (a Vice-President of the Lehman Corporation), and it would be very good if you could come along and form an opinion of your own as to the question whether we can expect any action from Sachs.

The name of the board of which K.T. Compton is a member, and of which Mr. Hancock - a partner of Lehman Brothers - is another member, is called the War Resources Board. According to today's papers the Board will make a report to the President soon and then disband.

I am still in bed, but practically certain to be up by Friday.

Your suggestion that a written memorandum should be handed to Compton, if he is approached at all, will be followed.

Yours,

(Leo Szilard)

*Paul Moravcsik*

Hotel King's Crown  
420 West 116th Street  
New York City

September 27th, 1939

Lieber Herr Professor!

Ich schicke Ihnen in der Anlage die Rede von Lindbergh, die Sie vielleicht nicht gelesen haben. Ich fuerchte, er ist in der Tat nicht unser Mann. Im uebrigen steht die Diskussion ueber das Neutralitaetsgesetz auf einem erbaermlichen Niveau. Man wird dabei Lindbergh gegenueber noch ganz milde gestimmt, denn er gibt wenigstens menschliche Toene von sich.

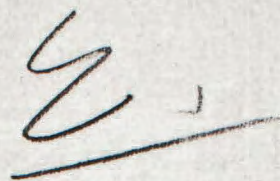
Soviel ich verstehe, ist Ihr Brief an den Praesidenten schon seit einiger Zeit in Washington. Ich sehe Dr. Sachs (Lehman Corporation) am Freitag und werde vielleicht hoeren, ob irgendetwas erfolgt ist.

Da wir darauf gefasst sein muessen, dass Belgien an einem dieser Tage ueberrannt wird, will ich versuchen jetzt durchzusetzen, dass wenigstens 50 Tonnen Uranoxide gekauft werden, die man ja spaeter, wenn das Material nicht mehr gebraucht wird, jederzeit auf dem Markt - vielleicht sogar mit Gewinn - verkaufen kann. Ob es gelingen wird, eine Regierungsstelle zu einem solchen Schritt zu bewegen, weiss ich natuerlich nicht. Vielleicht wuerde man es mit einem klugen Spekulanten leichter haben.

Mit freundlichen Gruessen

Ihr sehr ergebener

(Leo Szilard)



den 3. 10. 1939

Lieber Herr Professor!

Wigner und ich haben vorige Woche Dr. Sachs besucht, der uns gestanden hat, dass er immer noch auf Ihrem Brief sitzt. Er sagte, er haette wiederholt mit dem Sekretaer von Roosevelt telephoniert und den Eindruck gewonnen, dass Roosevelt so ueberlastet ist, dass es klue- ger waere, ihn spaeter zu sehen. Er hatte vor, diese Woche nach Washington zu fahren.

Es ist durchaus moeglich, dass Sachs un- brauchbar ist. Gegebenenfalls muessen wir die Sache in die Hand eines Anderen legen. Ich habe mit Wigner verabredet, dass wir Sachs noch eine Frist von 10 Tagen lassen. Dann werde ich Ihnen wieder schreiben, wie die Sache steht.

Mit freundlichen Gruessen  
Ihr sehr ergebener

(Leo Szilard)

*Paula Gordon*

*Not sent to Harvard*

to some of the great physicists now resident in this country who are carrying forward these experiments on uranium.

October 11, 1939

Dear Mr. President:

With approaching fulfillment of your plans in connection with revision of the Neutrality Act, I trust that you may now be able to accord me the opportunity to present a communication from Dr. Albert Einstein to you and other relevant material bearing on experimental work by physicists with far-reaching significance for National Defense.

Briefly, the experimentation that has been going on for half a dozen years on atomic disintegration has culminated this year (a) in the discovery by Dr. Leo Szilard and Professor Fermi that the element, uranium, could be split by neutrons and (b) in the opening up of the probability of chain reactions, - that is, that in this nuclear process uranium itself may emit neutrons. This new development in physics holds out the following prospects:

1. The creation of a new source of energy which might be utilized for purposes of power production;
2. The liberation from such chain reaction of new radioactive elements, so that tons rather than grams of radium could be made available in the medical field;
3. The construction, as an eventual probability, of bombs of hitherto unenvisioned potency and scope. As Dr. Einstein observes, in the letter which I will leave with you, "a single bomb of this type carried by boat and exploded in a port might well destroy the whole port together with some of the surrounding territory!"

In connection, then, with the practical importance of this work - for power, healing and national defense purposes - it needs to be borne in mind that our supplies of uranium are limited and poor in quality as compared with the large sources of excellent uranium in the Belgian Congo and, next in line, Canada and former Czechoslovakia. It has come to the attention of Dr. Einstein and the rest of the group concerned with this problem that Germany has actually stopped the sale of uranium from the Czechoslovakian mines it seized. This action must be related to the fact that the son of the German Under-Secretary of State, Karl von Weizsaecker, had been an assistant at the Kaiser Wilhelm Institute in Berlin

to some of the great physicists now resident in this country who are carrying forward these experiments on uranium.

Mindful of the implications of all this for democracy and civilization in the historic struggle against the totalitarianism that has exploited the inventions of the free human spirit, Dr. Sillard, in consultation with Professor E. P. Wigner, head of the physics department of Princeton, and Professor E. Teller of George Washington University, sought to aid this work in the United States through the formation of an association for scientific collaboration, to intensify the cooperation of physicists in the democratic countries - such as Professor Joliot in Paris, Professor Lindemann of Oxford and Dr. Dirac of Cambridge - and to withhold publication of the progress in the work on chain reactions. As the international crisis developed this summer, these refugee scholars and the rest of us in consultation with them unanimously agreed that it was their duty, as well as desire, to apprise you at the earliest opportunity of their work and to enlist your cooperation.

In view of the danger of German invasion of Belgium, it becomes urgent to make arrangements - preferably through diplomatic channels - with the Union Miniere du Haut-Katanga, whose head office is at Brussels, to make available abundant supplies of uranium to the United States. In addition, it is necessary to enlarge and accelerate the experimental work, which can no longer be carried out within the limited budgets of the departments of theoretical physics in our universities. It is believed that public-spirited executives in our leading chemical and electrical companies could be persuaded to make available certain amounts of uranium oxide and quantities of graphite, and to bear the considerable expense of the newer phases of the experimentation. An alternative plan would be the enlistment of one of the foundations to supply the necessary materials and funds. For either plan and for all the purposes, it would seem advisable to adopt the suggestion of Dr. Einstein that you designate an individual and a committee to serve as a liaison between the scientists and the Executive Departments.

In the light of the foregoing, I desire to be able to convey in person, in behalf of these refugee scholars, a sense of their eagerness to serve the nation that has afforded them hospitality, and to present Dr. Einstein's letter together with a memorandum which Dr. Sillard prepared after some discussion with me and copies of some of the articles that have appeared in scientific journals. In addition, I would request in their behalf

a conference with you in order to lay down the lines of policy with respect to the Belgian source of supply and to arrange for a continuous liaison with the Administration and the Army and Navy Departments, as well as to solve the immediate problems of necessary materials and funds.

With high regard,

Yours sincerely,

(Sachs)

The President,  
The White House,  
Washington, D. C.

In connection, then, with the practical importance of this work - for securing working and reserved defense resources - it must be so arranged that our supplies of uranium are identical and of equal quality as compared with the large amounts of excellent uranium in the Belgian Congo and, next in line, Canada and French Guiana. It was from the attention of Dr. Hahn and the fact of this year's conference with the German High Commission that we actually stopped the sale of uranium from the German Commission since it seemed. This action must be related to the fact that the son of the German Under-Secretary of State, Karl von Weizsaecker, had been an assistant at the Kaiser Wilhelm Institute in Berlin

From A Sachs (KW)

*Handwritten signature: Paul Wigner*

Hotel King's Crown  
420 West 116th Street  
New York City

den 17. Oktober 1939

Lieber Herr Professor!

Wigner hat Ihnen wohl telephonisch berichtet, dass Dr. Sachs (von Lehman Corporation) vorige Woche in Washington war, dem Praesidenten eigenhaendig Ihren Brief uebergeben hat, und dass der Praesident diesen Brief aufmerksam durchlas. Dr. Sachs sprach am vorigen Samstag telephonisch mit seiner Sekretaerin, diese sprach telephonisch mit mir, ich sprach telephonisch mit Wigner und Wigner telephonierte mit Ihnen. Da diese Art der Nachrichtenuebermittlung vielleicht etwas zu indirekt ist, moechte ich Ihnen heute, nachdem ich Sachs gestern gesprochen habe, brieflich berichten.

Sie haben in Ihrem Brief an Roosevelt den Vorschlag gemacht, dass ein Verbindungsglied geschaffen wird, welches den Kontakt zwischen der Administration und den Physikern aufrecht erhaelt. Roosevelt fragte nun Sachs, welche Form er zur Durchfuehrung Ihres Vorschlages empfehlen wuerde. Dr. Sachs schlug vor, zu diesem Zweck ein Komitee von nicht mehr als drei Personen zu ernennen.

Roosevelt hat diesen Vorschlag akzeptiert und ein Komitee ernannt, bestehend aus Briggs, dem Leiter des Bureau of Standards in Washington, aus einem Colonel, der wohl die Armee repraesentiert, und einem Commander, der, wie ich annehme, die Navy vertritt. Briggs hat an Sachs geschrieben und ihn gebeten, zu der ersten Sitzung dieses Komitees (welche jetzt auf Samstag vormittag festgelegt worden ist), nach Washington zu kommen und Wigner und mich mitzubringen,



damit jemand da ist, der ueber technische Einzelheiten Auskunft geben kann. Da es fuer Wigner und mich schwierig sein wuerde, allzu haeufig nach Washington zu fahren, hat Sachs auf meine Bitte Briggs heute telephonisch angerufen und mit ihm verabredet, dass Dr. Teller, der dauernd in Washington ist und den Briggs natuerlich kennt, zu dieser Besprechung zugezogen wird. So werden wir wahrscheinlich nachher ueber Teller den Kontakt mit Briggs auf wirksame Weise aufrecht erhalten koennen.

Falls mich eine etwas hartnaeckige Erkaeltung nicht daran hindert, werde ich, bevor ich nach Washington fahre, noch nach Princeton kommen, und ich hoffe, dass wir dann, wenn es Ihre Zeit gestattet, ueber all die schwebenden Fragen sprechen koennen.

Mit freundlichen Gruessen

Sie haben in Ihrem Brief an Sie Ihr sehr ergebener Wunsch, dass ein Verbindungsglied geschaffen wird, welches den Kontakt zwischen der Administration und dem Phys (Leo Szilard) herstellt. Roosevelt fragte von Sachs, welche Person er zur Durchfuehrung ihres Vorschlages empfohlen wuerde. Dr. Sachs schlug vor, zu diesem Zweck ein Komitee von nicht mehr als drei Personen zu ernennen.

Roosevelt hat diesen Vorschlag akzeptiert und ein Komitee ernannt, bestehend aus Briggs, dem Leiter des Bureau of Standards in Washington, aus einem Colonel, der wohl die Armee repraesentiert, und einem Commander, der, wie ich annehme, die Navy vertritt. Briggs hat an Sachs geschrieben und ihn gebeten, zu der ersten Sitzung dieses Komitees (welche jetzt auf Samstag vormittag festgelegt worden ist), nach Washington zu kommen und Wigner und mich mitzubringen.

bk. f. 5 (2) +

Alexander Sachs

October 17, 1939

Dear Professor Wigner:

In keeping with our conversation on your recent visit to my office and in furtherance of later developments reported to you by Dr. Szilard, I had a conference in Washington on October 11th with a committee appointed by the President, headed by General Watson, his executive secretary and military aide. After that conference I had the honor to present the matter to the President and to leave with him a dossier consisting of Dr. Einstein's letter, Dr. Szilard's memorandum, and my own original letter-memorandum on the subject addressed to him.

On the following day <sup>Oct 12</sup> the President appointed a small committee representing the Army, the Navy and the Bureau of Standards, in the persons of Colonel Adamson, Commander Hoover and Dr. Lyman Briggs. Dr. Briggs then, in consultation with me, arranged and formally issued an invitation on the following day for a conference to be held this week at Washington with your goodself and Dr. Szilard, as the scientific complement, and myself as the intermediary, and the informal committee above mentioned. To suit your joint preferences, as conveyed to me by Dr. Szilard, the date was shifted from Wednesday to Saturday morning, October 21st, at 9:30 at the office of the Bureau of Standards in the U. S. Department of Commerce. This afternoon Dr. Briggs warmly approved the suggestion of Dr. Szilard regarding the inclusion of Professor E. Teller of George Washington University and indicated that he would add two scientists conversant with this subject. Such, then, is the diary of the events since our last talk.

→ Teller (couldn't attend. Suggested Roberts sit in for him)

Will you be good enough to confirm to me your acceptance and will you also indicate whether you would wish to have a conference prior to our departure, or, alternatively, that we meet Friday night on the 12:50 train from Pennsylvania Station to Washington. In either event, I should like to have you and Dr. Szilard as my guests at breakfast at the Carlton Hotel Saturday morning, and we would thereafter proceed to the Department of Commerce building for our appointment.

Yours sincerely,

Professor E. P. Wigner,  
Fine Hall,  
Princeton University,  
Princeton, N. J.

→ sent to Howard

October 17, 1939

My dear Professor Teller:

In the wake of numerous conferences with Dr. Szilard since late summer and a more recent meeting with Professor Wigner of Princeton, I had the honor to submit last week to the President and to an informal committee from the Army, the Navy and the Bureau of Standards called together at his instance, information regarding the experimental work conducted by Dr. Szilard, Professor Fermi and others on atomic disintegration and certain proposals for aiding that work in the light of its potential significance for national defense.

Following that conference there was formed a committee including Colonel Adamson, Commander Hoover and Dr. Lyman J. Briggs. A conference has been scheduled by this committee with Professor Wigner, Dr. Szilard and myself for Saturday morning, October 21st, at 9:30 in Dr. Briggs' office in the Bureau of Standards at the Department of Commerce. In a telephone conversation with Dr. Briggs this afternoon, I submitted to him a suggestion which he cordially accepted, namely that you be included in this conference as one of the cognoscenti of this subject and as a common friend of the scientists from this end and the scientists from the Government end.

While I take it that you will hear direct from Dr. Briggs, this letter and the supplementary memorandum of Dr. Szilard will, I trust, serve to reinforce the invitation and to provide orientation on the purpose of the conference. As a matter of convenience, would you be good enough to call for us at the Carlton Hotel at 9:15 Saturday morning, when we will be arranging to proceed to the Department of Commerce.

Yours sincerely,

Professor E. Teller,  
George Washington University,  
Washington, D. C.

From Sachs  
(KW)

Dear Dr Szilard

I hope you  
can join us in a  
further discussion of  
uranium experiments at  
my office in the Nat.  
Bureau of Standards on  
Saturday at 2 pm

Sincerely yours

Lynne T. Biggs

Oct 21, 1939

(100-20000)

2nd set ✓  
May, 1969

Additional Material for pages 111-113 (2)

re: EINSTEIN'S LETTER, AUGUST 2nd, 1939

- II. Plan to send a letter to the Belgian government, with covering letter to the U.S. State Department. (Wigner's suggestion.)

Drafts of three letters, all undated, probably from July 1939. (kw)

Handwritten draft in German. No addressee.

The handwriting of this draft ~~looks as though it~~ is probably Wigner's. (kw)

Note the jotted telephone number, Pec. (Peconic).

Draft of letter, typed, Einstein to the Honorable Ambassador of Belgium.

Draft of letter, typed, Einstein to the Secretary of State.

(For confirmation that this plan was abandoned, see Szilard's letter to Wigner of August 9th, 1939, with the page 114 material.)

Nach ungehender Besprechung des im nachfolgenden geschilderten Sachverhaltes halten wir es für unsere Pflicht Ihnen einen für den belgischen Staat möglicherweise wichtigen Teilbestand mitzuteilen.

Die experimentellen Erfahrungen der allerletzten Zeit lassen es als nicht nur möglich sondern als geradezu wahrscheinlich erscheinen, dass das Uran-Element Uran künftig für Kriegszwecke von ~~der~~ eminentester Bedeutung werden wird. Es sind nämlich Dinge bekannt geworden um den ungeheuren Energiemenge freimachenden Zerfall dieses Elements die zur Erzeugung von explosionsartig von unvergleichlich grosserer Wirkung künstlich zu beschleunigen Sie entsprechen den Tatsachen und sind zum Teil publiziert, zum Teil sind sie aus ~~dem~~ dadurch bekannt, dass wir eine von uns (L.S.) zusammen mit Professor Fermi an der Columbia University ~~Frankreich~~ weitere ungehend Versuche ausgeführt hat, die unveröffentlicht sind.

Rec. 6571

die zur

Es ist mit Sicherheit zu erwarten, dass der Tatbestand in kürzester Zeit die Aufmerksamkeit der Militärmächte auf sich ziehen wird und dass eine Jagd nach Uranerzen in kürzester Zeit unsetzen wird.

~~Es gibt nur wenige~~ Bisher sind nur wenig ~~an~~ neuwertige Mengen enthaltende Uranalagerungen bekannt: 1. the Tschechoslowakei 2. Canada, 3. & Belgisch Congo, 4. Kleinere zerstreute Ablagerungen an anderen Stellen.

benutzt werden kann als alles was bisher bekannt ist

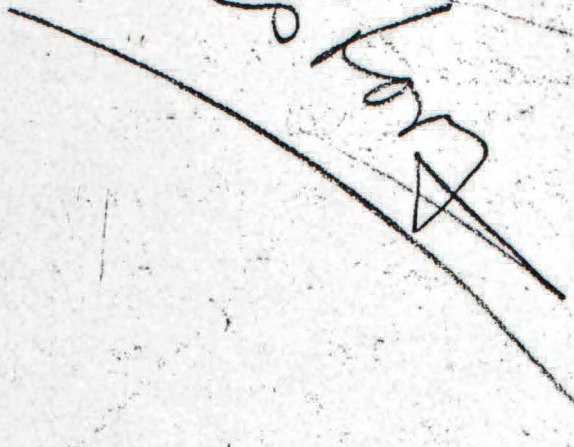
Es scheint also als ein Akt der elementarsten Ver-  
sicht, nicht zu stellen, dass die ~~unartigen belgi-~~  
~~die unter allen Depu'ten die Reichhaltigsten sind~~  
schen Mineralerschätze ~~nicht den die Hände von~~  
potentiellen Gegnern Belgiens fallen können. ~~Re-~~  
~~hinsichtlich~~ ~~die~~ ~~zu~~ Bezeichnend ist es gelien-  
falls, dass die Deutschen, ~~und die~~  
die noch nach Übernahme der Tschecho-  
wakischen Gruben das Uran zum Verkauf  
angeboten haben, neuerdings ~~nach dem~~  
nicht mehr bereit sind nach ~~dem~~  
zu verkaufen.

# durch Verkauf oder auf sonstige Weise.

Die unterzeichneten halten es für ange-  
messen ~~sein~~ den im Entwurf beiliegenden  
Brief an den belgischen Gesandten in  
Washington zu ~~schicken~~ schicken. Wir würden  
dies ~~am 20ten dieses Monats~~ am 20ten dieses Monats tun  
falls wir nicht von Ihnen in der Zwischenzeit  
hören dass dies <sup>Ihnen</sup> unerwünscht ist.



W. H. H. H.



To the Secretary of State  
Washington, D.C.

Sir:

I am enclosing a draft of a letter which I thought of sending to the Belgian Ambassador, being of the opinion that it is in the interest of this country as well as in the interest of Belgium and other pacific ~~countries~~ nations to draw the attention of the Belgian Government to a potential danger which has arisen in connection with the new development in physics. I am informing you of this in order to ask you whether your Department would care to receive information on the subject, and whether it would be willing to approach the Belgian Government, or whether ~~you feel that~~ I had better approach the Belgian government <sup>direct</sup> through its ambassador, ~~by sending the letter, a draft of which I am enclosing.~~

I am, Sir, yours very truly,

To the Honorable Ambassador of Belgium  
Washington, D.C.

Sir:

I feel that I ought to draw your attention to certain new discoveries in nuclear physics which may affect the welfare of your country as well as that of the United States and other nations.

It appears not only possible but a very likely that it will be possible to make a powerful source of energy out of an element called uranium, the chief source of which at present is Belgian Congo. Recent publications which appeared in the scientific periodicals point already in this direction, and more information is contained in some unpublished work which has been done at Columbia University and of which I have received information through Dr. L. Szilard, New York, and Dr. E.P. Wigner, Princeton. It is to be expected that, if it becomes known that uranium can be made to release energy on a large scale, certain powers will attempt to secure large stocks of this element or its ore. There is a possibility, though this point is not yet certain, that explosive bombs can be constructed from uranium, the destructive power of which would be beyond imagination.

Important deposits of uranium are present in that part of Germany that belonged formerly to Czechoslovakia, in Canada and in Belgian Congo. ~~Some deposits are also present~~ Of these deposits the German is estimated to be about 1000 to 1500

tons, the Canadian about 3000 tons, and the Belgian deposit is supposed to be considerably larger. About 3000 tons in the form of very poor ore are available in the United States, and rather unimportant deposits may be found in the possessions of other nations.

It is conceivable that certain powers, who are potential enemies both of Belgium and the United States, will in the near future attempt to secure a stock of this potentially so dangerous element, and in the circumstances it seems to me necessary to take precautions to inhibit the delivery of any stocks of this material to such potential enemies. I understand that Germany, which has offered some uranium for sale immediately after taking over the Czechoslovakian mines, is no longer prepared to export this material.

I am, Sir, yours, very truly,

2nd set  
May, 1969 ✓

Additional Material for pages 111-113 (3)

re: EINSTEIN'S LETTER, AUGUST 2nd, 1939

III. Genesis of the letter as sent.

Letter, L.S. to Einstein July 19, 1939  
This letter, contemporary with the events, tells exactly the same story as Szilard recounts years later in his REMINISCENCES.

Letter, L.S. to Einstein Aug. 2, 1939  
Enclosed two versions, for Einstein's signature, of the letter to Roosevelt.

See especially the third paragraph, which explains that while the version which had been drafted with Einstein in Peconic had the advantage of brevity, Szilard had written a longer version (the one finally sent) which went beyond this text and set forth all that was needed to give the President a clear picture.

For confirmation of Szilard's authorship, see page 622 of EINSTEIN ON PEACE, cited in Note 36. In 1955 Einstein wrote to the German physicist Max von Laue: "My action concerning the atomic bomb and Roosevelt consisted merely in the fact that, because of the danger that Hitler might be the first to have the bomb, I signed a letter to the President which had been drafted by Szilard."

Letter, Einstein to Roosevelt (short version) Aug. 2, 1939  
We have the original of this letter in our files, with Einstein's signature on it. The letter is marked in Szilard's handwriting: "original; not sent!"

Letter, Einstein to Roosevelt (longer version) Aug. 2, 1939  
We have a carbon copy of this letter, marked by Szilard, "long".

It is clear from comparing the texts of these two letters, with the text as published (EINSTEIN ON PEACE, pages 294-6), and also from the fact that we still own the original of the short letter, that the document actually sent to the White House was the long version.

19.Juli 1939

Lieber Herr Professor,

Als ich von Ihnen nach New York zurückkehrte, fand ich eine Nachricht von Dr. Stolper, der frühere Redakteur des Deutschen Volkswirt, vor, der mir mitteilte, dass er über unsere Probleme mit Dr. Alexander Sachs, ein Vice-President der Lehmann Corporation, Biologe und Nationalökonom, gesprochen hat und dass Dr. Sachs mich in dieser Angelegenheit sprechen wollte. Ich hatte mich vor einiger Zeit an Dr. Stolper gewandt weil ich glaubte, dass wir für die grossen Versuche, die über das Budget des Physic Department hinausgehen, finanzielle Hilfe von aussen werden heranziehen müssen. Ich habe nun Dr. Sachs ziemlich ausführlich alles erzählt, auch Wigners Standpunkt, dass man eine grosse Menge Erzes nach Amerika bringen und die belgische Regierung auf die Situation aufmerksam machen soll, einschliesslich unserem Plan an den belgischen Ambassador und an das State-Department zu schreiben. Dr. Sachs vertrat den Standpunkt und er hat mich vollständig überzeugt, dass diese Angelegenheit in erster Linie das Weisse Haus angeht und es auch vom praktischen Standpunkt das beste ist Roosevelt zu informieren. Er sagte, dass wenn wir ihm ein statement geben, er dafür sorgen wird, dass dieses in die Hände von Roosevelt gelangt. Obwohl ich Dr. Sachs

nur einmal im Leben gesehen habe und mir eigentlich kein Urteil über ihn bilden konnte, so glaube ich doch, dass es nicht schaden koennte wenn wir diesen Weg versuchen und ich glaube auch, dass er in der Lage ist, in dieser Beziehung das zu halten was er versprochen hat.

Ich habe dann noch heute mir Dr. Teller, der von Anfang an mit bei der Verschwörung dabei war und der jetzt im Sommer hier als Gast-Professor im Physics Department ist (sonst ist er in Washington) von der Sache erzählt und auch er war der Ansicht, dass wir lieber diesem Weg beschreiten sollen. Wigner konnte ich nicht mehr erreichen, er ist unterwegs nach Californien und wird erst in einigen Tagen dort ankommen.

Ich habe versucht einen Brief aufzusetzen, der das enthält was ich glaube, dass gesagt werden sollte, und schicke Ihnen diesen Entwurf in der Beilage ein. Ich werde Sie dann morgen telephonisch anrufen um Sie zunächst mal zu fragen, ob Sie überhaupt mit der ganzen Prozedur im Prinzip einverstanden sind. Falls dies der Fall ist, werden Sie mir dann im Telephon vielleicht sagen koennen, ob Sie mir den Entwurf mit Ihren Randbemerkungen per Post zurückschicken wollen oder ob ich hinausfahren soll, um mit Ihnen noch einmal über die ganze Sache zu sprechen. Falls ich hinauskommen soll, würde ich gerne, wenn es Ihnen recht ist, Teller bitten, mich hinauszufahren, und zwar sowohl weil ich glaube, dass sein Rat von Wert ist, wie auch weil ich glaube, dass es Ihnen Freude machen würde ihn kennen zu lernen. Er ist besonders nett.

Ihr sehr ergebener

( Leo Szilard )

Hotel King's Crown  
420 West 116th Street  
New York City

den 2. August 1939

Sehr geehrter Herr Professor:

Es waere sehr gut, wenn wir uns allmaechlich darueber klar werden koennten, wessen Ernennung als Mittelsperson man anstreben sollte. Dr. Sachs von der Lehmann Corporation, mit dem ich inzwischen wieder gesprochen habe, hat Bernhard Baruch oder K.T. Compton versuchsweise vorgeschlagen, doch scheinen sowohl Teller wie auch mir diese Personen nicht sehr geeignet. Dagegen haelt Sachs die Wahl von Lindbergh fuer gut, sodass im Augenblick Lindbergh der "Favorit" ist. Wir werden uns noch weiter den Kopf zerbrechen muessen.

Inzwischen wuerde ich jedenfalls gerne versuchen, mit Lindbergh ueber die Sache zu sprechen, um zu sehen, wie er sich dazu stellt. Ich habe ihn vor etwa 7 Jahren getroffen, er hat mir gut gefallen, aber ich nehme an, dass er mich inzwischen vergessen hat. Wenn Sie mich etwa re-introducen koennen, so wuerde ich Sie bitten, mir ein Einfuehrungsschreiben (adressiert an Col. Charles Lindbergh) nach New York zu schicken, welches ich einem Brief, den ich selber an Lindbergh schreibe, beilegen wuerde.

In der Anlage schicke ich Ihnen den deutschen Text, den wir zusammen in Peconic aufgesetzt haben, und die englische Uebersetzung dazu. Ebenfalls in der Beilage schicke ich eine



etwas laengere und ueber den deutschen Text hinausgehende Fassung, die ich nach der letzten Besprechung mit Sachs aufgesetzt habe. Die erste Fassung hat den Vorzug der Kuerze, dagegen enthaelt die zweite all das, was noetig ist, um dem Praesidenten ein klares Bild zu geben, welche Aufgaben die von ihm zu bestimmende Vertrauensperson zu erfuellen haette. Ich weiss nicht, welche von den beiden Fassungen Ihnen als richtiger erscheinen wird und schicke Ihnen daher beide Fassungen zu.

Falls Ihnen keine der beiden gefaellt, koennten Sie mir vielleicht einen veraenderten deutschen Text zuschicken, den ich Ihnen dann ins Englische uebertragen zuruecksenden wuerde.

Glauben Sie nicht, dass es vielleicht gut waere, wenn ich auch Gano Dunn sprechen wuerde? Ich habe ihn allerdings seit 7 Jahren nicht gesehen und es heisst, dass er einen grossen Teil seines Vermoegens verloren hat und nicht mehr Praesident der G.J. White Corporation ist. Er kennt viele Leute, und sein Rat koennte daher sehr nuetzlich sein. Ich denke, ich werdenan ihn schreiben, - seine jetzige Adresse wird man schon irgendwie auftreiben koennen.

In der Anlage schicke ich Ihnen auch das Manuskript, von dem die Rede war. Es gibt in diesem Zusammenhang ganz interessante Fragen, ueber die es sich vielleicht gelegentlich zu sprechen lohnte, und wenn Ihnen Teller gefallen hat, so wuerde ich gern gelegentlich wieder einmal mit ihm zu Ihnen hinausfahren. Er ist allerdings, wie mir eben einfaellt, nur noch bis zum 13. in New York.

Ihr sehr ergebener

(Leo Szilard)

*Short letter (Bk. 5)*  
*in No. 1*

Albert Einstein  
Old Grove Rd.  
Nassau Point  
Peconic, Long Island

August 2nd, 1939

*original*  
*not used*

F. D. Roosevelt  
President of the United States,  
White House  
Washington, D.C.

Sir:

Recent work in nuclear physics made it probable that uranium may be turned into a new and important source of energy. New experiments performed by E. Fermi and L. Szilard, which have been communicated to me in manuscript, make it now appear likely that it will be possible to set up a chain reaction in a large mass of uranium and thereby to liberate considerable quantities of energy. Less certain, but to be kept in mind, is the possibility of making use of such chain reactions for the construction of extremely powerful bombs. Such bombs may be too heavy for transportation by air plane, but not too heavy for being carried by boat, and a single bomb exploded in a port might very well destroy the port together with the surrounding territory.

This being the situation, you may find it desirable that some contact be established between the Administration and the group of physicists who are working in this country on the subject of chain reactions. One possible way of achieving this would be for you to entrust a person who has your

confidence, and who could perhaps act in an inofficial capacity, with this task.

I understand that Germany has stopped the sale of uranium. That she should have taken such early action might perhaps be understood on the ground that the son of the German Under-Secretary of State, von Weizsäcker, is attached to the Kaiser-Wilhelm-Institut in Berlin where some of the American work on uranium is now being repeated.

The United States has only poor ores of uranium. Better ores in moderate quantities are mined in the former Czechoslovakia and in Canada, while the most important source of uranium is Belgian Congo.

Yours very truly,

*A. Einstein*

(Albert Einstein)

*Einstein*

Albert Einstein  
Old Grove Rd.  
Nassau Point  
Peconic, Long Island

August 2nd, 1939

F.D. Roosevelt,  
President of the United States,  
White House  
Washington, D.C.

Sir:

Some recent work by E. Fermi and L. Szilard, which has been communicated to me in manuscript, leads me to expect that the element uranium may be turned into a new and important source of energy in the immediate future. Certain aspects of the situation which has arisen seem to call for watchfulness and, if necessary, quick action on the part of the Administration. I believe therefore that it is my duty to bring to your attention the following facts and recommendations:

In the course of the last four months it has been made probable - through the work of Joliot in France as well as Fermi and Szilard in America - that it may become possible to set up a nuclear chain reaction in a large mass of uranium by which vast amounts of power and large quantities of new radium-like elements would be generated. Now it appears almost certain that this could be achieved in the immediate future.

This new phenomenon would also lead to the construction of bombs, and it is conceivable - though much less certain - that extremely powerful bombs of a new type may thus be constructed. A single bomb of this type, carried by boat and exploded in a port, might very well destroy the whole port together with some of the surrounding territory. However, such bombs might very well prove to be too heavy for transportation by air.

The United States has only very poor ores of uranium in moderate quantities. There is some good ore in Canada and the former Czechoslovakia, while the most important source of uranium is Belgian Congo.

In view of this situation you may think it desirable to have some permanent contact maintained between the Administration and the group of physicists working on chain reactions in America. One possible way of achieving this might be for you to entrust with this task a person who has your confidence and who could perhaps serve in an inofficial capacity. His task might comprise the following:

a) to approach Government Departments, keep them informed of the further development, and put forward recommendations for Government action, giving particular attention to the problem of securing a supply of uranium ore for the United States;

b) to speed up the experimental work, which is at present being carried on within the limits of the budgets of University laboratories, by providing funds, if such funds be required, through his contacts with private persons who are willing to make contributions for this cause, and perhaps also by obtaining the co-operation of industrial laboratories which have the necessary equipment.

I understand that Germany has actually stopped the sale of uranium from the Czechoslovakian mines which she has taken over. That she should have taken such early action might perhaps be understood on the ground that the son of the German Under-Secretary of State, von Weizsäcker, is attached to the Kaiser-Wilhelm-Institut in Berlin where some of the American work on uranium is now being repeated.

Yours very truly,

(Albert Einstein)

2nd set ✓  
May, 1969

Additional Material for page 115

re: NOTE no. 30. The first meeting of Briggs's "Advisory  
Committee on Uranium," Oct. 21, 1939

Letter, L.S. to Pegram, reporting on meeting. Oct. 21, 1939  
(Corroborates story of Teller speaking for Tuve).

Memorandum. Part I. Meeting of October 21st, 1939, Washington, D.C.  
by Leo Szilard. Oct. 26, 1939

Letter, L.S. to Briggs Oct. 26, 1939

Letter, Briggs to L.S. Nov. 1, 1939

Letter, Wigner to L.S. Nov. 4, 1939

Letter, Teller to L.S. In Hungarian. Undated, but appears to  
belong to this period.

re: Procuring Materials

Letter, Gustav L. Lechien to L.S. Nov. 4, 1939

Bk f5



# WARDMAN PARK HOTEL

Washington, D. C.

CONNECTICUT AVENUE & WOODLEY ROAD  
1800 ROOMS

October 21, 1939.

Prof. G. E. Pogram,  
Physics Department,  
Columbia University,  
Broadway at 120th Street,  
New York City.

Dear Professor Pogram:

I wish to give you a short account of yesterday's meeting, at which Briggs acted as chairman. I will give you a longer account in the form of a memorandum, which I am now writing and which I will leave with Briggs before returning to New York. This memorandum is essentially a repetition of the statements and recommendations which I made at the meeting, and it serves the purpose of making things easier for Briggs, when he writes his own report.

On the whole everything came off as could be expected. Teller, who returned from New York, where he spoke with Tuve and Fermi, acted in a double capacity - speaking once in his own name and once in the name of Tuve, who was asked by Briggs to attend the meeting but was unable to come. Tuve put forward certain recommendations which he has discussed and on which he has agreed with Fermi. He said that Government funds ~~are~~<sup>ought</sup> to be made available for our graphite absorption experiment at Columbia, and named a specific sum, which I do not remember. He also named a sum which he thought ought to be given for purposes of isotop-separation to the University of Virginia, and so on. These recommendations, though they were beside the point, had nevertheless a beneficial effect. The diversion of Government funds for such purposes as ours appears to be hardly possible, and I have therefore myself avoided to make any such recommendation, but Tuve's suggestion provoked detailed discussion of the proposed experiments, and the representative of the Army and the Navy almost committed themselves to the extent of providing some four metric tons of graphite for ~~the~~ experiments, if we so desire.

I was astonished how active and enthusiastic Dr. Cocks was during the meeting, and was most favorably impressed. After the meeting he asked me jokingly to confess that I suspected that he was no good, that he would really never get anything done, and that I was surprised, when the time came, that he really became active and started to do things. It seems to me now that he is performing his task efficiently and in the right spirit, and now I am in favor of giving him a fairly free hand, and see what he can achieve.

I expect to be in New York by Tuesday night at the latest.

Yours sincerely,

(Leo Szilard).



October 26th, 1939

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**Memorandum**

**Part I.**

**Meeting of October 21st, 1939, Washington, D.C.**

---

**by Leo Szilard.**

## SUMMARY

Recent experimental work and calculations based on its results make it appear possible that in the immediate future a nuclear chain reaction might be set up under certain well specified conditions in a system composed of uranium and graphite. In view of this and other possibilities it seems desirable

1. that it should be made the responsibility of some person or persons to watch on behalf of the government the further development of this branch of research, so that the government should be at any time in the position of taking such action as it deems appropriate;

2. that some persons or persons, who have the confidence of the government, should take upon themselves the task of furthering this branch of research, of insuring that it should not suffer from lack of facilities, and of preparing the grounds for experiments on a large scale, which might become necessary.

### Observation to the above.

The fairly large quantities of material, which might be required for performing large-scale experiments, might perhaps be secured, without drawing on existing funds, by enlisting the assistance of certain industrial firms in the U.S.A. and of the Union Minière du Haut Katanga. Most of the materials required are produced by large corporations who own uranium mines and would therefore directly benefit if the present development created a market for uranium. Some of these firms could be approached now with a view of obtaining the promise of their assistance.

THE POSSIBILITY OF A LARGE-SCALE EXPERIMENT  
IN THE IMMEDIATE FUTURE.

At present it appears quite possible that a nuclear chain reaction could be set up in a system composed of uranium oxide (or uranium metal) and graphite. The graphite would have to be piled up in a space of perhaps 4 x 4 x 4 metres and might weigh about 100 metric tons. Perhaps 10 to 20 tons of uranium oxide would have to be used, embedded in some such pile of graphite.

The probable success or failure of such large-scale experiment cannot be forecast at present with any degree of assurance. The properties of a system composed of uranium and graphite have been calculated independently, for a homogeneous mixture by Fermi, for a lattice of spheres of uranium oxide, or uranium metal, embedded in graphite, by myself. The results of these two independent calculations are in reasonable agreement and show that the two arrangements have different properties. For instance, in the case of using a lattice of spheres a great advantage could be obtained by using uranium metal instead of uranium oxide, whereas in the case of the homogeneous mixture the use of uranium metal would be of no great advantage. In spite of these calculations, we cannot foretell with certainty whether or not a nuclear chain reaction can be maintained in such a system, because the absorption cross-section of carbon for slow neutrons is not sufficiently known.

In order to remove this uncertainty Fermi and I have devised two different experiments by means of which the absorption cross-section of carbon, which is very small, could be measured. It is assumed that one of these experiments, or both of them, will be

started at Columbia University as soon as the facilities required can be obtained.

If the absorption of carbon should turn out to be comparatively large we could conclude that the large-scale experiment is bound to fail, and in this case it need not be started. If the absorption of carbon should prove to be exceedingly small the large-scale experiment would appear to be very promising, and it can be assumed that everybody will then be in favor of starting it without delay.

Unfortunately, we must also be prepared to find an intermediate value for the carbon absorption. In this case a large-scale experiment will have to be performed in order to find out whether or not a nuclear chain reaction can be achieved with a combination of uranium and graphite. So we may have to make the experiment and risk its possible failure.

It should be borne in mind that a negative result of the large-scale experiment could also be of value by showing with certainty that a chain reaction cannot be achieved with simple means in the near future. Otherwise there remains an ever present potential threat arising out of experiments on uranium, which are carried out in certain other countries. Therefore, in my personal opinion, a large-scale experiment ought to be performed unless the possibility of its success can be excluded with reasonable assurance on the basis of experiments which are designed to determine the absorption of carbon, or other similar experiments which can be carried out on a moderately small scale.

RECOMMENDATIONS CONCERNING LARGE-SCALE EXPERIMENTS

No expenses need be incurred in connection with large-scale experiments until the absorption of carbon has been measured. On the other hand, steps ought to be taken now in order to prepare the ground for a large-scale experiment, so that this can be started without delay at the proper time. For instance, the possibility of converting uranium oxide into uranium metal ought to be explored. An attempt ought to be made to obtain a promise on the part of certain industrial corporations to supply at the proper time the quantities of the materials which are required. If possible, these materials ought to be loaned without any financial consideration. Barring an accident, in the case of a successful large-scale experiment, most of the materials used would remain unaffected and could be returned after the experiment is completed.

100 metric tons of graphite represent a value of about \$ 33,000 at the rate of \$ .15 per lb. If a purer brand of graphite has to be used, which rates at \$ .24 per lb., the value involved would be \$ 53,000.-

20 metric tons of uranium oxide represent a value of \$ 100,000 at the rate of \$ 2.50 per lb. If it need not be converted into uranium metal but can be used in the form of oxide in the large-scale experiment this material could be kept pure and could be returned undamaged. It would be desirable to have up to 50 tons of uranium oxide readily available for experiments in the United States.

STATEMENT CONCERNING THE POTENTIAL ASSISTANCE OF  
THE UNION MINIERE DU HAUT KATANGA.

It would be of particular value to enlist the assistance of this Belgian corporation which is to some extent controlled by the Belgian government. It appears to be the only corporation which could supply at short notice 20 metric tons of uranium oxide, and probably even 50 tons. I understand that the Managing Director, Mr. E. Sengier, is on a short visit in America.

From conversations which Professor G.B. Pegram of Columbia University had with a representative of the Eldorado Gold Mines, Ltd., it appears that this Canadian corporation might be able to supply uranium oxide for our purposes at the rate of 1 ton per week. If the uranium oxide were to <sup>be</sup> bought rather than obtained as a gift or a loan, it might be secured from Canada probably just as easily as from Belgium. On the other hand, the Canadian corporation is rather small and can hardly be asked to give away large quantities of material without financial compensation.

So far, radium up to 2.5 grams was used in our experiments, and we had to pay high rent to a subsidiary of the Union Minière, the only corporation from which large quantities of radium can be readily rented in this country. An attempt ought to be made to obtain radium for the purposes of experiments - like the proposed measurement of the carbon absorption and other similar small-scale experiments - rent-free from the Union Minière in the future.

Carnotites containing uranium are mined in the U.S.A. among others by the U.S. Vanadium Corporation which is owned by the Union Carbon and Carbide Corporation. A conversation, which I recently had

with William F. Barrett, Vice-President of the corporation, did not encourage the hope of obtaining large quantities of uranium oxide from this firm, but the issue could perhaps be reopened.

STATEMENT ABOUT URANIUM ORE.

As far as I was able to find out, pitchblend, which is an ore rich in uranium, is mined in Czechoslovakia, Canada and Belgian Congo. The total content of uranium in the deposit in Czechoslovakia is estimated to be between 1000 and 1500 tons. The Canadian deposit visibly contains a total of 3000 tons. The amount of pitchblend in the Belgian Congo is not known, but it is believed to be very much larger. In the United States uranium occurs chiefly in the form of carnotites, which is an ore poor in uranium, and is mined for the sake of its vanadium content. The total deposit is estimated to contain 3000 tons of uranium oxide. (Perhaps there are in the United States larger quantities of ore containing a very small amount of uranium, which are not included in the above estimate).

RECOMMENDATIONS CONCERNING URANIUM ORE.

Steps to secure a stock of uranium ores for the government can hardly be recommended at the present time if such steps would involve financial commitments on the part of the government. It might, however, be advisable to begin to study the question in what manner the government could secure such a stock at a later date, if required.

For instance, the question has been raised whether it might not be possible to obtain for the government a large quantity of pitchblend from Belgium as a token reparation payment. Such a transaction would not cause alarm abroad if it were arranged before the

world learns of the results of some successful large-scale experiment. The transaction could be justified without reference to the uranium content of the ore. Pitchblend is also the ore of radium, and action could be taken on the ground of securing the ore for the sake of its radium content, with a view of extracting the radium at some future date for medical purposes. Action taken on this ground alone might in fact be entirely justified.



Bk. 5

c/o Department of Physics  
Columbia University  
New York, N.Y.

October 26th, 1939

Dr. Lyman J. Briggs  
U.S. Bureau of Standards  
Connecticut Avenue  
Washington, D.C.

Dear Dr. Briggs:

Enclosed you will find a memorandum in which the statements and recommendations made by me at the meeting of October 21st are repeated and somewhat amplified.

Both at the meeting and in the memorandum I have refrained from putting forward a detailed plan for promoting further research on uranium. Having recently started conversations on this subject with Dr. Pegros, Dr. Fermi, Dr. Wigner and others, I feel that it is best to limit myself to general recommendations until a consensus of opinion on details has been reached.

I personally believe that if sufficient interest in the subject could be aroused, intensive research on uranium might be carried on at four or five different laboratories. Columbia, the Carnegie Institute for Terrestrial Magnetism, the University of Virginia, M.I.T and Princeton were so far tentatively mentioned in this connection. If a committee, foundation, or some other non-profit organization considered it his task to encourage research on uranium, and had the approval of the government, it could approach the presidents of certain universities in order to obtain the release of some younger physicists from their teaching duties. These men could then devote their

H

entire time to experiments on uranium, which they might want to undertake. They could work either at their own universities, or could work as guests of one of the four or five universities at which larger groups are active on the same subject. In a year or two these men could return to their regular work, and we would thus avoid creating the problem of how to place them later. Such a problem might arise if some of the alternative schemes that have tentatively been put forward were adopted. Also, by proceeding in this way we could avoid interfering with existing research projects in various physics departments, which would inevitably suffer if a large number of men in any single department were persuaded to work on uranium.

One point which might have to be considered in this connection is the following: some of the work which has to be done may be of such nature that the publication of the results had better be avoided. For a young physicist, who has not yet made a name for himself, refraining from publication means a sacrifice which he should not be asked to make without being offered some compensation. Some addition to the salary which he is normally drawing from his university might therefore be desirable and might require the creation of some special fund. This observation is based on experiences gained early in March, when Fermi and I agreed to delay the publication of our experiments on the neutron emission of uranium and attempted to obtain the cooperation of French and English physicists with regard to withholding all publications on this particular subject. I am enclosing for your information copies of the letters and cables exchanged on this issue between February 2nd and April 19th of this year.

Copies of the enclosed memorandum will be sent by me to Dr. Wigner and Dr. Teller, who are old personal friends of mine and with whom I have been in almost constant consultation on this subject since January of this year. I shall also send copies to Dr. Alexander Sachs, Professor G.B. Pegibet and Professor E. Fermi. Three additional copies will be sent to you, to be used at your convenience.

Yours sincerely,

(Leo Szilard)

Bk. f. 5

52

U. S. DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

WASHINGTON

ADDRESS REPLY TO  
NATIONAL BUREAU OF STANDARDS

LJB:DEK

November 1, 1939

IN YOUR REPLY  
REFER TO FILE

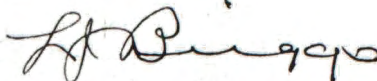
D

Dr. Leo Szilard,  
King's Crown Hotel,  
420 West 116th St.,  
New York, N. Y.

Dear Dr. Szilard:

I wish to thank you for your letter of October 31,  
transmitting four additional copies of your memorandum,  
and to say that your memorandum will be very helpful.

Sincerely yours,



Lyman J. Briggs, Director.

PALMER PHYSICAL LABORATORY  
PRINCETON UNIVERSITY  
PRINCETON NEW JERSEY

Bk. f. 5

54

November 4, 1939

Dr. L. Szilard  
420 West 116th Street  
New York, New York

Dear Szilard:

Thank you very much for letting me have a copy of your memorandum on the conference in Washington. I think it is very clearly and carefully written, and I heartily agree with its contents.

There was a sudden burst of mail for Farkas, which I am holding for him. Do you know by any chance his present address?

Sincerely,

*Wigner*

E. Wigner

EW:MH

(2) in add'l material for page 115  
comes from s.b.s. book folder 5;  
is preceded by Nov. 1939  
material, followed by 1939 +  
1940 material all out of  
chronological order.

Translation

New Island,

I am very glad that the matter with Roosevelt converges (?). I will be in Washington Saturday morning and I will be available unless I get instructions to the contrary.

Mici will probably stay in Washington and I will not be in New York until Friday. It ~~will be good~~ <sup>would be good</sup> if you'd call me as soon as you arrive in Washington. It will be probably best if you stay with us.

I talked to Tuckerman but he didn't react. Apparently it is difficult to awaken his interest in anything that is not his own idea.

To Ture I have not talked about Uranium since the summer. It seems that there is no work going on in the laboratory in this direction. On the other hand, at the Carnegie-exhibition in November (whose purpose will be propaganda for Carnegie), there will be a fission-exhibit. — I hope I'll see you on the weekend. If not at Briggs', then at our place.

Teller

Post  
monat

Columbia 6955  
2610 Garfield Street N. W.  
Washington, D. C.

365  
ll. folder 5

S. B. S.  
bk folder  
#5

Kædres Siðind,

Vaggon ömilit. Þógy a dolog  
Roosvelttel converyát. Samhat  
veggel Washington þan lexel és  
venndelherisone fogatöllu. Þa  
ellenfikes utasita'st nem kapok.

Yici valószínűleg Washington-  
ban marad és én csak Pénzfelen ké-  
nek New Yorkban. Jó volna, ha  
fölkívna mihez lát Washington-  
ba érkeik. Valószínűleg legjabb ké-



He nähtun lähik.

Tuoheman-nal besielhem,  
de nem reagält. ~~Ugy~~ Ugy-  
lätsch vehie ar indel löstleit  
mäs föllhellem valami isänt auri  
nem a sajut it le.

Tare-nal nem besielhem a Uro-  
stet niunvot nyärit. Ugy lätsch  
a laborafonium han es ino'nyä man-  
ha nem fobyit. Vizont a Novemberi  
Carnegie-exhibitor-ovuz (melynek el-  
ja a Carnegie-itnek reklámot cai-  
náltui) kes egy fissian-exhibit.

Prémium láfom a Wehmenen. He  
nem Briggs vil nagy náhun k a t h an.

So long

Teller

Bk. f. 5

53

New-York, November 4th. 1939.

Mr. Leo Szilard,  
King's Crown Hotel,  
420 West 116th. street,  
New-York, N.Y.

Dear Sir,

With reference to the correspondence exchanged between yourself, Mr. Cattier and Mr. Vogelstein, I shall be glad to make an appointment with you at your convenience.

I am at your disposal at the offices of the

Radium Chemical C°  
General Electric Building  
570, Lexington Avenue  
New-York

My telephone number is PLaza 3-1481.

Yours sincerely,



G.L. Lechièn

GLL.VSM.

2nd set ✓  
May, 1969

Additional Material for pages 116 and 117.

re: UNION CARBIDE AND CARBON

Meeting, (Oct. 16, 1939)

Memorandum by L.S.

Oct. 18, 1939

Invitation to lunch with Pegram and Fermi

Letter, L.S. to William F. Barrett, Vice President, Union Carbide  
and Carbon Corporation. Oct. 18, 1939

(Both of the above items are copies typed by Union Carbide  
over a year later, at Szilard's request, ~~showing his sharp  
sense for history in the making.~~)

Letter, Robt. J. Hoffman of Union Carbide, to L.S., enclosing above.  
Dec. 6, 1940

COPY

KING'S CROWN HOTEL  
420 West 116th St.  
New York, N.Y.

October 18, 1939

Mr. William F. Barrett, Vice President,  
Union Carbide and Carbon Corporation,  
30 East 42nd Street  
New York City

Dear Mr. Barrett:

Enclosed I am sending you a short memorandum referring to the conversation which we had on Monday this week. We have calculated how much graphite we would need for the preliminary experiment, which we propose to start immediately, and find that we could probably manage with 4 metric tons. As you will see from the enclosed copy of a letter of the National Carbon Company the price quoted for this amount of graphite is about \$3500.00. As soon as you let us know whether we can have this amount of graphite we would take all the necessary steps for preparing this experiment.

I have telephoned to your office today and left a message with Mr. Mills in order to ask you whether you would care to meet Professor Pegram, who is in charge of the Physics Department at Columbia University, and Professor Enrico Fermi one of these days for lunch at the Faculty Club. If you let me know what days would be convenient to you I would find out when the others are free and communicate with you.

On Friday I have to leave for Washington where a meeting has now been fixed for Saturday, but I hope to be back by Tuesday at the latest.

Yours very sincerely,

(signed)

(Leo Szilard)

(typewritten)

October 18, 1939

Bk. f. S f

MEMORANDUM

Recent results concerning the possibility of setting up a nuclear chain reaction in uranium make it appear desirable that we should establish some sort of cooperation with the Union Miniere. Just what form of cooperation would be most appropriate has not been decided as yet. I have seen Mr. Jean E. V. Cattier, whose father is President of the Union Miniere, and arranged with him to meet in the near future the Managing Director, Mr. Sengier, who is now here on a visit.

It appeared desirable that the firms who use American uranium ores should be contacted before any definite arrangements are made with the Union Miniere, especially since, in an emergency, the United States might be cut off from Canadian and Belgian supplies. I was advised that most of the carnotites containing uranium are mined by the Vanadium Corporation of America, which is a subsidiary of the Union Carbide and Carbon Corporation. This was primarily the reason for my contacting the Carbide and Carbon Corporation.

A second reason for my contacting this corporation was the fact that an experiment is being considered for which about 50 tons of graphite might be required. This experiment also requires a large quantity of uranium oxide. It is assumed that it will be possible to obtain the uranium oxide required for this experiment as a loan from the Union Miniere. While it is impossible to say with certainty that this experiment will lead to a large scale liberation of nuclear energy, there is a good chance that this will be the case. Obviously, the success of the experiment would lead to a great increase in the value of uranium and would thereby directly benefit those who control the supply of uranium ores. The cooperation of the Union Miniere and of the Union Carbide and Carbon Corporation would appear to be justified on this ground alone, even without emphasizing the possible importance of these experiments from the point of view of national defense.

50 Metric tons of graphite, which might possibly be required for the experiment which is envisaged, represent a value of about \$16,000.00 if ordinary graphite is used, which rates at a price of 15 cents per pound. However, it seems that a special brand of graphite has

Oct. 18, 1939

to be used, for which the National Carbon Company quotes a price of 35 cents per pound; the value involved would then be about \$40,000.00. A letter of the National Carbon Company containing a price quotation is enclosed.

It seems impossible to foresee with certainty the outcome of the proposed large scale experiment, and it appears that we simply will have to have the courage to embark on it on a fifty-fifty chance for success and failure.

The estimate of the chances of this experiment might be slightly improved by investigating the properties of graphite in a separate experiment which we propose to start as soon as possible. This requires 4 metric tons of graphite of the grade specified in the enclosed letter of the National Carbon Company, and on the basis of the quotation contained in this letter this amount would represent a value of about \$3500.00. The Physics Department at Columbia University has at present no funds available for the purpose of this experiment, but it is believed that, if the National Carbon Company would consent to supply the graphite material, the other facilities required could be obtained from the Rockefeller Foundation or some other Foundation. An early decision on this point would be appreciated.

(signed) LEO SZILARD

UNION CARBIDE AND CARBON RESEARCH LABORATORIES, INC.  
CARBIDE AND CARBON BUILDING  
30 EAST FORTY SECOND STREET  
NEW YORK

December 6, 1940

Mr. Leo Szilard,  
King's Crown Hotel,  
420 West 116th Street,  
New York, N. Y.

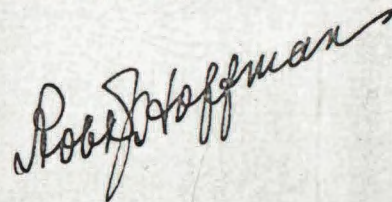
Dear Mr. Szilard:

As per the request made by you on your recent visit to my office, I am herewith enclosing a copy of your letter dated October 18, 1939, addressed to Mr. William F. Barrett, Vice President, Union Carbide and Carbon Corporation. I am also enclosing a copy of the memorandum which accompanied the above mentioned letter.

With respect to your other request for opportunity to contact a member of National Carbon Company's research organization, our Messrs. MacPherson and Hamister will make arrangements to visit you as stated in my letter of even date.

Do not hesitate to call on me if I can be of any further service.

Very truly yours,



RJH:l

Additional material for pages 117-118

re: "no word from Washington - at least none that reached me"

Letter, L.S. to Sachs

Nov. 5, 1939

re: 1939 to 1940 period in France, recollections

"Conversation with Halban" 2-3-44 L.Szilard.



November 5th, 1939

Dr. Alexander Sachs  
One South William Street  
New York City

Dear Dr. Sachs:

I wish to confirm our appointment for Tuesday night, 7 p.m., at the Men's Faculty Club of Columbia, 400 West 117th Street (117th Street and Morningside Drive). I think you will find both Dr. Pegram and Dr. Fermi very enjoyable persons.

In addition to what I told you over the telephone I should like to make some observations for your personal information:

I expected Briggs to enlarge his committee by including men like you, K.T. Compton or G.B. Pegram. It was a surprise for me to hear that he wanted to include also a group of younger physicists who are themselves actively engaged in doing research on uranium, namely Fermi, Tuve and Beams.

To the inclusion of this second group I should like to make two observations:

1. Since it so happens that the proposed second group includes the name of Fermi we could be assured that the committee will always be well informed and conscientiously advised. The committee would not have to depend on information gathered

haphazardously. This may prove to be a very important point and may outweigh all other considerations.

2. The fact that such a second group is being included and that it does not contain my name will make it virtually impossible for me to do in the future what I tried to do in the past, i.e. concern myself beyond the scope of my own experiments with the broader aspects connected with the possibility of a chain reaction, and to act as a driving power in this connection. For me to go on in the future as I did in the past, with a status wholly undefined at a time when some other colleagues have a clearly defined status, would hardly be advisable and in the end probably physically impossible.

I came up against similar difficulties in England six years ago. When the German government started to dismiss German scholars I persuaded Sir William Beveridge to form a committee and create an organization for assisting and placing these scholars. After this was done I went on working for this cause for another six months without having any defined status. Though I finally succeeded in getting a number of things done by exerting myself up to the limit of my strength I learned a lesson, and now I am anxious to avoid a repetition of this experience.

This point may have little importance from a general point of view, but I feel that I have to state my case now so that after the proposed committee has been appointed you may not think that I am willfully abandoning a cause when in fact I shall have little choice left in the matter.

In addition to these observations I should like to repeat what I told you over the telephone:

It seemed to me that the omission of the name of G.B. Pegram, who is Head of the Physics Department at Columbia and also Dean of the Graduate School, might be an objective mistake and at the same time also be embarrassing to Fermi. I had a conversation on this subject with Fermi, and we thought that if the committee had the right to co-opt members you might find it perhaps possible to suggest the inclusion of Pegram at the first meeting of the committee.

On Monday I shall telephone your secretary in order to find out if there are any points in the memorandum which you are preparing, or anything else, which you care to discuss with me. I am looking forward to seeing you in any case Tuesday night.

Yours very sincerely,

(Leo Szilard)

History

36.5. 15A

CONVERSATION WITH HALBAN

2-3-44

L. Szilard

On the basis of Hahn's first paper it occurred to Joliot that neutrons may be emitted in the interaction of neutrons with uranium and that this might lead to a chain reaction. He tried to demonstrate this by surrounding a piece of uranium with a radium-beryllium source in the center with a layer of ethyl bromide separate the radioactive bromine by means of the Szilard-Chalmers process and compared the intensity of the bromine activity in the presence and absence of uranium. No conclusive results could be obtained this way and Joliot turned to demonstrate the existence of fission by catching the fission products emitted from a thin layer of uranium oxide which is exposed to a photo neutron source.

In the meantime Halban began to urge Joliot to let him organize more adequate experiments for determining whether neutrons are emitted in fission. Halban used a photo-neutron source of 100 millicurie uranium and measured the thermal neutron density as a function of the radius in a uranium nitrate solution. A primary measurement completed in one day indicated a positive effect (Joliot goes on vacation) and further measurements are carried out during the following week with 300 millicurie confirmed this. A letter was then sent to the editor of Nature.

Subsequent experiments he used photo-neutrons interactive with uranium were shown capable of inducing the n, p reaction in sulphur, in carbon bisulfide.

Second paper by Halban, Joliot, Kovarsky contains a more thorough discussion of the first experiment published in NATURE.

\_\_\_\_\_ and Halban discuss such things as using a heterogeneous mixture of uranium oxide and water and also other slowing down materials such as carbon and heavy water. In August the experiment later published by Halban, Joliot, Kovarsky and \_\_\_\_\_ is performed. In September Halban calculates in homogeneous mixtures of water and uranium oxide. In the meantime the war broke out and in October measurements are started on heterogeneous mixtures of water, uranium and oxide. In December an experiment is performed on 8 tons of graphite for the purpose of measuring the absorption of carbon. This leads to a feeling that carbon is only slightly better than water. It is realized that metal is an advantage over uranium oxide because there is no slowing down in the metal due to collisions with oxygen. These carbon lead to shift in the main interest in the direction of heavy water.

Joliot visits Dautry in December or January and finds immediate response. He is told he made a mistake not to come earlier. The Army wants to get rid of Halban and Kovarsky and Joliot is asked if he could replace them or add some Frenchmen who could gradually learn the subject and displace Halban and Kovarsky. Joliot replies that he hopes gradually to learn the subject himself and that he does not propose to add any other Frenchmen to the group. Dautry gives his full support to Joliot and Joliot has unlimited financial resources at this disposal. It is decided to place a contract through the \_\_\_\_\_ Bureau (secret service) for the total heavy water output of Norway which is expected to amount to 200 liter per month and negotiations are started at once. Halban and Kovarsky are asked through Joliot whether they would be willing to be interned for three weeks during those negotiations.

Halban accepts on the condition that this be the last foolish demand which is made upon him. Halban is sent to Porquerolles (island military post in south of France) in the middle of February and Kovarsky goes to Belle Isle, Brittany. It is suggested that Joliot himself take a holiday in Grenoble to make Halban and Kovarsky feel better about their confinement. When Halban reports at Porque Rolles showing his order of mission it turns out that Porque Rolles has not been notified of his arrival and of the conditions under which he is to be held there so Halban is for all practical purposes under arrest. A guard is put in front of his door over night who keeps him awake by snoring. Next morning Halban asks to see the commander and informs him that unless the guard is at once replaced by a non-snoring one, he will send a telegram to the minister for armaments and refuse all further collaboration with the French command.

Incidentally, the original order of mission stated that Halban was sent to the island for geological survey and this was done in order to give him freedom of movement on the island; since the commander of the island was not notified directly the order or mission was disregarded. It took one week to reach Dautry who was away from Paris and matters were then straightened out.

160 liters of heavy water arrived in the middle of March. At that time about 6 tons of graphite were on order. Tanks were under construction for the experiment with heavy water. The absorption of sulphur was being measured in order to see if a suspension of uranium in heavy water could be used. An experiment was under preparation to make measurements on a heterogeneous mixture of heavy water and uranium oxide (aluminum cubes were made to be filled with heavy water). The absorption of iron and copper was measured.

On the 14th of May Joliot told Halban that Paris must be considered as lost. This was lightening out of a clear sky for Halban, who had not realized at all the seriousness of the war situation. (1st of April unlimited financial backing) Joliot told Halban that he wanted him to set up a new laboratory in the south of France, Mont D'Or. A month later Paris fell and Joliot came to the new laboratory. But two days later Dautry's aide appears and asks Halban and Kovarsky to go at once to Bordeaux with all available equipment and materials and all notes and documents. Joliot stays behind but promises he will visit Halban in Bordeaux. At Bordeaux Dautry tells Halban that this work must be saved and that he must go at once to England. He himself and Joliot refused to leave France.

An 8,000 ton coal ship which was put in charge of the Earl of Suffolk and which could take 600 persons stands by and takes all who want to go. Bordeaux is full of people but only 150 persons can be found who wish to embark. The ship waits three more days for additional passengers but none arrive. Finally as the Germans approach Bordeaux the ship has to leave.

In England there is already a committee under the chairmanship of G. B. Thompson. Halban presents his views to this committee. He talks about the possibility of using 93 or 94 in the slow neutron chain reaction. Considers the possibility of a heterogeneous system of uranium and water; believes that carbon beryllium have a chance but chiefly emphasizes the homogeneous uranium heavy water system which he prefers to the heterogeneous heavy water system.

G. B. Thompson does not believe that a chain reaction can be made with unseparated uranium. At that time \_\_\_\_\_ had already calculated the atomic bomb based on separated 235 and Simon is considering to start work on the separation of 235.