INCEPTION ATOMIC BOMB PROJECT 1939–1940.

PRESENTATION OF IDEA TO PRESIDENT ROOSEVELT

By

Doctors Albert Einstein and Alexander Sachs

August - October, 1939.

AND FOSTERING DIRECTION OF EARLY DEVELOPMENT TO mid-1940 by Dr. Lyman J. Briggs, Head of Bureau of Standards, Department of Commerce, and Chairman of Presidential Committee with Dr. Einstein, Dr. Sachs and Dr. Pegran, as Co-ordinating Members.

SUMMARY DOCUMENT HISTORY

By

Alexander Sachs

August 8, 1945.
OUTLINE OF THE HISTORICAL SOURCE-MATERIAL on
THE PRESENTATION TO THE PRESIDENT BY
ALBERT EINSTEIN AND ALEXANDER SACHS
IN THE AUTUMN OF 1939, OF THE APPLICATION OF
A PROJECT FOR THE UTILIZATION OF ATOMIC
DISINTEGRATION FOR NATIONAL DEFENSE AND
RELATED PURPOSES.

HISTORICAL COURSE OF THE PROJECT UNTIL THE
ASSUMPTION OF RESPONSIBILITY FOR ITS EXECUTION
BY OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT,
NEWLY ESTABLISHED IN THE WAKE OF THE ENTRY OF THE
NATION UPON NATIONAL DEFENSE UP TO THE FALL OF FRANCE.
October 12, 1939, conference at the White House - finally
arranged for and effected on October 11th - as a result of efforts by
Alexander Sachs since late August on the basis of letter from Dr. Einstein
of August 2nd, delay having been due to events prior and subsequent to the
outbreak of the war and the President's preoccupation with the revision
of the Neutrality Act.

At this conference Alexander Sachs presented to the President
Dr. Einstein's letter of August 2, 1939, and went over his own covering
letter of October 11th and the redraft which he had made of the memorandum
of Dr. Szilard of the end of August, 1939.

It was at this conference that the President effected an intro-
duction of Alexander Sachs to General Edwin M. Watson, his secretary.
General Watson in turn arranged for a meeting with Dr. Lyman J. Briggs,
Director of the National Bureau of Standards of the United State Department
of Commerce.
August, 1939, collaboration between Doctors Albert Einstein and Leo Szilard, and Alexander Sachs, on the letter and memorandum for the President on the significance of for national defense of recent experimental research at Columbia University by Doctors E. Fermi and L. Szilard on uranium, and recommendation for the acceptance of such research in view of the German embargo on the sale of uranium from the Czecho-Slovakian mines, and the prosecution of similar research on uranium at the Kaiser-Wilhelm-Institute in Berlin.

1a - letter of Dr. Albert Einstein to the President dated August 2, 1939.

1b - memorandum of Dr. Leo Szilard dated August 15, 1939, on the recent work on atomic disintegration its national importance to the United States, and recommendation for the acquisition of a pitchblende from Belgium or the Belgian Congo, and the assumption of the successful demonstration of a chain reaction of fast neutrons.

"Experiments have been devised for settling this important point - whether a fast neutron reaction can be made to work; it is solely a question of organization to insure that such experiments be carried out."

"There is reason to believe that if fast neutrons could be used, it would be easy to construct extremely dangerous bombs that would go far beyond all military conceptions, and that could be transported by boat and exploded in port with disastrous results."
ADDENDUM TO IV or V.

April meeting. Originally the April meeting was scheduled by Dr. Briggs for April 22nd. Those invited were Professor Einstein, Dean Pegram and the writer, as appears from Exhibit IIA. Then Dr. Briggs by telegram of April 20th the meeting was postponed to the 27th (Ex. IIB).
In the course of April writer had a succession of conferences with
Dr. Einstein as one group, Dr. Wigner and Dr. Szilard as another group, and
Dr. Fermi and Szilard as another group. The month having been marked by the
German invasion of Norway and Denmark on April 9th and the counter operation
of the British in their landing in Norway on April 16th and 18th, writer had
sought to relate and assume favorable outcomes of the uranium experiments to
Naval operations. As this in turn required the use of certain Naval facts
and factors as a framework, he sought the aid of Naval officers. Dr. Briggs
with whom he discussed this matter kindly undertook to submit a request for
data to Admiral Bowen and Commander Hoover, accordingly Dr. Briggs' good
offices were utilized as appears from the writer's letter to him of April 23,
1940 (Exhibit 12) Though, no copy has been preserved of the final form of
the request for data, a longer memorandum as a aid-memoir of the accumulated
progress was prepared at the time and has been preserved. As this memorandum
of April 20th is rather long, a summary is submitted as exhibit 12.
(Referring to the meeting of April 27th) the discussions to be described later that the writer had with the scientists on the military applications reinforced the desire for enlargement of the conference group that was called together by Dr. Briggs for the meeting of April 27th. Accordingly in a telegram of April 26th referred to that part of the discussions with Dr. Einstein that produced the joint "proposals" for carrying forward the work with greater speed and more adequate scale than hitherto", as appears from the day letter of April 26th (marked Ex. 11c). In the same connection Dr. Einstein wrote on April 25, 1940, to Dr. Briggs recording his conviction "as to the wisdom and urgency as to creating the conditions under which that work can be carried out in greater speed and on a larger scale than hitherto" and indicated that he was sympathetic to the suggestion made by the writer than "THE SPECIAL ADVISORY COMMITTEE" submit the names of persons to serve as a board of trustees for a non-profit organization which with the approval of the Government Committee should secure from the Government or private sources, or both, the necessary funds for carrying out the work. (Letter marked Ex. 12a), but Dr. Briggs on the other hand, in his telegraphic reply of April 26th deemed it best to limit the meeting to the Advisory Group that had been appointed by the President, consisting of Dr. Einstein, Pegram and the writer. (marked Ex. 11d)
By Spring, 1939, there was completed in the Physics Laboratories at Columbia University an advance upon the uranium researches in Europe of Drs. Hans O. Hahn and L. Strassmann and the supplementary research of Dr. L. Wissine and H. Frisch (the latter noted in the February, 1939, issue of "Naturwiss., London"). This European work on the fission of uranium was independently and by different methods carried out by the scientists in the U.S. (ms. Columbia University Physics Laboratory was dated March 16, 1939). The cumulative researches of Dr. E. Fermi and L. Szilard which had been communicated in manuscript to Dr. Einstein led him in conferences first with Dr. Szilard and then with Alexander Sachs to develop jointly the implications of the imminent discoveries for the world situation, on the assumption that Germany would go to war. It so happened that in memorandum of last mentioned, Alexander Sachs, economist, had just prior to the Nazi seizure of Prague and Czechoslovakia placed as is evident from the title "The Imminence of World War in Perspective, Accrued Errors and Cultural Crisis of the Inter-war Decades"; (Exhibit No. 1, dated March 10, 1939, "Naturwiss., London: "Notes on Imminence of World War in Perspective, Accrued Errors and Cultural Crisis of the Inter-war Decades". The author of that memorandum was then at the time sensitive to the concern over the need of what he called in the concluding sentence "the preparedness that will become inevitable because of the consequences of the accumulated errors of the victors of the last war and the prospectively unfolding aggressions of Nazi Germany."

The further developments of the period that had come to the attention of Dr. Einstein was that subsequent to the seizure of Prague in mid March, 1939, Germany stopped the sale of uranium from the Czechoslovakian mines. This was related by Dr. Einstein to the dual fact that the recent work on uranium carried on outside of Germany by predominately refugee scientists was being watched and repeated by German scientists at the Kaiser-Wilhelm-Institut in Berlin and that a son of the German Under-secretary of State, von Heiseacker, has been attached to the institute.

While among the physicists there were doubts entertained by the further developments, Dr. Einstein accepted the possibility that the nuclear chain reaction could be set up in a mass of uranium by which vast amounts of power could be generated; and he carried the new phenomenon a stage further to the eventuality that extremely powerful bombs of a new type could be thereby 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".

In view of the foregoing developments and concern for the world in the event of and on the assumption of German aggressions on the peace of the world, it was agreed, by Dr. Einstein and his colleagues, that the situation and its implications should be brought to the attention of the president.

Though the experimentalists were uncertain whether a fast neutron reaction could be made to work, the far-reaching military consequences from such a possibility were such that here on it was deemed essential that the researches
in England, France, and the United States be somehow kept from Nazi Germany, and indeed a proposal to the effect for the withholding of the publication on chain reaction was already submitted in the Kasirer Kasimir and while it was received with favor by the Western scientists, the proposal was looked at askance in France. Finally, since the largest supply of good ore was in the Belgian Congo and as new phases of the experiment could not be carried out within the limited budget of universities, it was deemed by this group that the aid of the government was, even from an economic standpoint, necessary, if only to indicate to public spirited private persons and corporations that the ensuing research would be invested with a special national significance.

In view of all these considerations of development, it was finally agreed that to be effective the presentation to the president must be direct and under conditions that would permit the spelling out of the cumulative implications and consequences for the nation; and this task was entrusted to the economist and political-scientist member of the group by reason of his long association with the President as an informal advisor and friend.

Upon the completion of the of the letter of Dr. Einstein to President Roosevelt dated August 2nd and the supplementary memorandum by Doctor Szilard dated August 15th, 1939, came the German demands upon Poland and the invasion of Poland on September 1st, culminating with the fall of Warsaw on the 27th, the attendant and ensuing presidential concern with guiding through Congress a revision of the Neutrality Act served to delay the arrangement of a meeting for the writer with the president. Only after the first week of September was it possible to arrange an interview with the president and conference with his aides delegated for the consideration of the problem and the proposals.
II.

Conference at the White House on October 11, 1939, and the appointment of a committee headed by Dr. Lyman J. Briggs, director of the Bureau of Standards to pass upon the project.

1. At the conference with the president at the White House on October 11th writer presented a review of the following collect of material:

(a) Dr. Einstein's letter of August 2, 1939 (marked herein as Ex. 2a)
(b) Memorandum of Dr. Szilard of August 15, 1939 (marked herein as Ex. 2b)
(c) copies of articles that have appeared in scientific journals (of which only the report of Dr. Szilard's communication to The Physical Review dated April 15, 1939, is herewith enclosed marked Ex. 2c)

Writer orally and in his memoranuming memorandum letter dated October 11, 1939 to President Dr. Einstein

On behalf of Dr. Einstein and himself the writer orally and in the course of the conference and in his covering memorandum letter of October 11, 1939 (marked herein as Ex. 3) made the following requests:

(a) liaison at the White House
(b) committee of the services as a liaison between Army and Navy
(c) with war having broken out and submarine operations begun, the securing of material from the Belgian Congo

In keeping with the theory already cited in writer's memorandum of March 10, 1939, (Ex. 1) namely: President and writer's memorandum to the president of October 11, 1939, pointed to the danger of German invasion of Belgian and hence the possibility of advisability of taking steps then through diplomatic channels for the diversion of the Belgian uranium to the United States. In respect to the financial requirements of the project, it was suggested that, if assuming recognition by the government of the national significance of the research, funds could be secured either from public spirited executives in chemical and electric companies or from foundations.

2. In the wake of this conference the president asked his secretary and military aide, General Was Edwin M. Watson, to act as a liaison for the White House. General Watson was further asked by the president to effect an introduction to Dr. Lyman J. Briggs and to constitute in the president's behalf a committee of Dr. Briggs, Colonel Adamson of the Army and Commander Hoover of the Navy for the consideration of the ideas and material that had been submitted to him by Dr. Einstein and the writer. President further suggested that the writer stay over the following day for a conference with this newly appointed committee.

The conference on October 12th with Dr. Briggs led to the arrangement of a meeting for the end of the month between the government group and those concerned with this problem. (In addition to the formal invitations sent by Dr. Briggs the writer was asked to send an explanatory note to Professor Wigner, of Princeton, and Professor Marshall B. Teller of George Washington University (copy of which is included under the designation of Ex. 4). The meeting held at the office
With the exception of Dr. Einstein, whose health did not permit attendance at
that or subsequent meetings, all those invited participated as follows at the
meeting held in the office of Bureau of Standards on Saturday morning,
October 21, 1939, at 9:30.

(a) For the government - L. J. Briggs
   Colonel Edmonson
   Commander Hoover

(b) As Presidential representative - Alexander Sachs

(c) As cooperating scientists - Professor Albert Einstein (who was unable to
   attend on account of health).
   E. P. Wigner - (Professor Theoretical Physics at Princeton)
   E. Teller (Professor, George Washington University)
   E. R. Fermi (Professor, Columbia University)
   L. Sieve (visiting experimental physicist at Columbia
      and Trustee of the Association of Scientific Collaboration)

In the course of the technical discussion at the meeting on October 21st objections
were raised by some that those interested in the political-military implications
were much too previous in pre-supposing that what was merely possible would
become actual and so they urged that it was necessary for the government to con-
cern itself at this time with the scope and pace of the research being carried
on under the normal auspices of our educational institutions. Dr. Lyman Briggs
in his official position as the Director of the Bureau of Standards and as
presidential appointee was as chairman of the combined group observed that
national considerations justified the mental extension of the $s$ available
possibilities with a view to arriving at an estimation of the national interest
in facilitating and accelerating the course of development: it was on the note
that the governmental part of the group would thus approach the problem
sympathetically that the conference ended.

3. The inter-departmental committee appointed by the President submitted
on November 1, 1939, a preliminary report of this its findings and recommendations
with regard to the subject that had been set by the President: FAMILIES USE OF
URANIUM FOR SUBMARINE POWER AND HIGH DESTRUCTIVE BOMBS. The report of the
committee - L. J. Briggs, chairman, Keith Edmonson, Lt. Colonel USA and
Gilbert C. Hoover, Commander U & N - opened with a reference to the meetings of
the committee "with Ale Dr. Alexander Sachs and the physicists from Columbia,
Princeton and other institutions", and described the recent work, and set forth
the possible applications to submarine power and explosives inherent in the
possible successful release of accumulated atom splitting in the form of a general
reaction. Because of the historic interest of this formulation by the govern-
mental committee of the projected developments, it is desirable to present the
full text of the main findings.
(1) Discoveries made within the last year have shown that when a uranium atom is bomarded by neutrons (uncharged elemental particles of matter) from an outside source, the uranium atom may be split in two and this breakdown is accompanied by the release of a great amount of atomic energy.

(2) When the uranium atom is split it likewise sets neutrons free. These neutrons may be able in turn to split other uranium atoms and thus continue the process as a chain reaction. This continuous splitting has not so far been accomplished. The proposed research would be directed to finding a way to do it.

(3) The energy released by the splitting of a mass of uranium atoms would develop a great amount of heat. If the chain reaction could be controlled so as to proceed gradually it might conceivably be used as a continuous source of power in submarines, thus avoiding the use of large storage batteries for under-water power.

(4) If the reaction turned out to be explosive in character it would provide a possible source of bombs with a destructiveness vastly greater than anything now known.

While desiring that such a general reaction has not yet been demonstrated, the committee next gave as its major conclusion the following:

In furtherance of that he proposed that initial support - funds for which committee expected to secure from the enactment of the Sea Bill - be given to -

(a) supplying for immediate experimental work 4 metric tons of pure-grade graphite, and
(b) if later justified, supplying 50 tons of uranium oxides.

Finally it recommended under the concluding paragraph 3 - by letter of Dr. Briggs to the President of November 1, 1939 - that the committee be enlarged for the support and coordination of these investigations in different universities, and that the following be invited to constitute a coordinating group:

President Karl Compton, Massachusetts Institute of Technology
Cambridge, Massachusetts

Dr. Alexander Sachs - One William Street, New York

Professor Albert Einstein, Princeton University, Princeton, N.J.

Dean George B. Pegram, Columbia
Then an interlude of activity ensued, approximately coincident with the then demobilized phoney war between the fall of Poland and the invasion of Norway. The President was preoccupied with numerous internal and international problems. General Lee, as liaison, felt that the report of November left was not sufficiently pointed, and accordingly in transmitting its text to the writer on February 8, 1940, having previously conveyed merely its general tenor — stated that he was asking "for a special recommendation from Dr. Briggs."

Meanwhile, progress was concentrated in the organization and the functioning of the coordinating committee mentioned in the conclusion of point 6 of Dr. Briggs's report to the President of November 1, 1939. Conferences were had between the groups at Columbia University — consisting of Drs. Pagram, Fermi and Szilard — with the writer as presidential advisor and intermediary. In mid-November an octet of experimental projects was projected at C by the Columbia group with a view to securing a number of subsidiary questions, in the hope that these could be vigorously pursued so that reports could be made within a period of six months. Based on notes made at the time, the definition and scope of the subsidiary questions and the recommended personnel from nearby educational institutions as projected were as follows:

1. Slow Neutron Reaction:
   Fermi, Pagram, Szilard (all Columbia) Wheeler (Princeton)
2. Fast Neutron Reaction:
   Fermi, Szilard Tuve (Carnegie Institute) Wigner (Princeton)
3. The Question which of the Uranium isotopes splits:
   Dunning (Columbia) Fermi, Tuve, Wheeler.
4. Small Scale Separation of Isotopes by any Method except Diffusion:
   Beams (Univ. Virginia) Fermi, Tuve.
5. Small Scale Separation of Isotopes by Diffusion:
   Fermi, Furry (Harvard) Urey (Columbia)
6. Theoretical Possibility and Limitation of Large Scale Separation by Centrifuging:
   Beams, Pagram, Szilard, Teller (George Washington Univ.)
7. Theoretical Possibility and Limitation of Large Scale Separation by Diffusion:
   Fermi, Furry, Onsager (Yale) Urey.
8. Possibility of Large Scale Production of Uranium Metal:
   Pagram, Szilard, and somebody from the Department for Chemical Engineering of MIT or Columbia.

In particular, the projects at Columbia came to receive limited aid for the purchase of materials, as is evident from the reply of February 20th, by the Director Lyman H. Briggs to General Watson's memorandum of February 9, 1940 (this exchange of correspondence being marked respectively Ex. 6A and 6B).

The writer as co-initiator with Dr. Einstein, of the original project conferred with Dr. Einstein in February at Princeton and learned of his judgment that the work progressing at Columbia was merely more significant than that at Paris, as reported in "Science". Hence in anticipation of Dr. Briggs' reply to General Watson — (Ex. 6B) — a letter was written to General Watson under date of February 15 pleading for larger and more interested aid and promising an evaluation in the near future from Dr. Einstein of the work being completed at Columbia (marked Ex.6C)
A. Preludes to Presentation of Project to President Roosevelt

By Spring, 1939, there was completed in the Physics Laboratories at Columbia University an advance upon the uranium researches in Europe of Dr. Otto Hahn and L. Strassmann and the supplementary research of Dr. L. Meitner and F. Frisch (the latter noted in the February, 1939, issue of "NATURE, LONDON"). This European work on the fission of uranium was independently and by different method carried out by Professor Fermi and others in the United States.

The advance made by Dr. Leo Szilard was repeated under the title "Instantaneous Emission of Fast Neutrons in Interaction of Slow Neutrons with Uranium" and was published April 15, 1939, issue of the "PHYSICAL REVIEW" (manuscript from Columbia University Physics Laboratory was dated March 16, 1939).

The cumulative researches of Dr. E. Fermi and L. Szilard which had been communicated in manuscript to Dr. Einstein led him in conferences first with L. Szilard and then with Alexander Sachs to develop jointly the implications of the imminent discoveries for the world situation, on the assumption that Germany would go to war. It so happened that in memorandum of last mentioned, Alexander Sachs, economist, had just prior to the Nazi seizure of Prague and Czechoslovakia placed as is evident from the title "The Imminence of World War in Perspective, Accrued Errors and Cultural Crisis of the Inter-war Decades." (Exhibit No. 1, dated March 10, 1939, "NATURE," "Notes on Imminence of World War in Perspective, Accrued Errors and Cultural Crisis of the Inter-war Decades". The author of that memorandum was then at the time sensitive to the concern over the need of what he called in the concluding sentence "the preparedness that will become inevitable because of the consequences of the accumulated errors of the victors of the last war and the prospectively unfolding aggressions of Nazi Germany! The further developments of the period that had come to the attention of Dr. Einstein was that subsequent to the seizure of Prague in mid March, 1939, Germany stopped the sale of uranium from the Czechoslovakian mines. This was related by Dr. Einstein to the dual fact that the recent work on uranium carried on outside of Germany by predominately refugee scientists was being watched and repeated by German scientists at the Kaiser-Wilhelm-Institut in Berlin and that a son of the German head of State, von Neissacker, has been attached to the Institut.

While among the physicists there were doubts entertained by the further developments, Dr. Einstein accepted the possibility that the nuclear chair reaction could be set up in a mass of uranium by which vast amounts of power would be generated; and then carried the new phenomenon a stage further to the eventuality that extremely powerful bombs of a new type could be thereby 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."

In view of the foregoing developments and concern for the world in the event of and on the assumption of German aggressions on the peace of the world, it was agreed, by Dr. Einstein and his colleagues, that the situation and its implications should be brought to the attention of the President.

Though the experimentalists were uncertain whether a fast neutron reaction could be made to work, the far-reaching military consequences from such a possibility were such that here on it was deemed essential that the researches
in England, France, and the United States be somehow kept from Nazi Germany, and indeed a proposal to the effect for the withholding of the publication on the chain reaction was already submitted and while it was received with favor by the Western scientists, the proposal was looked at askance in France. Finally, since the largest supply of good ore was in the Belgian Congo and as new phases of the experiment could not be carried out within the limited budget of universities, it was deemed by this group that the aid of the government was, even from an economic standpoint, necessary, if only to indicate to public spirited private persons and corporations that the ensuing research would be invested with a special national significance.

In view of all these considerations of development, it was finally agreed that to be effective the presentation to the president must be direct and under conditions that would permit the spelling out of the cumulative implications and consequences for the nation; and this task was entrusted to the economist and political-scientist member of the group by reason of his long association with the President as an informal advisor and friend.

Upon the completion of the letter of Dr. Einstein to President Roosevelt dated August 2nd and the supplementary memorandum by Doctor Szilard dated August 15th, 1939, came the German demands upon Poland and the invasion of Poland on September 1st, culminating with the fall of Warsaw on the 27th, the attendant and ensuing presidential concern with guiding through Congress a revision of the Neutrality Act served to delay the arrangement of a meeting for the writer with the president. Only after the first week of September was it possible to arrange an interview with the president and conference with his aides delegated for the consideration of the problem and the proposals.
Conference at the White House on October 11, 1939, and the appointment of a committee headed by Dr. Lyman J. Briggs, director of the Bureau of Standards, to pass upon the project.

1. At the conference with the president at the White House on October 11th, the writer presented a review of the following collection of materials:

(a) Dr. Einstein's letter of August 2, 1939 (marked herein as Ex. 2a)
(b) Memorandum of Dr. Sullard of August 15, 1939 (marked herein as Ex. 2b)
(c) copies of articles that have appeared in scientific journals (of which only the report of Dr. Sullard's communication to THE PHYSICAL REVIEW dated April 15, 1939, is here with enclosed marked Ex. 2c)

On behalf of Dr. Einstein and himself, the writer orally and in the course of the conference and in his covering memorandum letter of October 11, 1939 (marked herein as Ex. 3) made the following requests:

(a) liaison at the White House
(b) committee of the services as a liaison between Army and Navy
(c) with war having broken out and submarine operations begun, the securing of material from the Belgian Congo

In keeping with the theory already cited in writer's memorandum of March 10, 1939, (Ex. 1) and writer's memorandum to the president of October 11, 1939, pointed to the danger of German invasion of Belgium and hence the necessity of advising the president of the steps that through diplomatic channels for the diversion of the Belgian uranium to the United States. In respect to the financial requirements of the project, it was suggested that, if assuming recognition by the government of the national significance of the research, funds could be secured either from public spirited executives in chemical and electric companies or from foundations.

2. In the wake of this conference, the president asked his secretary and military aide, General Watt Edwin M. Watson, to act as a liaison for the White House. General Watson was further asked by the president to effect an introduction to Dr. Lyman J. Briggs and to constitute in the president's behalf a committee of Dr. Briggs, Colonel Adamson of the Army and Commander Bogey of the Navy for the consideration of the ideas and material that had been submitted to him by Dr. Einstein and the writer. President further suggested that the writer stay over the following day for a conference with this newly appointed committee.

The conference on October 12th with Dr. Briggs led to the arrangement of a meeting for the end of the month between the government group and those concerned with this problem. (In addition to the formal invitations sent by Dr. Briggs, the writer was asked to send an explanatory note to Professor Wigner of Princeton, and Professor Edward Teller of George Washington University, copies of which is included under the designation of Ex. 4).
With the exception of Dr. Einstein, whose health did not permit attendance at that or subsequent meetings, all those invited participated as follows at the meeting held in the office of Bureau of Standards on Saturday morning, October 21, 1939, at 9:30.

(a) For the government — L. J. Briggs 
Lt. Colonel Adamson, USA, USA 
Commander Hoover

(b) As Presidential representative — Alexander Sachs
(c) As cooperating scientists — Professor Albert Einstein (who was unable to attend on account of health)
E. F. Wigner (Professor Theoretical Physics at Princeton)
E. Teller (Professor, George Washington University)
E. Fermi (Professor, Columbia University)
L. Szilard (Visiting experimental physicists at Columbia and Trustee of the Association of Scientific Collaboration)

In the course of the technical discussion at the meeting of October 21st objections were raised by some that those interested in the political-military implications were much too previous in supposing that what was merely possible would become actual and that they argued that it was necessary for the government to concern itself at this time with the scope and pace of the research being carried on under the normal auspices of our educational institutions. Dr. Lyman Briggs in his official position as the Director of the Bureau of Standards and as presidential appointee wrote as chairman of the combined group observed that national considerations justified the mental extension of the few available possibilities with a view to arriving at an estimate of the national interest in facilitating and accelerating the course of developments; it was on the note that the governmental part of the group would thus approach the problem sympathetically that the conference ended.

3. The inter-departmental committee appointed by the President submitted on November 1, 1939, a preliminary report of its findings and recommendations with regard to the subject that had been set by the President: POSSIBLE USE OF URANIUM FOR SUBMARINE POWER AND HIGH DESTRUCTIVE BOMBS. The report of the committee — L. J. Briggs, chairman, Keith Adamson, Lt., Colonel USA and Gilbert C. Hoover, Commander U. S. N. — opened with a reference to the meetings of the committee with the Dr. Alexander Sachs and the physicists from Columbia, Princeton and other institutions, and described the recent work, and set forth the possible applications to submarine power and explosives inherent in the possible successful release of accumulated atom splitting in the form of a general reaction. Because of the historic interest of this formulation by the governmental committee of the projected developments, it is desirable to present the full text of the main findings.
(1) Discoveries made within the last year have shown that when a uranium atom is bombarded by neutrons (uncharged elemental particles of matter) from an outside source, the uranium atom may be split in two and this breakdown is accompanied by the release of a great amount of atomic energy.

(2) When the uranium atom is split it likewise sets neutrons free. These neutrons may be able in turn to split other uranium atoms and thus continue the process as a chain reaction. This continuous splitting has not so far been accomplished. The proposed research would be directed to finding a way to do it.

(3) The energy released by the splitting of a mass of uranium atoms would develop a great amount of heat. If the chain reaction could be controlled so as to proceed gradually it might conceivably be used as a continuous source of power in submarines, thus avoiding the use of large storage nickel batteries for under-water power.

(4) If the reaction turned out to be explosive in character, it would provide a possible source of bombs with a destructiveness vastly greater than anything now known.

While deeming that such a general reaction has not yet been demonstrated, the committee next gave as its major conclusion the following:

In furtherance of that he proposed that initial support - funds for which committee expected to secure from the enactment of the Lea Bill - be given to -

(a) supplying for immediate experimental work 4 metric tons of pure-grade graphite, and
(b) if later justified, supplying 50 tons of uranium oxide.

Finally it recommended under the concluding paragraph 8 - by letter of Dr. Briggs to the President of November 1, 1939 - that the committee be enlarged for the support and coordination of these investigations in different universities, and that the following be invited to constitute a coordinating group:

President Karl Compton, Massachusetts Institute of Technology
Cambridge, Massachusetts

Dr. Alexander Sachs - 31 East William Street, New York

Professor Albert Einstein - Princeton University, Princeton, N.J.

Dean George B. Pegram, Columbia University, N.Y.C.
Then an interlude of activity ensued, approximately coincidental with the then denominated phoney war between the fall of Poland and the invasion of Norway. The President was preoccupied with numerous internal and international problems. General Wilson, as liaison, felt that the report of November 1st was not sufficiently pointed, and accordingly in transmitting its text to the writer on February 8, 1940, having previously conveyed merely its general tenor – stated that he was asking "for a special recommendation from Dr. Briggs".

Meanwhile, progress was concentrated in the organization and the functioning of the coordinating committee mentioned in the conclusion of point 8 of Dr. Briggs' report to the President of November 1, 1939. Conferences were had between the groups at Columbia University – consisting of Drs. Pegram, Fermi and Szilard – with the writer as presidential advisor and intermediary. In mid-November an octet of experimental projects was projected at C by the Columbia group with a view to securing a number of subsidiary questions, in the hope that these could be vigorously pursued so that reports could be made within a period of six months. Based on notes made at the time, the definition and scope of the subsidiary questions and the recommended personnel from nearby educational institutions as projected were as follows:

1. Slow Neutron Reactions
   Fermi, Pegram, Szilard (all Columbia), Wheeler (Princeton)
2. Fast Neutron Reaction
   Fermi, Szilard, Tuve (Carnegie Institute), Wigner (Princeton)
3. The Question which of the Uranium Isotopes splits
   Dunning (Columbia), Fermi, Tuve, Wheeler,
4. Small Scale Separation of Isotopes by any Method except Diffusion
   Beams (Univ. Virginia), Fermi, Tuve,
5. Small Scale Separation of Isotopes by Diffusion
   Fermi, Furry (Harvard), Urey (Columbia)
6. Theoretical Possibility and Limitation of Large Scale Separation by Centrifuging
   Beams, Pegram, Szilard, Teller (George Washington Univ.)
7. Theoretical Possibility and Limitation of Large Scale Separation by Diffusion
   Fermi, Furry, Onsager (Yale), Urey.
8. Possibility of Large Scale Production of Uranium Metal
   Pegram, Szilard, and somebody from the Department for Chemical Engineering of MIT or Columbia

In particular, the projects at Columbia came to receive limited aid for the purchase of materials, as is evident from the reply of February 20th, by the Director Hyman H. Briggs to General Watson's memorandum of February 8, 1940 (this exchange of correspondence being marked respectively Ex. 6A and 6B).

The writer as co-initiator with Dr. Einstein, of the original project conferred with Dr. Einstein in February at Princeton and learned of his judgment that the work progressing at Columbia was more significant than that at Paris, as reported in "Science". Hence in anticipation of Dr. Briggs' reply to General Watson (Ex. 6B) - a letter was written to General Watson under date of February 15 pleading for larger and more interested aid and promising an evaluation in the near future from Dr. Einstein of the work being completed at Columbia (marked Ex. 6C)
Early the following month Dr. Einstein upon submission of his view to the President wrote me under date of March 7, 1940, from Princeton, reviewing the development since the conferences I had arranged in Washington in October between the scientists engaged in the uranium research and the governmental committee appointed by the President. (A copy of Dr. Einstein's letter to me — original having been later forwarded to the President — submitted herewith as Ex. 7e) The letter referred to the intensification of interest in uranium in Germany, judging by the German government's taking over of both the chemical and the physical institutes and the placement of the research under the leadership of C. F. von Weizsäcker in substitution for the retired director. A week later the writer sent to the President Dr. Einstein's review and asked for an opportunity to confer on the latest phase of the experimental work (marked Ex. 7b) at the turn of April at a conference in the White House at which the writer unfolded some views on the probably course of the German aggression in the course of the Spring and summer campaigns for the mastery of the coast opposite England from Norway through France, the uranium project was once more pressed and the writer urged that a liberal fund be made available as distinguished from the delimitation reimbursements fund for material purchases as under Dr. Briggs' procedure. Indeed the late spring months must be utilized to preempt academic talents for research as distinguished from seasonal appointments for teaching.

At the end of the month a note was received from General Watson under date of March 27, 1940, to the effect that the work was proceeding satisfactorily and that "the matter should rest in abeyance until we get the final report" (marked herein Ex. 7c), but a sense of foreboding with respect to Nazi aggression that characterized the writer the previous year (as was voiced in the memorandum of March 10, 1939, No. 1) impelled the writer to the conviction that what was called at the time the phoney war was bound to be replaced by unrelenting waves of unrestricted Nazi aggression through Western Europe. At the turn of April at a conference in the White House at which the writer unfolded some views on the probable course of the German aggression in the course of the Spring and summer campaigns for the mastery of the coast opposite England from Norway through France, the uranium project was once more pressed and the writer urged that a liberal fund be made available as distinguished from the delimitation reimbursements fund for material purchases as under Dr. Briggs' procedure. Indeed the late spring months must be utilized to preempt academic talents for research as distinguished from seasonal appointments for teaching. (The statements and recommendations then made were embodied in an aide-memoir which was prepared at Washington and left at the White House and a copy if presented herewith as Exhibit 7e)

Then harrowing back to the previous correspondence, letter of March 15th (Ex. 7b) the President advised the writer under date of April 5, 1940, that he had asked General Watson to arrange another meeting in Washington at a time convenient for you and Dr. Einstein. He concluded with his reaffirmation that "I shall always be interested in these results." (marked Ex. 8a) Under even date General Watson asked the writer for a list of scientists to be invited and for the writer's solicitation of Dr. Einstein's suggestions — this latter being included herein as Ex. 8b) In furtherance of General Watson's request writer had inquiries made of Dr. Einstein and a composite list was submitted to General Watson of those to be present at the next meeting with the governmental authorities (communication to General Watson by writer of April 19, 1940, being included as Ex. 8c)
The conference was held on April 27, 1940, at the Bureau of Standards under the chairmanship of Dr. Briggs. At this conference there was considerable discussion as to the matter of expenditure that would be required. At the instance of the writer and with Dr. Szilard's collaboration, Dr. Szilard prepared a memorandum for him that was placed in the record, describing two types of chain reaction. It is noteworthy that the second type - in which neutrons were not slowed down - was described under PART II as holding the promise "to bring about explosions of extraordinary intensity."

"If for purposes of aggression (or attack) a bomb based on such a chain reaction was set off at sea near a port, the tidal waves brought about by the explosions might lead to the destruction of the coastal cities." (included herein as Ex. 9).

While the author indicated in the memorandum and in his oral presentation at the meeting that such a bomb required for its transportation larger and more powerful airplanes than the existing ones, it was voiced by the present writer as a student of technology and strategy that we must regard atomic as in an incipient stage of development and that the resistance to Nazi aggression that the Western civilization has just embarked upon may be relied upon to solve this problem of transportation just as we are trying to solve the problem of harnessing the energy from atomic disintegration to offset or even to anticipate corresponding experiments being carried on in Germany.

It was still the view of the governmental group that the scale of operations remained the same as it had been under the auspices of university experimental projects and that the funds be held down to specific needs for material at the various experimental centers instead of according advance assurance to each center that it could go forward with a larger staff and on an accelerated basis for teleoping within a short compass of time the answers to its sector of the total problems.
SUPER-OUTLINE FOR PART I OF ARTICLE

1. Open with a description of the hesitancy of the scientists as given in the governmental release. Use also Oppenheimer's statement when the award was given to Los Alamos on, I believe, October 5th, as quoted in the Kilgore hearings. Connect it with the story of how Napier in the period of the religious wars of the 17th century destroyed a device that was analogous.

2. Then deal with the impact upon the scientists by relating it to the vision they have secured of the end of the universe. Give the summary of the scientific view of the cosmic history from Sir James Jeans' "The Mysterious Universe," Chapter 1. Feature the things developed with Riezler as earth and life as rare events, now returning to a more normal distribution and probability.

3. How can the non-scientists who operates with more restricted histories — namely, histories of civilization and particularly the history of the modern age — obtain a reflection, however dim, of this apocalyptic sense? This will introduce the quartet of charts which for the first time give a synoptic statement of how, using the most elementary arithmetic measure of the number of war outbreaks a year occurring within the time-stretches, have behaved in relation to the statistical measure given by the law of rare events, or the Poisson law; and how as civilization has increased in industrialisation and technology, the divergences have gotten greater; and now war is no longer a rare event. Follow up with the criteria in the other memoranda of E.J.G. Then deal with the unique entry of the time-factor analogous to the time-dimensions in the Mankovsky general theory of relativity.

4. The ending of this war has been apocalyptic in the terms of total technology of war weapons, not just the atomic bomb — though the atomic bomb is itself the greatest exemplar. The V bomb, the super-sonic planes, the picture of a war impact that can only be detected after the casualty and in an ultimate sense, after the war itself.
5. Contrast that with the picture of war as a contest between powers. Here the weapon is to eliminate the possibility of a contest. Our generation has had two such apocalyptic impacts: the Great Depression and what is now realized as a Thirty Years War. In the Great Depression for the first time a world that had felt it was going from strength to strength suddenly felt that the whole basis of life was dropping out. (Utilize A. J. Toynbee, 1931 survey and especially the contrast with Gibbon.) In this Thirty Years War the first part of it left us with a desire and a universal expectation that we could return to normalcy. Everybody sought to reinstate 19th century systems and everybody felt that democracy and capitalism were thus vindicated. The one rift in the lute was Russia. As the reconstruction on the basis of normalcy broke down, first in economics, it led to a Hobbesian twilight state of a suspense for a war leap. The second half of the interwar period was characterised by a conflict of idealogies, both of which were played out during the war.

6. Now the atomic bomb is exerting a continuing radio-activity on our minds. We are realizing that though we have been victorious and though we have gotten an extraordinary sense of self-confidence from our technology and our managerial powers in the technical management of war, we somehow do not know how to liquidate this war. Last time we thought we successfully fought a war against war. Now we realize dimly that the war against war is our current task — that somehow we cannot make an effective peace between the victors of this war unless war itself is somehow mastered.

7. Now the peculiarity of this weapon is that it endangers everybody — that it is a reductio ad absurdum of war as an institution — that the disintegration of the atom is the instrument for disintegrating a civilisation beyond reconstruction. Such is the challenge.
In 1925 it was demonstrated that protons can produce tracks in photographic emulsions, similar to those of alpha particles. This method was improved afterwards and used for the study of disintegration processes of atomic nucleus. Methods were indicated to calculate the energy of the protons by measuring the length of the tracks and the distance of the grains in the tracks.

In 1932 it was demonstrated that the recoil tracks of fast neutrons also can be made visible in photographic emulsions. In the following years photographic plates, especially prepared, were exposed in different places, at different altitudes, to investigate the component of heavy particles (neutrons, protons, alpha particles) in the cosmic radiation (Hafelekar, Austria - Jungfraujoch, Switzerland, etc.).

In 1937 a new phenomenon was found, which can be described as the formation of disintegration stars. From a point in the photographic emulsion (atom of the emulsion), tracks of heavy particles originate. The only possible explanation is, that an atomic nucleus by the impact of a cosmic ray suffered a multiple disintegration, releasing a great number of particles (protons, neutrons and alpha particles). The nature of the emitted particles and their energy could be determined, and the total energy (minimum value) liberated in this process could be calculated. Depending upon the disintegrated nucleus and the energy of the radiation which produces the disintegration, different energies were found until 150 MeV per nucleus.

The theoretical explanation of this process is not established completely as yet. Probably it is some kind of evaporation or ionization of the nucleus itself. It is not yet known exactly what is the nature of the primary radiation which produces this kind of disintegration. It is known that it somehow is related to the soft component of the cosmic radiation, and that it is produced either by a heavy particle (proton or neutron), or by a very energetic light quantum (photon) which releases a heavy particle in the nucleus itself. This heavy particle on its way through the nucleus produces this evaporation.
The energies liberated by these processes are very high. If it is possible to produce radiation similar to cosmic radiation artificially, nearly every kind of atoms could be used for nuclear evaporation experiments producing enormous quantities of energy.

If it is confirmed that the evaporation can be produced, either by photons or neutrons, there is some possibility to produce artificially such evaporation by means of betatrons. If only protons or neutrons are responsible for this evaporation, powerful cyclotrons have to be used. (√) Because many of the particles ejected by the evaporation process have very high energies, some kind of chain reaction can be expected.

(√) It is known that protons of high energy can be released by photons of high energy, so that even in the case where the evaporation is due to protons or neutrons, a betatron is the most indicated apparatus.
In a stratospheric flight of the balloon, Explorer II, conducted by the National Geographic Society and the U. S. Army Corps in 1956, Wilkins, Rumbaugh and Locher exposed photographic plates to cosmic rays; these authors found some heavy particles (alpha particles, protons and recoil protons produced by neutrons).

In experiments made at the Hafelekar (2300 m) (1936–37) with special photographic emulsions, a great number of proton tracks (170 per cm²) were found (some of them with energies corresponding to 1 meter range in air). Many of the proton tracks were recoil tracks produced by neutrons, but a part of them must be due to primary protons.

Later experiments, for instance, by Hailler (1940), and others, proved the existence of protons in the cosmic radiation. A plausible mechanism for its production is a nuclear photo effect in which a cosmic ray photon releases a proton from a nucleus.

The above-mentioned experiments on disintegration stars suggest that many of the single tracks (protons and neutrons) are due to multiple nuclear disintegration.

Secondary effect (secondary nuclear disintegration) in lead and other materials were observed by many authors.
STILL FURTHER CONSIDERATIONS ON THE SOLUTION OF THE

PROBLEMS OF THE BOMB AND THE ENERGY DEVELOPMENTS

Further Conferences with F.P., November 11, 1945

1. What is being currently neglected is the probability that atomic energy by the method of fission will be displaced. There is greater probability that the next method will be evaporation of the nucleus. The Betatron built by General Electric generates 100 million volts. If we can build one that would generate half a billion volts it might suffice to evaporate the nucleus. This view ties in with an observation of Dr. J. C. Stearns as a member of the quartet of scientists - Drs. Sirlard, Urey, Stearns and L. B. Borst - that addressed an informal gathering of Congressmen on November 8th. Dr. Stearns suggested the possibility that the energy could be created in the same way the sun does by transmuting hydrogen to helium. The other possibility is to utilise the billions of electron volts released by the mesotron, which exists in cosmic rays. Regarding the latter method, there will be very difficult problems of protecting the experimenters and the users.

Before the war experimentation in that direction was done by European scientists. There was an exposure of photographic plates on high altitudes like the Jungfrau, and it was then found that there were tracers to show that the silver had been evaporating. A report of that experiment which was conducted by Dr. Marietta Blau, who, like Iesse Meitner worked with Dr. Bahan, was published in Nature or in Science (a copy will be supplied). One university is preparing to build such a machine.

It might be not more than six months to a year for this new revolution in the production of the atomic energy or explosive. In the evaporation process - the evaporation of the nucleus - we are not bound to uranium or thorium. In the
already alluded to case, the evaporation of the nucleus was of silver. Experimenta-
tion would have the whole gamut of elements from hydrogen to plutonium. The argument
about the expensiveness of the raw material would disappear.

It is the probability of alternative methods that takes the props from
under proposals like that of Mr. O'Neill in the Sunday Tribune of November 11th and
the article in the New York Times Magazine by Mr. Davis also on November 11th. Both
arguments are based on the assumption that only uranium would be used. So the first
one thinks there can be detection from the radio-activity. But radio-activity
might occur from other experiments going on and how can a specific use be inferred?
This multiplicity of sources also affects the practicability of more economical pro-
duction. Thorium is more frequent in desirable quantities. The countries having
thorium are India, Australia, Brazil, Arabia and possibly Russia.

2. Regarding the writer's thesis about the opportunities opened up to
misuse by political gangsters, P. accepts that thesis. One only needs to contemplate
a Colonel Peron or other colonial groups. This provides an argument against un-
controlled or laissez-faireist type of research just as strongly as it provides an
argument against nationalist research without international control. Expressed
more strongly, neither internal nor international laissez-faireism can be free of the
gravest peril. If there is internal laissez-faireism, then we lack, so to speak,
an internal Sullivan law. If there is internal control in the democracies, but a
lack of international accord, then the chances of smuggling and bootlegging would
be increased.

It is a new age of tyrants, far graver than that which had occurred in
Greece or in medieval Europe, that threatens the world. Indeed, weapons have become
at once so potent and so economically measured by their efficacy that there is danger
of capture for exploitation purposes of the resources of whole countries by gangsters
or dictators. Political buccaneerism and privateering will be enormously facilitated and the mere threat to blow up a city before aid could be sent might suffice to secure the capitulation of a whole government. Supposing that such an atomic bomb coup d'etat were secured. Only after there were an international concern could proper counter-measures be employed, starting with economic sanctions and consciously being ready for the consequences of it after a military follow-up was necessary.

The alternative production prospects are bound to affect the problem of control. If there were only one element then there could be control over the source of the raw material. But then we would have to be in a position to know whether the representation as to the use of the material checks up with what is being done. Supposing there is importation of uranium from Madagascar or thorium from Brazil. Tabs would have to be kept on whether it is really being used for medicinal experimentation. Again, the country importing might well be quite truthful in its representations. But there must be assurance that the internal policing is adequate against theft, let us say, or against misapplication by the scientists themselves who might be tempted to act unethically by foreign agents. This brings up the question as to whether the bomb experimentation should not, wherever it is conducted, be under international auspices with an international policing.

The stress herein is that the greatest danger would lie in the surreptitious use for high stakes. We will have to think out the types of incentive and motive.

The mere destruction of a city is not the worst of the dangers. It is the international hold-up that is the greater danger. A city like New York might disappear entirely, like the island Atlantic; and if it stopped there, it would be a calamity like an earthquake.
3. The view pressed by P. is that the only way to circumvent the dangers of the bomb is through the immediate and concerted development of the pacific uses. That, of course, presupposes the validity of the thesis that economic pressures give rise to the frictions that lead to war. The present writer does not accept that view. Nonetheless, there is something to the idea that economic maladjustments and frustrations provide a favorable conjuncture or catalyst for the reagents of belligerency. There is distortion of the truth when war is assimilated to the social situations of petty larceny, which is a function of the availability of an economic minimum.

4. Considerations of which the foregoing order point to the urgency of making a disposition now before the alternative methods are demonstrated as to practicability. We should utilize the fact that in the present situation there is fear by everybody from everybody. Booth Tarkington's short piece in the Tribune of November 11th is to the point: "It is time to be afraid."

"Before atomic bombs go into mass production, God give us grace to be cowardly enough to save ourselves by common sense. A shower of atomic bombs from Guatemala could write finis to the United States. From now on the nations are like a family in a house with walls built of dynamite, yet unable to move to another house. The Security Council of the United Nations could protect the world against the atomic bomb. It must have a force of international and scientifically trained inspectors, who must have access to every country. Aggressor countries could no longer be aggressive and exist under a Council able to insure the peace."

As to the international schism, the hypothesis that needs to be evaluated is the validity of the view that the Soviets will never wage an offensive war to introduce socialism in other countries. The time of military communism is gone. The internal situation is sufficiently delicate that a large army could not be used for an aggressive war against a major power. Instead, Russia needs peace for a couple of generations.

Another constructive factor that needs to be developed is that something
analogous to the impact upon medieval Europe of Islamic civilization from the
Crusades has taken place as a by-product of the war. Millions of Russian soldiers
have seen what life can be for the individual in Western civilization. The
capitalist infidel, it has been found out, leads a comelier and more comfortable life.

On the other hand, Russia is not free of fear that the capitalist countries
would engage in a preventive war. The co-existence of the socialist and capitalist
worlds can be accepted by the Soviets because of the size and variety of its own
territory.

Atomic energy can show the West how to make a reality of socialist pre-
tensions, thus increasing the attraction of Western system for Russia. The more
there is of development, the greater the prospect of eventual disarmament.

At the same time we must be ready for an interim of increased responsi-
sibilities. We need universal military training so that our youth becomes aware of
the importance of the international situation for internal stability. Liberals
should exert their influence to assure that that period of training is devoted to
an understanding of other countries and our responsibilities.
November 7, 1945

Dear Mr. Hellman:

Thank you for your note of the 6th and the accompanying galleys. To facilitate your work, I am submitting a note embodying some corrections and suggestions.

With kind regards,

Sincerely yours,

Mr. Geoffrey T. Hellman
The New Yorker
25 West 43rd Street
New York City
NOTES ON DESIRED CHANGES AND CORRECTIONS

Galley 1

1. Line 11 - change "18" to "19".

2. Insert after 1951: "Two years after having become Director of 
Economic Research for the Lehman Corporation, and ... etc., etc.

3. Re clients: As I have not deemed it advisable to give an adequate 
list of clients, any featuring is apt to be invidious. I suggest 
the following substitution for this passage:

"Since then he has continued to serve as a Director of 
The Lehman Corporation and as economic advisor to it. 
In his consultant capacity he has prepared a special 
report for the War Emergency Pipelimes Corporation, 
which during the war built petroleum pipelines from the 
Gulf of Mexico to the Atlantic Seaboard. In his public-
professional capacity he has been an economic advisor 
to the Petroleum Industry War Council, an industrial 
agency set up by Harold Iukes as Petroleum Administrator 
in furtherance of the readjustment of the industry to 
the war tasks."

Galley 2

4. Change 4. to read as follows:

"Sachs is credited with having on occasion furnished 
Raymond Swing, Dorothy Thompson and Major George Fielding 
Eliot with interesting ideas."

Galley 4

5. Would appreciate omission of this passage, as it is reflection 
upon a President who applied himself to his tasks with a per-
severance and a passion without parallel.

Galley 6

6. As the penultimate paragraph on the page is a quotation from a 
letter of General Donovan, it is highly desirable, if it is to 
be used at all, that it be made to appear that this is not some-
thing personally selected and deliberately disclosed. I would 
suggest that the background for it be as follows:

"Since the disclosure by the Smyth Report and by other 
commentaries of his origination connection with the project, 
he has prepared a document, which is now part of the War

#This service has been rendered by me as a public service, 
without remuneration.
Department's files on the early history. Of the numerous acknowledgments and tributes he has received, he cherishes in particular a recent letter from his chief in the O.S.S., General Donovan, etc., etc.

Gally 7.

7. The concluding paragraph in its present form is inconvenient because of the special role that the tables played in confidential discussions of the timing of operations, though to what extent they influenced the final decisions is not for me to say and cannot be known now that President Roosevelt is dead. I would still hold that the suggestion on page 6 of my letter to you of October 10th would be advisable, namely to utilize my observations on D-Day for a concluding and light note.

If, however, you desire to utilize the material dealing with strategy, then will you consider substituting the attached contemporaneous analysis of the D-Day operations in the enclosed resubmission of my talk before the A. T. T. Economists Group on June 30, 1944. It is noteworthy that a year later the Times, on June 22, 1945, published a dispatch from its correspondent in Paris, Gladwin Hill, to the effect that General Jodl, the "brain" of the German General Staff, revealed that Berlin expected a second blow in the Calais area and held back reserves until too late.

The fact that this impression had been sedulously fostered by the press, the radio and in Mr. Churchill's masterly reviews of the war situation and that it had come to be accepted with almost total unanimity by our people and by our Allies constitutes the greatest and most profitable propaganda feast in history.

Your own version of this could be followed by your neat and humorous concluding sentence.
ALEXANDER Sachs, mentioned in the Smyth Report on the atomic bomb as the man who got President Roosevelt interested in atomic research, in the fall of 1939, came to this country from Russia when he was eleven, received a scientific degree at Columbia when he was nineteen, and when he was twenty went to work as a clerk for the Wall Street firm of Lee Higginson. A year or so later he returned to Columbia as a postgraduate student of philosophy. In 1916, when he was twenty-three, he was made a Francis Parkman Fellow in philosophy at Harvard, where later he was also made a Henry Rogers Fellow in jurisprudence and sociology. These appointments enabled him to spend a couple of years studying philosophy, jurisprudence, and sociology at Harvard, and further enabled him, when he returned to the Wall Street district, to join the Downtown Harvard Lunch Club, a group of Harvard downtown men who maintain a couple of lunchrooms over Angelo's Restaurant on Pearl Street. Sachs has been an economic adviser to a number of important private investors, among them Walter Meyer, a brother of Eugene. In 1931, while Sachs was abroad, the late Lord Reading, then Foreign Secretary of the British Cabinet, invited him to serve as his informal economic consultant, without pay. Sachs accepted and, after he had returned to this country, proceeded to pelt Reading with long letters of economic counsel. In 1933 he was in Washington, working for the N.R.A. In 1936 he was elected a vice-president of the Lehman Corporation, an investment trust managed by Lehman Brothers, and in 1942 he resigned to become an independent economic consultant. He has been consulted by, among others, the Lehman Corporation; the War Emergency Pipelines Corporation, which during the war built the petroleum pipelines from the West to the Atlantic seaboard; and—again without pay—by the Petroleum Industry War Council, set up in 1942 at the suggestion of Harold Ickes, then Petroleum Administrator, to coordinate and oversee the war work of the oil companies. Sachs was also, during the war, an O.S.S. consultant on matters so secret that not even Collier's or Life has written them up, and he sent many hush-hush, and perhaps even hush-hush-hush, communications to General Donovan.

Sachs is fifty-two, has curls, and looks so much like Ed Wynn that when he was in Washington with the N.R.A., his colleagues would tell visitors that Ed Wynn was working there; they would then open the door to Sachs' office and permit these people from the outside world to peck in and admire this interesting bureaucratic wrinkle. Sachs likes to carry research around with him and is the possessor of forty second-hand briefcases, a birthday gift from some jocular Lehman Corporation officials. His pockets are stuffed with memoranda, which he deposits in a pile on the floor when he is looking for something, and both in writing and in conversation he uses such phrases as "if only we could overcome the scleroticism of the Right and the infantilism of the Left," "secular Calvinism," "this Jeremiahesque observer" (Sachs), and "an instrument of divisiveness among the survived triad of hegemonic powers" (the atomic bomb). Dr. Sachs likes to embed his phrases in rather long sentences. In 1932, in a typical three-thousand-word letter, he wrote Lord Reading: "The apparent success of the monetary doctrine and the forecasting technique based thereon in dealing with the business recessions of 1923 and 1927—which, while serious on the inadequate and misleading business curves, too heavily weighted with regressive economic activities, were mere pauses in the major postwar reconstruction expansion—so strengthened the belief in the validity

"Anyhow, you're improving. This time, you're leaving under your own power."
of this monistic monetary doctrine that businessmen came to adopt a sort of fatalistic reliance on managed Federal Reserve policies, and abdicated their qualitative thinking and practical caution for mechanical indicators and quantitative measures which, for all their elaborate sophistication, had only a tangential relation to the dynamic realities of the economic overproduction and the financial inflation that they failed to grasp and evaluate." After a few staccato sentences of fifty or sixty words each, he went on: "It [the collective illusion about the forces underlying American post-World War I prosperity] can only be understood as a product and manifestation of the postwar culture: of the eclipse of certain attitudes and habits of rational management of affairs in the light of intellectually determined or accepted principles and ethical standards and critical judgment applied with old-fashioned logic, can-dor, and caution; and of the emergence and diffusion of certain attitudes and habits characterized by facile skepticism as to all principles and standards, by an exaltation of the quantitative and ignoring of the qualitative—illustrated not least in the prevailing financial and business forecasting by mere mechanical guides which proved so unperceiving and so misleading in the greatest slump in history—by the vogue of irrationalism and psychologizing and the whole technique of propaganda, regimented opinion, and super-salesmanship for 'putting it over' on the public to the point of having succeeded in putting it over on oneself."

Dr. Sachs is credited with having furnished Dorothy Thompson and Major George Fielding Eliot with a number of their ideas. They, in turn, are credited with having made Sachs comprehensible, on occasion, to the public. Sachs himself is the man who accomplished the possibly more monumental feat of making Einstein, Dr. Leo Szilard, and Professor Enrico Fermi, three men whose work on uranium fission helped in the discovery of the secret of atomic disintegration, comprehensible to President Roosevelt. In the spring of 1939, around the time the Axis seized Prague, Szilard summed up the work he and Fermi had done at Columbia on the matter in a report entitled "Instantaneous Emission of Fast Neutrons in the Interaction of Slow Neutrons with Uranium." Einstein read the Szilard report, which was printed in the April 15, 1939, number of the Physical Review, and he and Szilard and Sachs and Professor Eugene P. Wigner, a Prince-
ton physicist, all of whom were friends, began to discuss the role an atomic bomb might have in a world apparently about to go to war. Sachs had just covered the same subject, in an interoffice communication to himself called “Notes on Imminence World War in Perspective—Accrued Errors and Cultural Crisis of the Inter-War Decades,” which read, in part:

There is still time for Western Civilization, and especially for the exceptionally and fortunately situated United States, to use the time-drafts that can still be made on the Bank of History, for the preparedness that has and will become more and more urgent and inevitable for all members of Western Civilization as a result of the past errors committed and in the course of the prospective unfolding aggressions of Nazi Germany.

Through sources available to Einstein, the four men knew that Germany had stopped the exportation of pitchblende—the ore that yields both radium and uranium—from Czechoslovakia to other countries and that uranium research was going on at a great pace at the Institute of Chemistry of the Kaiser Wilhelm Institute in Berlin. “I am an economist, not a scientist,” Sachs has told friends, “but I had a prior relationship with the President, and Szilard and Einstein agreed I was the right person to make the relevant elaborate scientific material intelligible to Mr. Roosevelt. No scientist could sell it to him.” Sachs had been on casual terms with Roosevelt ever since he had done the economic research for some of Roosevelt’s speeches in the 1932 campaign.

The following blow-by-blow account of the Roosevelt-Sachs-et-al. meetings which ensued, and which eventually produced the Manhattan District project, is the result of a recent conversation I had with Dr. Sachs in his office downtown. On October 11, 1939, visiting Roosevelt for over an hour, Sachs read to, and left with, the President three items: (1) an August 2nd letter to Roosevelt from Einstein which said, “This new phenomenon [i.e., the expected conversion of uranium into a source of energy] would also lead to the construction of bombs. . . 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;” (2) an August 15th memo from Szilard which said, “There is no doubt that it [the destructive power of these bombs] would go far beyond all military conceptions,” and urged that a quantity of pitchblende be brought to this coun-

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[Ad for Henri Bendel, size 10 to 16]
try from the Belgian Congo, then the major source of it, before the Germans invaded Belgium; (3) a letter to the President from his interlocutor which referred to “the construction, as an eventual probability, of bombs of hitherto unenvisaged potency and scope,” and went on to say, “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.” In September of 1939, after the German invasion of Poland, the President and Congress were preoccupied with the revision of the Neutrality Act, and it took Sachs several weeks to arrange for this interview.

Sachs read his three documents out loud to the President because of a theory he has that busy people, especially Presidents, give anything they read almost an automatic brushoff. “People are punch drunk with printer’s ink and it’s mostly mascara on the eyes,” he explained to me. The October 11th White House interview was one of a considerable series, during which Sachs, according to friends, would ease the President into the discussion with a few learned jokes. I asked Dr. Sachs about this, and he entered a modest disclaimer. “I’d just tell him I’d paid for the trip to Washington and couldn’t deduct it from my income tax and would he please pay attention,” he said. “I once made a joke about Americans’ being God’s Frozen People, during the wartime freeze on everything—to which, incidentally, I was in some particulars opposed.”

Roosevelt, to whom atomic research was news, reacted favorably to the October 11th talk, during which Sachs suggested that the President arrange for a continuous liaison between the scientists working on uranium, the Administration, and the War and Navy Departments. “He seemed to share the sense of urgency,” Sachs says, “He was a man of quick apprehension.” Toward the end of this conversation, the President arranged for the liaison Sachs was asking for by calling in his side, the late General Edwin M. Watson, and instructing him to set up an Army-Navy committee under the chairmanship of Dr. Lyman J. Briggs, Director of the National Bureau of Standards, to consider the ideas and material Sachs had presented. He also asked Sachs to stay over in Washington to confer with Briggs the next day. This conference led to a meeting, on October 21st, attended by the three members of the new government committee (the Advisory Committee on Uranium: Briggs, Colonel Keith F.
Adamson, of the Army Ordnance Department, and Commander Gilbert C. Hoover, of the Navy Bureau of Ordnance, by Sachs, as Roosevelt's representative, and by Fermi, Szilard, Wigner, Fred L. Mohler, head of the atomic-physics section of the Bureau of Standards, and Professor E. Teller, a theoretical-physics authority at George Washington University. Einstein had also been invited, but, according to Dr. Sachs, his "health and shy disposition interposed obstacles."

At the Uranium Committee's first meeting, a number of the men were in favor of the government's leaving atomic research to the universities. Briggs, however, after outlining the world situation for the benefit of the more cloistered scientists, urged everyone, as Sachs puts it, "to engage in a mental projection from the normal course of research-development to the impact of a mere scientific possibility upon the national defense" and to "weigh differently in the new setting the risk coefficients attached to even remote possibilities." On November 1st, in a report to the President signed by Briggs, Adamson, and Hoover and entitled "Possible Use of Uranium for Submarine Power and High Destructive Bombs," the committee said that if the chain reaction which would presumably follow uranium fission "could be controlled so as to proceed gradually it might conceivably be used as a continuous source of power in submarines, thus avoiding the use of large storage batteries for underwater power," and that if the reaction "turned out to be explosive in character it would provide a possible source of bombs with a destructiveness vastly greater than anything now known." The report urged that uranium research be given financial support by the government. By February, 1940, $6,000 of Army and Navy funds had been allotted to the research being done at Columbia. Einstein and Sachs, who kept conferring with each other, felt that this was a tiny drop in the bucket. On March 7th, by prearrangement, Einstein wrote Sachs calling attention to the intensified atomic work going on in Berlin. "I have now learned," he said, "that research there is being carried out in great secrecy and that it has been extended to another of the Kaiser Wilhelm institutes, the Institute of Physics." Sachs forwarded this letter to Roosevelt, and in a talk with the President, early in April, he read a copy of it out loud and suggested that $100,000 be provided for preliminary work toward the setting up
Ever since the 50's

of a large-scale experiment. Roosevelt got General Watson to call another Uranium Committee meeting. This was held on April 27th and was attended by Briggs, Fermi, Szilard, Adamson, Hoover, Wigner, Sachs, Rear Admiral Harold G. Bowen, Director of the Naval Research Laboratory, and Dr. George B. Pegram, Dean of the Graduate Faculties of Columbia. Sachs again tried to get Einstein to show up, but, he says, "it became clear that indisposition on account of a cold and the shyness which makes Dr. Einstein recoil from participating in large groups would prevent his attendance." Einstein did, however, send Dr. Briggs a letter, to be read at the meeting, which seconded a Sachs suggestion that a board of trustees be set up to head "a non-profit organization which, with the approval of the Government committee, should secure from governmental or private sources, or both, the necessary funds for carrying out the work," so that it "could be carried out much faster than through a loose cooperation of University laboratories and Government departments."

The April 27th meeting gave Dr. Sachs the feeling that the time-drafts on the Bank of History were being exhausted without our making sufficient progress. "The majority of the committee," he said the other day, "accustomed to the small scale of physical laboratories at the universities and the correspondingly reduced scales of the budgets of governmental scientific laboratories, did not appear ready to design a large-scale and comprehensive program, and instead insisted on bit-a-bit procedures with ranked preferences and time de-ferments."

Two weeks later, history, in the shape of the German invasion of Belgium, came to the aid of Sachs and the more urgent of his scientist colleagues. ("The situation adumbrated in the initial presentation of October 11, 1939, had come to pass" is the way Dr. Sachs says it.) On May 11th, after a discussion with Einstein, Fermi, Szilard, Pegram, and Professor Harold C. Urey of Columbia, he wrote the President that the invasion of Belgium, heightening the danger that the supply of uranium from the Belgian Congo would be cut off, had accentuated the pressing need of governmental atomic-research backing. Four days later Dr. Sachs recommended to General Watson the establishment of a Scientific Council of National Defense "composed of executives, engineers, and economists, acting in behalf of the Government, who should be invested with administrative powers for the testing...
and execution of technical projects of utility for national defense.” Watson assured him the President would consider the matter, and on June 15th, the day after the German Army entered Paris, Roosevelt set up the National Defense Research Committee, headed by Dr. Vannevar Bush. After Pearl Harbor, it was renamed the Office of Scientific Research and Development. The Briggs committee became a subcommittee of the Bush committee, atomic-bomb research was on its way to becoming a two-billion-dollar federal project, and Dr. Sachs happily and voluntarily faded out of the picture. “I provided for my own disappearance,” he told me.

At that point in our conversation, Dr. Sachs gave me permission to dive into a pile of memoranda on the floor. I came up with a recent letter from General Donovan. “Unclassified,” he said, relieved, and handed it over. “Dear Alexander,” it ran. “History deserves the full story of the Atomic Project. The nation is indebted to you for the catalytic function which you performed. ‘We may our ends by our beginnings know.’ How could the project have ended other than successfully when you—the deft intermediary between committee room, laboratory, and planning board—helped lay its foundations so well? Sincerely, Bill.”

“My relationship to the President was that of a possible Ishmaelite,” said Dr. Sachs, filing General Donovan’s letter back on the floor. “My contemporaneous memoranda threw into sharp relief the decisive choice of the period—namely, between the leisurely bitaritarian procedure of dispersed university experiments and tense and coordinated large-scale experimentation. Today the choice is in a converse direction. If the research from here on remains under the control of the Army, then the military use will come to throttle the independence and initiative which, operating through a pluralism of sources, make for those novelties and mutations in human thought that give us the great discoveries.”

Dr. Sachs thinks that the atomic bomb should be turned over to an international police force under Chiefs of Staff of a World Security Council and further developed on an island in the Pacific as a weapon to strengthen the control of the existing world organization. He also feels that atomic energy should be made available for peaceful projects. “From the vantage point of cultural-technological history,” he said,
presumably surveying me from it, “a major source of new power enlarges the physical geography and transforms the sociographic complex along the dimension of depth. What have remained the desert areas of the world and the sterile spaces are related to the inadequacies and inaccessibilities of water and energy sources. In the light of the reflections given in certain exhibits connected with the formative stages of the atomic project, it is reasonable rather than speculative to say that new worlds will open up and that the existing world will be enriched. The areas from the Sahara to the Arctic, from the jungle to the arid, will in the course of a time that we can control be transformed by the lifting of the deep-lying water and by making accessible power and heat.”

**The Essence of Giving!**

Lewiston (Me.) Journal.

You did well.

**Most Fascinating News Story of the Week**

[The following item, reprinted in its entirety, is from the Durham (N.C.) Morning Herald]

Lawrence, Mass. (U.P.)—Every night for 25 years, James Tierney looked out his bedroom window as a habit just before retiring. Not once in that time did he ever notice anything unusual.
INCEPTION ATOMIC BOMB PROJECT 1939-1940.
PRESENTATION OF IDEA TO PRESIDENT ROOSEVELT

By
Doctors Albert Einstein and Alexander Sachs
August - October, 1939.

AND FOSTERING DIRECTION OF EARLY DEVELOPMENT
TO mid-1940 by Dr. Lyman J. Briggs, Head of
Bureau of Standards, Department of Commerce,
and Chairman of Presidential Committee with
Dr. Einstein, Dr. Sachs and Dr. Pegran, as
Co-ordinating Members.

SUMMARY DOCUMENTARY HISTORY

By
Alexander Sachs

August 8, 1945.
I. Prelude to Presentation of Project to President Roosevelt.

By Spring, 1939, there was completed in the Physics Laboratories at Columbia University an advance upon the uranium researches in Europe of Doctors O. Hahn and L. Strassmann, and the supplementary research of Dr. L. Meitner and E. Frisch (the latter noted in the February, 1939, issue of "NATURE, LONDON"). This European work on the fission of uranium was independently and by different method carried out by Professor Fermi and others in the United States.

The advance made by Dr. Leo Szilard was reported under the title "Instantaneous Emission of Fast Neutrons in Interaction of Slow Neutrons with Uranium" and was published April 15, 1939, issue of "THE PHYSICAL REVIEW" (manuscript from Columbia University Physics Laboratory was dated March 16, 1939).

The cumulative researches of Dr. E. Fermi and L. Szilard which had been communicated in manuscript to Dr. Einstein led him in conferences first with L. Szilard and then with Alexander Sachs to develop jointly the implications of the imminent discoveries for the world situation, on the assumption that Germany would go to war. It so happened that in memorandum of last mentioned, Alexander Sachs, economist, had just prior to the Nazi seizure of Prague and Czechoslovakia placed as is evident from the title "The Imminence of World War in Perspective, Accrual Errors and Cultural Crisis of the Inter-war Decades." (Exhibit No. 1, dated March 10, 1939, "Mitarbürgerlicher Aufsatz," Notes on Imminence of World War in Perspective, Accrual Errors and Cultural Crisis of the Inter-war Decades.

The author of that memorandum was then at the time sensitive to the concern over the need of what he called in the concluding sentence "the preparedness that will become inevitable because of the consequences of the accumulated errors of the victors of the last war and the prospectively unfolding aggressions of Nazi Germany!

The further developments of the period that had come to the attention of Dr. Einstein was that subsequent to the seizure of Prague in mid March, 1939, Germany stopped the sale of uranium from the Czechoslovakian mines. This was related by Dr. Einstein to the dual fact that the recent work on uranium carried on outside of Germany by predominately refugee scientists was being watched and repeated by German scientists at the Kaiser-Wilhelm-Institut in Berlin and that a son of the German Under-Secretary of State, von Weissacker, was in attached to the Institut.

While among the physicists there were doubts entertained by the further developments, Dr. Einstein accepted the possibility that the nuclear chain reaction could be set up in a mass of uranium by which vast amounts of power would be generated; and he carried the new phenomena a stage further to the eventuality that extremely powerful bombs of a new type could be thereby constructed; a single bomb of this type carried by air and exploded in a port might very well destroy the whole port together with some of the surrounding territory.

In view of the foregoing developments and concern for the world in the event of and on the assumption of German aggressions on the peace of the world, it was agreed by Dr. Einstein and his colleagues, that the situation and its implications should be brought to the attention of the president.

Though the experimentalists were uncertain whether a fast neutron reaction could be made to work, the far-reaching military consequences from such a possibility were such that here on it was deemed essential that the researches
in England, France, and the United States be somehow kept from Nazi Germany, and indeed a proposal to the effect for the withholding of the publication on chain reaction was already submitted to the President and while it was received with favor by the Western scientists, the proposal was looked at askance in France. Finally, since the largest supply of good ore was in the Belgian Congo and as new phases of the experiment could not be carried out within the limited budget of universities, it was deemed by this group that the aid of the government was, even from an economic standpoint, necessary, if only to indicate to public spirited private persons and corporations that the ensuing research would be invested with a special national significance.

In view of all these considerations of development, it was finally agreed that to be effective the presentation to the President must be direct and under conditions that would permit the spelling out of the cumulative implications and consequences for the nation; and this task was entrusted to the economist and political-scientist member of the group by reason of his long association with the President as an informal advisor and friend.

Upon the completion of the of the letter of Dr. Einstein to President Roosevelt dated August 2nd and the supplementary memorandum by Doctor Szilard dated August 15th, 1939, came the German demands upon Poland and the invasion of Poland on September 1st, culminating with the fall of Warsaw on the 27th, the attendant and ensuing presidential concern with guiding through Congress a revision of the Neutrality Act served to delay the arrangement of a meeting for the writer with the president. Only after the first week of September was it possible to arrange an interview with the President and conference with his aides delegated for the consideration of the problem and the proposals.
II.

Conference at the White House on October 11, 1939, and the appointment of a committee headed by Dr. Lyman J. Briggs, Director of the Bureau of Standards to pass upon the project.

1. At the conference with the president at the White House on October 11th writer presented a review of the following collect of materials:

   (a) Dr. Einstein's letter of August 2, 1939 (marked herein as Ex. 2a)
   (b) Memorandum of Dr. Szilard of August 15, 1939 (marked herein as Ex. 2b)
   (c) copies of articles that have appeared in scientific journals (of which only the report of Dr. Szilard's communication to THIS PHYSICAL REVIEW dated April 15, 1939, is herewith enclosed marked Ex. 2c)

On behalf of Dr. Einstein and himself the writer orally and in the course of the conference and in his covering memorandum letter of October 11, 1939 (marked herein as Ex. 3) made the following requests:

   (a) liaison at the White House
   (b) committee of the services as a liaison between Army and Navy
   (c) with war having broken out and submarine operations begun, the securing of material from the Belgian Congo

In keeping with the theory already cited in writer's memorandum of March 10, 1939, (Ex. 1) and writer's memorandum to the president of October 11, 1939, pointed to the danger of German invasion of Belgian and hence the advisability of taking steps then through diplomatic channels for the diversion of the Belgian uranium to the United States. In respect to the financial requirements of the project, it was suggested that, assuming recognition by the government of the national significance of the research, funds could be secured either from public spirited executives in chemical and electric companies or from foundations.

2. In the wake of this conference the president asked his secretary and military aide, General Wat Edwin M. Watson, to act as a liaison as for the White House. General Watson was further asked by the president to effect an introduction to Dr. Lyman J. Briggs and to constitute in the president's behalf a committee of Dr. Briggs, Colonel Adamson of the Army and Commander Hoover of the Navy for the consideration of the ideas and material that had been submitted to him by Dr. Einstein and the writer. President further suggested that the writer stay over the following day for a conference with this newly appointed committee.

The conference on October 12th with Dr. Briggs led to the arrangement of a meeting for the end of the month between the government group and those concerned with this problem. (In addition to the formal invitations sent by Dr. Briggs the writer was asked to send an explanatory note to Professor Wigner, of Princeton, and Professor Albert Einstein Teller of George Washington University, (copy of which is included under the designation of Ex. 4). The meeting held at the office
With the exception of Dr. Einstein, whose health did not permit attendance at that or subsequent meetings, all those invited participated as follows at the meeting held in the office of Bureau of Standards on Saturday morning, October 21, 1939, at 9:30.

(a) For the government - L. J. Briggs
   Colonel Adamson
   Commander Hoover

(b) As Presidential representative - Alexander Sachs
(c) As cooperating scientists - Professor Albert Einstein (who was unable to attend on account of health).
   E. P. Wigner - (Professor, Theoretical Physics at Princeton)
   E. Teller (Professor, George Washington University)
   E. R. Fermi (Professor, Columbia University)
   L. E. Meitner (visiting experimental physicist at Columbia and Trustee of the Association of Scientific Collaboration)

In the course of the technical discussion at the meeting on October 21st objections were raised by some that those interested in the political-military implications were much too previous in presupposing that what was merely possible would become actual and so they urged that it was necessary for the government to concern itself at this time with the scope and pace of the research being carried on under the auspices of our educational institutions. Dr. Lyman Briggs in his official position as the Director of the Bureau of Standards and as presidential appointee serving as chairman of the combined group observed that national considerations justified the mental extension of the few available possibilities with a view to arriving at an estimation of the national interest in facilitating and accelerating the course of development. It was on the note that the governmental part of the group would thus approach the problem sympathetically that the conference ended.

3. The inter-departmental committee appointed by the President submitted on November 1, 1939, a preliminary report of these findings and recommendations with regard to the subject that had been set by the President: POSSIBLE USE OF URANIUM FOR SUBMARINE POWER AND HIGH DESTRUCTIVE BOMBS. The report of the committee - L. J. Briggs, chairman, Keith Adamson, Lt. Colonel USA and Gilbert C. Hoover, Commander USN - opened with a reference to the meetings of the committee "with the Dr. Alexander Sachs and the physicists from Columbia, Princeton and other institutions", and described the recent work, and set forth the possible applications to submarine power and explosives inherent in the possible successful release of accumulated atom splitting in the form of a general reaction. Because of the historic interest of this formulation by the governmental committee of the projected developments, it is desirable to present the full text of the main findings.
(1) Discoveries made within the last year have shown that when a uranium atom is bombarded by neutrons (uncharged elemental particles of matter) from an outside source, the uranium atom may be split in two and this breakdown is accompanied by the release of a great amount of atomic energy.

(2) When the uranium atom is split it likewise sets neutrons free. These neutrons may be able in turn to split other uranium atoms and thus continue the process as a chain reaction. This continuous splitting has not so far been accomplished. The proposed research would be directed to finding a way to do it.

(3) The energy released by the splitting of a mass of uranium atoms would develop a great amount of heat. If the chain reaction could be controlled so as to proceed gradually it might conservatively be used as a continuous source of power in submarines, thus avoiding the use of large storage batteries for under-water power.

(4) If the reaction turned out to be explosive in character it would provide a possible source of bombs with a destructiveness vastly greater than anything now known.

While deeming that such a general reaction has not yet been demonstrated, the committee next gave as its major conclusion the following:

In furtherance of that he proposed that initial support - funds for which committee expected to secure from the enactment of the Lea Bill - be given to -

(a) supplying for immediate experimental work 4 metric tons of pure-grade graphite, and
(b) if later justified, supplying 50 tons of uranium oxide.

Finally it recommended under the concluding paragraph 8 - by letter of Dr. Briggs to the President of November 1, 1939 - that the committee be enlarged for the support and coordination of these investigations in different universities, and that the following be invited to constitute a coordinating group:

President Karl Compton, Massachusetts Institute of Technology
Cambridge, Massachusetts

Dr. Alexander Sachs - One William Street, New York

Professor Albert Einstein, Princeton University, Princeton, N.J.

Dean George B. Pegram, Columbia
Then an interlude of activity ensued, approximately coincidental with the then denominated phoney war between the fall of Poland and the invasion of Norway. The President was preoccupied with numerous internal and international problems. "General Watson, as liaison, felt that the report of November 1st was not sufficiently pointed, and accordingly in transmitting its text to the writer on February 8, 1940, - having previously conveyed merely its general tenor - stated that he was asking "for a special recommendation from Dr. Briggs".

Meanwhile, progress was concentrated in the organization and the functioning of the coordinating committee mentioned in the conclusion of point 3 of Dr. Briggs's report to the President of November 1, 1939. Conferences were had between the groups at Columbia University - consisting of Drs. Fegran, Fermi and Sillrd - with the writer as presidential advisor and intermediary. In mid-November an octet of experimental projects was projected at C by the Columbia group with a view to securing a number of subsidiary questions, in the hope that these could be vigorously pursued so that reports could be made within a period of six months. Based on notes made at the time, the definition and scope of the subsidiary questions and the recommended personnel from nearby educational institutions as projected were as follows:

1. Slow Neutron Reactions
   Fermi, Fegran, Sillrd (all Columbia) Wheeler (Princeton)
2. Fast Neutron Reactions
   Fermi, Sillrd Tuve (Carnegie Institute) Wigner (Princeton)
3. The Question which of the Uranium Isotopes splits
   Dunning (Columbia) Fermi, Tuve, Wheeler.
4. Small Scale Separation of Isotopes by any Method except Diffusion
   Beams (Univ. Virginia) Fermi, Tuve.
5. Small Scale Separation of Isotopes by Diffusion
   Fermi, Furry (Harvard) Urey (Columbia)
6. Theoretical Possibility and Limitation of Large Scale Separation by Centrifuging
   Beams, Fegran, Sillrd, Taller (George Washington Univ.)
7. Theoretical Possibility and Limitation of Large Scale Separation by Diffusion
   Fermi, Furry, Onsager (Yale) Urey.
8. Possibility of Large Scale Production of Uranium Metals
   Fegran, Sillrd, and somebody from the Department for Chemical Engineering of MIT or Columbia.

In particular, the projects at Columbia came to receive limited aid for the purchase of materials, as is evident from the reply of February 20th, by the Director Hyman H. Briggs to General Watson's memorandum of February 8, 1940 (this exchange of correspondence being marked respectively Ex. 6A and 6B).

The writer as co-initiator with Dr. Einstein, of the original project conferred with Dr. Einstein in February at Princeton and learned of his judgment that the work progressing at Columbia was made more significant than that at Paris, as reported in "Science". Hence in anticipation of Dr. Briggs' reply to General Watson - (Ex. 6B) - a letter was written to General Watson under date of February 15 pleasing for larger and more interested aid and promising an evaluation in the near future from Dr. Einstein of the work being completed at Columbia (marked Ex. 6C).
Early the following month Dr. Einstein upon submission of his view to the President wrote me under date of March 7, 1940, from Princeton, reviewing the development since the conferences I had arranged in Washington in October between the scientists engaged in the uranium research and the governmental committee appointed by the President. (A copy of Dr. Einstein's letter to me - original having been later forwarded to the President - submitted herewith as Ex. 7a)

The letter referred to the intensification of interest in uranium in Germany, judging by the German government's taking over of both the chemical and the physical institutes and the placement of the research under the leadership of G. F. von Weizsäcker in substitution for the retired director. A week later the writer sent to the President Dr. Einstein's review and asked for an opportunity to confer on the latest phase of the experimental work (marked Ex. 7b)

At the turn of April at a conference in the White House at which the writer unfolded some views on the probably course of the German aggression in the course of the Spring and summer campaigns for the mastery of the coast opposite England from Norway through France, the uranium project was once more pressed and the writer urged that a liberal fund be made available as distinguished from the delimited reimbursement fund for material purchases as under Dr. Briggs' procedure. Indeed the late Spring months must be utilised to preempt academic talents for research as distinguished from seasonal appointments for teaching.

At the end of the month a note was received from General Watson under date of March 27, 1940, to the effect that the work was proceeding satisfactorily and that "the matter should rest in abeyance until we get the report" (marked herein Ex. 7c), but a sense of foreboding with respect to Nazi aggression that characterized the writer the previous year (as was voiced in the memorandum of March 10, 1939, No. 1) impelled the writer to the conviction that what was called at the time the phoney war was bound to be replaced by unrushing waves of unresisted Nazi aggression through Western Europe. At the turn of April at a conference in the White House at which the writer unfolded some views on the probable course of the German aggression in the course of the Spring and summer campaigns campaigns for the mastery of the coast opposite England from Norway through France, the uranium project was once more pressed and the writer urged that a liberal fund be made available as distinguished from the delimited reimbursements fund for material purchases as under Dr. Briggs' procedure. Indeed the late Spring months must be utilised to preempt academic talents for research as distinguished from seasonal appointments for teaching. (The statements and recommendations then made were embodied in an aide-memoir which was prepared at Washington and left at the White House and a copy if presented herewith as Exhibit 7c)

Then hardening back to the previous correspondence, letter of March 15th (Ex. 7b) the President advised the writer under date of April 5, 1940, that he had asked General Watson "to arrange another meeting in Washington at a time convenient for you and Dr. Einstein". He concluded with his reaffirmation that "I shall always be interested in these results." (marked Ex. 8a) Under even date General Watson asked the writer for a list of scientists to be invited and for the writer's solicitation of Dr. Einstein's suggestions - this letter being included herein as Ex. 8b) In furtherance of General Watson's request writer had inquiries made of Dr. Einstein and a composite list was submitted to General Watson of those to be present at the next meeting with the governmental authorities (communication to General Watson by writer of April 19, 1940, being included as Ex. 8c)
In his capacity as coordinator of the governmental group and the research group writer sought to secure the attendance of Dr. Einstein in the conference that was proposed by the president on April 5th. According the writer advised Dr. Einstein under date of April 15th of the developments since March and expressed the hope that Dr. Einstein would be able to attend in person and also voiced the desire to have a preliminary conference at Princeton, prior to the meeting. (letter of A.S. to Dr. Einstein dated April 15, 1940, included herein as Exhibit 10), but an indisposition from a cold and a characteristic shyness prevented Dr. Einstein's attendance. Instead writer after a conference was able to bring to Dr. Briggs an amplification of the position that had been taken by him in a communication to me of March 7, 1940 (already referred to and described as Ex. 7a) This communication which was a product of a conversation the writer had with Dr. Einstein at Princeton, emphasized the need for the establishment by the government of a committee that would have the flexibility of the conduct of research by modern technical industry, yet considering its purpose would be detached from economic implications of a profit motive.

It was suggested by writer and concurred in by Dr. Einstein that the appropriate vehicle would be a non-profit corporation with a mixed board of trustees formed of governmental officials and public-spirited citizens drawn from the executive side of our universities and from the executive side of socially significant corporate life. The Board of Trustees of the proposed corporation would have charge of the allocation of the financial resources and the general administration of the corporation and a joint supervision over the scientific work. It was further suggested by writer that it should be left to an advisory scientific board selected by Dr. Briggs.
The conference was held on April 27, 1940, at the Bureau of Standards under the chairmanship of Dr. Briggs. At this conference there was considerable discussion as to the matter of expenditure that would be required. At the instance of the writer and with the collaboration of Dr. Stilwell prepared a memorandum for him that was placed in the record, describing two types of chain reaction. It is noteworthy that the second type—in which neutrons were not slowed down—was described under PART II as holding the promise "to bring about explosions of extraordinary intensity."

"If for purposes of aggression (or attack) a bomb based on such a chain reaction was set off at sea near a port, the tidal waves brought about by the explosions might lead to the destruction of the coastal cities." (included herein as Ex.9).

While the author indicated in the memorandum and in his oral presentation at the meeting that such a bomb required for its transportation larger and more powerful airplanes than the existing ones, it was voiced by the present writer as a student of technology and strategy that we must regard this same technology of our weapons as in an incipient stage of development and that the resistance to Nazi aggression that the Western civilization has just embarked upon may be relied upon to solve this problem of transportation just as we are trying to solve the problem of harnessing the energy from atomic disintegration to offset or even to anticipate corresponding experiments being carried on in Germany.

It was still the view of the governmental group that the scale of operations remained the same as it had been under the auspices of university experimental projects and that the funds be held down to specific needs for material at the various experimental centers instead of according advance assurance to each center that it could go forward with a larger staff and on an accelerated basis for taking up ongoing within a short compass of time the answers to its sector of the total problems.
BACKGROUND AND EARLY HISTORY
ATOMIC BOMB PROJECT IN RELATION
TO PRESIDENT ROOSEVELT

OPENING TESTIMONY
BY ALEXANDER SACHS

IN HEARINGS BEFORE THE SPECIAL
COMMITTEE ON ATOMIC ENERGY
UNITED STATES SENATE
SEVENTY-NINTH CONGRESS
FIRST SESSION
Pursuant to
S. Res. 179

NOVEMBER 27, 1945

(Not printed at Government expense)
marching march of events swept aside the half-willed and half-thought schemes, and even attacked improvised defenses that were not too late, as in the German case, to save Germany for democracy. The outstanding feature of this great march of ill-fated events is that the economic order that has developed since the present war has been threatened by the destructive impact of external or natural causes, but by a destructive force within because of an inept failure of concerted will and political wisdom.

Thus imbued, I came to suggest early in 1933 in connection with the formulation of the National Recovery Act—for which I was called in by Mr. Bush in my capacity as an economic assistant to him in the first economic recovery program to be proposed by the President, the reconditioning of the Navy, the mechanization of the Army, and the improvement of national defense. General Hugh Johnson, who during the depression was responsible for the economic capacity to Mr. Baruch and had thus become interested in my interpretations and forecasts of economic developments, was given by the President a leading role in the NRA and he and the President asked me to serve as organizer and first head of the NRA's Division of Economic Research. In the drafting phase of the act, I at first urged upon them the inclusion of those national defense provisions.

Senator Austin: What year was that?

Dr. Sacher: That was 1933, in the legislation of April and May. Hugh Johnson in the Blue Eagle, pages 197-198, credits me with having suggested that this provision about making available funds for naval construction and other defense be written into the NRA bill. Hugh Johnson was a little bit too generous in his handling of my role in the NRA. I was at that time, if you will, the assistant in an economic capacity to Mr. Baruch and had thus become interested in my interpretations and forecasts of economic developments, been given by the President a leading role in the NRA and he and the President asked me to serve as organizer and first head of the NRA's Division of Economic Research.

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who played toward Mr. Churchill a role analogous to the one concerning this project played by me toward Mr. Roosevelt.

In the wake of the phase of the exodus, the scientists settled in democratic countries were concerned not only with the problems of the new country, but with its political and moral implications. Dr. Einstein was prominent among them. Professor Einstein's theoretical work, while it anticipated the First World War, was not directly related to the problems of the war. With my refutation of the cosmological constant, I was faced with the question of whether the future of mankind was to be determined by the values of the constants of the universe. That, interestingly enough, came just in the closing phase of World War I, as Prof. A. Eddington of Cambridge, showed in his early works on relativity and space, time and gravitation. There was another great physicist, who was a student and friend of Einstein, who was a part of that group, Prof. E. P. Wigner, professor of theoretical physics at Princeton.

Einstein, Wigner, and Szilard discussed the problem. I want to impress upon you that the member of the cognate older faith may refer to the Gospel of St. John—that "In the beginning was the word," and the idea. In the beginning was the idea and a political concern on the part of the physical scientists and the social scientist whom they brought in. They brought me in because I had known of their interests in the physical sciences, but with my political and moral implications. Dr. Einstein observed, 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.'

To connection, then, with the practical importance of this work—for power, healing, and national defense purposes—its need 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.

I also informed him that we had learned that in the wake of the successful experiments of Dr. Bone, Strassmann, and others, the last of which is described in the following, the Germans upon capturing Czechoslovakia and seizing Prague, had embarked the export of uranium from Czechoslovakia. I also mentioned the people who had been at work on this and who were connected

Mindful of the implications of all this for democracy and civilization in the struggle against totalitarianism that has expelled the scientists from the organization of defense,

In the following, 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. Szilard and others have composed, in which I will state some of the arguments that have appeared in scientific journals.

In addition, I would request in behalf of the 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 other departments, as well as to solve the immediate problems of necessary materials and funds.

As the international crisis developed this summer, these refugee scholars and I met in consultation with them unanimously agreed that it was their duty as well as their privilege to advise you at the earliest moment of their work and to enlist your cooperation 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. Szilard and others have composed, in which I will state some of the arguments that have appeared in scientific journals.

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...of war first by Japan in the seizure of Manchuria, and then came the succession of wars, the Italian war against Abyssinia, the intervention of the Axis Powers in Spain, the war against Austria, and finally the seizure of Czechoslovakia.

In 1930 there were lectures delivered on the history of science, reviewing the progress since the turn of the century in the physical sciences. The book was published by Cambridge University Press after Munich in 1938. Due to the war that I had done in England and my relationship to leading figures, I used to get publications in a variety of fields, including science. This book contained two lectures on the history of recent developments in physics, and the development of the theory of atomic structure by Lord Rutherford, whose work initiated the technical side of the physical research since the turn of the century. Some of the greatest work of Lord Rutherford was done right nearer when he was professor of physics at McGill University, and it was for this work that he got the Nobel Prize.

There were these lectures by the subsequently deceased Lord Rutherford which were revised by an assistant of his, and then there was a separate lecture in addition on Forty Years of Atomic Theory, by F. W. Aston, of Cambridge, who died only a few days ago, as you may have seen the notice. F. W. Aston, reviewing the work that had been done by 1930 and describing what was being done in England and elsewhere, ended up his lecture with a warning and a prophecy. I showed this book to the President with a view to high lighting that, 

We cannot prevent him from doing so and can only hope that he will not use it exclusively in blowing up his next door neighbor.

The President remarked, "Alex, what you are after is to see that the Nazis don't blow us up," I said, "Precisely." He then called in General Watson, his son of the German Emperor, and the informal group was established.

Senator VANDENBERG. What was the date of this?

DR. SACHS. That is part of a record which I will leave with you gentlemen, which was a report I prepared immediately after the announcement about the use of the atomic bomb in August for the White House, for the Department of Commerce. 

Dr. C. appalled the successor in charge of the Department that had such an important role through the Bureau of Standards—and for the War Department.

The HEADMAN. Does that contain your letter?

Dr. SACHS. Yes, sir. [Reading:] "Some recent work by E. Fermi and L. Saltz, which has been communicated to me in manuscript, leads me to expect that the element uranium may be used to form a new and important source of energy in the immediate future. Certain aspects of the situation which have 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 recommendation."

Dr. SACHS, Yes, sir. [Reading:] "The description of the new phenomenon, and states that the sources of practical supplies are outside the United States; that the United States has only very poor sources of uranium in moderate quantities. It is shown that there is some good ore in Canada, and the former Czechoslovakia. As to that, the report states, "I understood that Germany has actually stopped the sale of uranium from the time of her invasion which she has taken over. That is not a very early action perhaps might be understood on the ground that the son of the German Under Secretary of State, von Weizsaecker, is attached to the Bureau of Standards, in Berlin, where some of the American work on uranium is now being repeated."

In other words, there was political interest being taken in the work. So Dr. Einstein said that one of the ways in which the administration could be helpful was to suggest this task to a person "who through the cooperation, in the capacity."

...the head of a government, in the capacity of head of a government, and put forward recommendations for government action, giving particular attention to the problem of securing a supply of uranium for the United States.

(2) To speed up the experimental work, which is already being carried on at various institutions, and the production of the element and the industry of laboratories, by providing funds, if such funds are needed, through his contacts with private persons who are volunteering to make contributions for this cause, and perhaps also by obtaining the cooperation of industry. The President recommended that Mr. Hoover, the Secretary of Commerce, and the President named a Government individual who was concerned with the advancement of science, the Director of the Bureau of Standards, Dr. Lyman J. Briggs, who rendered great service during the critical period.

I met with Dr. Briggs that very night, before having to go to again to the White House to report progress to the President. For the substantiation of this was very much in the mind of the President, and he had remarked, "Don't let Alex go without seeing me again.

I met with Dr. Briggs that very night, and the resultant idea was to hold a meeting in the near future. A meeting was scheduled for the October 11 conference at the White House, for October 21.

I reported to Dr. Briggs, who throughout this period occupied a pivotal role because he is highly esteemed and was on the political problems. I reported to him in a letter of October 17, and I sought throughout the interval to broaden the group of scientists who were to attend that conference.

Senator VANDENBERG. How about the Einstein letter you referred to?

Dr. SACHS. The Einstein letter of August 2, from which I quoted in part in my opening, was left with the President, along with my letter.

The HEADMAN. Have you a copy of it?
member using the phrase of the Irish poet Yeats, echoing Coolegide— in a "willing suspension of disbelief."

The issue was too important to wait, because if there was something to it there was no longer being shown up. We had to take time by the forelock, and we had to be ahead of the Germans.

One great advantage we had was that these refugees, these scientists themselves, responded to that very spirit of freedom that brought the Pilgrim Fathers, and on behalf of the services, Keith P. Adamson, Lieutenant-Colonel, United States Army, and Gilbert C. Hoover, commander, United States Navy. A report was written to the President dated November 1, 1939, on the stationary of the pilot and air officer in the Department of the Navy, which reviewed the situation technically and culminated with this observation:

"...The energy released by the splitting of a mass of uranium atoms would develop a great amount of heat. If the chain reaction could be controlled so as to proceed gradually, it might conceivably be used as a continuous source of power, not only for submarines, but to power the use of large storage batteries for under-water power."

(I would not have wanted to limit it to this form, but a continuous source of power was the fundamental idea.)

"...If the reaction turned out to be explosive in character it would provide a possible source of power with a destructiveness vastly greater than anything known now."

"...The military and naval applications suggested in paragraphs 3 and 4"—in the case he was expressing the not quite suspended belief of the representative the ignorant, knowing greater skepticism in the better therealization of these uranium reactions and their potential military value, we believe that adequate support for a thorough investigation of the subject should be provided."

This was a technical adviser of the services in the summer, and it was because of that adverse report that they didn't see any reason for being interested, although they were kept informed, that I brought in to go directly to the Commander in Chief.

So they concluded:

"...We believe that this investigation is worthy of direct financial support by the Government."

But, alas, we had no money.

"The Lea bill now before Congress if enacted would provide for carrying out some of our hurried plans for the production of uranium."

"We recommend the enlargement of the committee to provide for the support and coordination of these investigations in different universities. We suggest the following be invited: President Karl Compton, Massachusetts Institute of Technology; Dr. Alexander Sachs, 1 William Street, New York; that was my address at Lehman Bros., who were very kind to let me devote time, and did not ask me to tell them what is about. Mr. Robert Lehman is particularly interested in this subject, and early in November I had a long talk with him and included him in all of the War Production Board, and later Deputy Chairman, Mr. Arthur B. Bunker, who was then executive vice-president of the Lehman Corp.)

The people who were asked to be added were Prof. Karl Compton, myself, Dr. Albert Einstein of the Institute for Advanced Study, and Dean George B. Pegram, Columbia University.

As a sequel to the major finding and recommendation, the committee proposed that initial support take the form of:

(a) Supplying for immediate and experimental work four metric tons of pure-grade graphite and;

(b) If later justified, supplying 50 tons of uranium oxide.

Later on there were all kinds of difficulties about getting the supply, to which I referred. Late that year and in the following year there was another newcomer, an industrialist-engineer by the name of Boris Pregel, who made available his very valuable supplies and experience to Columbia University for the exploitation of Dr. Szilard and Professor Perlman, for which he was thanked by Dean Pegram.

The first phase was to coordinate the group of physical scientists for the purpose of presenting the production of special radio and the idea to the President. The second phase was to secure action by the Government, and that was climax by the report, which was a go-ahead signal, that Dr. Briggs wrote on November 1, 1939.

If you hear in mind how narrow has been the zone of this correct was the country from which I read March 10, 1939, that the job was "time-borrowing, the issuance of drafts on the 'Bank of History,'" it becomes plain that if the work had not been thought through before the advent of the war, and if President Roosevelt had not immediately after, and the report of the Bureau of Standards and its technical head had not come forth on November 1—the bomb could not have come when it did toward the end of the war to abbreviate the war in 1945. Indeed, time-borrowing was very essential, and along with it the founding and improvement of the organization media for the successive tasks of the year 1939 and the year 1940 and beyond. In the ensuing period I was an advisor of the President also on problems of strategy. I was also a special consultant to General Donovan, Director of the Office of Strategic Services, for whom I had written in 1941 the first report on the intellectual work that was being done in outside institutions on problems of total-war military economics, as well as strategy, before the organization of the Office of Coordinator of Information, that afterward became the Office of Strategic Services.

Through these connections I was able to keep in touch, and I was in turn kept informed, on the basis of great confidence! with the White House on what was going on, so I knew what was happening even to the very last. I discussed the problem of the form of the use of the bomb with the President earlier in November. He asked me to review the situation technologically and culminate with this observation:

"My decision, because of that adverse report that they didn't see any reason for being interested, although they were kept informed, that I brought in directly to the Commander in Chief."

So they concluded:

"...We believe that this investigation is worthy of direct financial support by the Government."

But, alas, we had no money.

"The Lea bill now before Congress if enacted would provide for carrying out some of our hurried investigations in the field of this kind of concern over the country."

"We commend the enlargement of the committee to provide for the support and coordination of these investigations in different universities. We suggest the following be invited: President Karl Compton, Massachusetts Institute of Technology; Dr. Alexander Sachs, 1 William Street, New York; that was my address at Lehman Bros., who were very kind to let me devote time, and did not ask me to tell them what is about. Mr. Robert Lehman is particularly interested in this subject, and early in November I had a long talk with him and included him in all of the War Production Board, and later Deputy Chairman, Mr. Arthur B. Bunker, who was then executive vice-president of the Lehman Corp.)

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adopted by the Navy through technical work under Professor Hunzacker of MIT and the fostering concern from 1942 on of Mr. Lewis Douglas, then Deputy Administrator of the WSA.

Thus with regard to the adoption of all such technical devices I want to say that in the beginning there had to be a political concept and a moral concern, and that later it was necessary to provide proper vehicles for action and also to induce acceleration of action.

The third stage in the atomic project was the coordination phase of the university researches with limited governmental aid and—by Einstein and the speaker—for a new framework and an accelerated tempo for the project. While a number of the university representatives were encouraged by the governmental interest in the fundamental tenor and the universities, on the whole, continued with the past—that is, they were regarded as mere laboratory researches.

The time of this phase was approximately coincident with what was called then the “phony” war. This was the time of the war which embraced the period between the fall of Poland and the Nazi invasion of the Lowlands. You can well realize that the President during this period was pressed by and preoccupied with numerous internal and international problems. Our liaison for the project, General Watson, orally conveyed the general tenor to the President of Dr. Briggs’s report. While he had done that, he thought when, after an interval, he transmitted it to me on February 8, 1940, that a more pointed conclusion was still necessary. He added that he had asked for a special recommendation from Dr. Briggs.

Meanwhile, some progress was made in the coordination of the university researches by the Coordinating Committee mentioned in the concluding point 8 of Dr. Briggs’s report. The appointment of Dean Pegram served to localize activities in Columbia on this project and frequent conferences were held there by Dean Pegram, Professorfull and Professor Pegram.

In mid-November of 1939, our group had projected an octet of experimental projects in the hope that the subsidiary questions could be cleared during a period of 6 months. In notes that were made at the time, I listed the nature and number of projects involved and the proposed leading figures in technical publicaions that could be made to throw light on these problems. Of the new men brought in the most important was Prof. Harold C. Drey, who had won the Nobel prize in physics.
"Should you think it advisable to relay this information to the President, please consider yourself free to do so. Will you be kind enough to let me know if you are taking any action in this direction?"

I have discussed with Professor Wigner of Princeton University, and Dr. Szilard the situation in the light of the information that is available. Dr. Szilard will let you have a memorandum informing you of the progress made since October last year so that you will be able to take such action as you think in the circumstances advisable. You will see that the line he has pursued is different and apparently more promising than the line pursued by Monsieur Joliot in France about the paragraph. Then he wrote:

I had, throughout, followed the policy not only of being an expert on tap, but of going to other people's experts to see what they were doing. When Dr. Szilard first told me, I left that to the scientists. I did not presume, when I forwarded the memorandum written by Dr. Einstein, Dr. Szilard, and the others, to act other than as a synthesizer for them.

I passed on Dr. Einstein's review of the situation to the President on March 14, and in the course of that I had an opportunity to confer with him on the latest phases of the experimental work.

The letter referred to was entered in the record of the committee and appears below:

MARCH 15, 1940.

The President,

The White House, Washington, D. C.

DEAR MR. PRESIDENT: As a sequel to the communication which I had the honor to submit to you on October 12, Prof. Albert Einstein sent me another regarding the latest developments touching on the significance of research on uranium for problems of national defense. In that letter he suggests that I convey to you the information that has reached him from the last war—the Berlin Institute of Physics, which has been taken over by the government and placed under the leadership of C. F. von Weizsacker, son of the German Secretary of State.

In the realization that these further views of Dr. Einstein have a definite bearing on the favorable report submitted to you by Dr. Briggs as chairman of the committee which conferred with experimental scientists concerned and myself, I am enclosing his communication for your kind perusal. May I also ask whether and when it would be convenient for you to confer on certain practical issues brought to a focus by the very progress of the experimental work as indicated in the concluding paragraph of Dr. Einstein's letter?

In view of your original designation of General Watson in this matter, I am transmitting it through his good offices.

Yours sincerely,

ALEXANDER SACHS.

Dr. Sachs. The reply of General Watson on March 27, 1940, was to the effect that the governmental committee was awaiting "a report of the investigations being conducted at Columbia University" and "the matter should rest in abeyance." I did not feel that I could rest.

Senator Tydings, "In abeyance!"

Dr. Sachs. Yes. For the sense of foreboding about Nazi aggression that had been voiced before the outbreak of the war—as I disclosed previously—impelled me to relate the expectations of new invasions in the wake of spring to the instant projection.

At the beginning of April, opportunity was afforded the speaker in the course of a visit to the White House to unfold views on the probable course of German aggression in the spring. In this war—as distinguished from the elimination of neutrals so as to secure complete control of the coast from Norway to France. It had this bearing on the uranium project: It was suggested that diplomatic arrangements be made for the shipment of uranium supplies from Belgium. The point was on the eve of shipment to France to avoid their probable capture by the Germans in their military march through France.

Taking the project as a whole, it was urged that instead of delimited aid in the form of specific material purchases or reimbursements for expenditures by universities, a fund be made available from governmental sources or by persuading foundations to allocate a fund in order that research could be planned on an adequate scale and on a long-term basis.
The President of Interest.

Dean Mr. President, in furtherance of your kind letter of May 4, the conference suggested by you was arranged and held under Dr. Briggs' chairmanship on April 27, between the governmental and non-governmental groups concerned with the execution of uranium experiments on national defense. The conclusion of the first experiment, which was performed at the University of California by Dr. Szilard and Fermi, with governmental aid, the whole enterprise now entering upon a new stage. Assuming that the governmental committee will now, upon your thirty-third report in favor of further and larger governmental action, may I, in accordance with your gracious expression of a desire to be advised of developments, submit the following considerations and suggestions:

1. With the laying up of Belgium by the very power which has organized the residue of its scientists for uranium research, the situation demands that we be prepared to face a new stage of the problem. This situation suggests that we be prepared to face a new stage of the problem. This situation suggests:

   1. The necessity for an international conference on the possibilities of utilizing the atomic energy for peaceful ends.

   2. The need for a comprehensive program of research and development for the utilization of atomic energy for peaceful ends.

   3. The appointment of a committee of experts to study the possibilities of utilizing atomic energy for peaceful ends.

2. Such action necessarily involves not only large financial support to be accorded by the Government but also the formation of an international framework under which the work can proceed with the fullest possible cooperation for a going enterprise. Interestingly enough, the latter practical aspect has been emphasized by Dr. Einstein in conversations with myself and was communicated in his letter of April 27 to Dr. Briggs, of which I am enclosing a copy for your kind personal and attention. In this connection you might find of interest the enclosed copies of two communications which I have received from Dr. Szilard, the first of which was a complete statement of the implications of the work for national defense that was made orally at the above-mentioned conference of April 27, and the second an outline of the outline of the next tasks to be undertaken.

3. The remaining requirement for forming an organization for directing the work outside of governmental institutions and for assuring that work by scientists in the universities is carried out with due secrecy has to be complied with the designation of persons to serve as trustees of a nonprofit organization that is to supervise the allocation of funds and to coordinate the various branches of the work.

4. These interlinked needs suggest to me that it would be desirable to bring one or more of these legal aides into the circle of discussion, along with General Watson, who is now serving as a liaison for the representatives of the service departments and the Bureau of Standards. I would be glad to have the opportunity of presenting these points, and I should greatly appreciate conferring with you in the course of next week, at your convenience.

Yours sincerely,

Alexander Sachs

ATOMIC ENERGY
solely to the military—Clemenceau had seen that development and he expressed himself on it as an illustrious layman, who while entertaining complete respect for the performance of the military, can synthesize the military considerations with the economic considerations.

Clemenceau had insisted at the Peace Conference, "If you do not give the French the protection at the Rhine, then the other democracies will have no basis of operations, no base of support, no jumping-off place for operations by the overlordship of the last war. Therefore, even a base on the Continent, I think the significance of the Mediterranean was going to be south-west and not east-west.

In the fall of 1940, before describing such discussion and on the fate of our access by sea to the Continent, I broached the problem of the supply of uranium for the United States. I pointed out that the biggest supply of uranium was in the hands of the Belgians. I pointed out that if in anticipation of invasion they were to send us a weapon whose essence was to make us ready to use it. Hence we ought to open, ahead of invasion, diplomatic negotiations.

Incidentally, that industrialist-scientist I mentioned, Borel Pregel, who at the outbreak of the war was in France, was a French citizen, had it later appeared, asked the French Government in 1939 to make arrangements with the Belgians.

That presence on the part of these newcomers and refugees, gentlemen, was operating in our case because they were united by a political sensitivity along with their specific expertise as scientists and technologists.

Now, the memorandum which I submitted to the President opened with a description of the meetings and the work that was being done by other scientists; by the scientists in England, men like Drudwick and Lindemann, and so on. That work would be available for coordination with research in America. In other words, there was suggested at that time the idea of Anglo-American collaboration, which led to the establishment of M.I.T. by 1940, where it was seen that there would eventually be developed a new source of energy; and that lecturers were also aware, profoundly and humbly aware, of the dual and good and evil potentialities of the atomic energy, and the moral and political considerations.

The memorandum then dealt with the tendency to reservations and underestimation of the results of research and their implication, the effect of which on government as a representative was to cause from the very suggestions that were being pressed by Dr. Einstein and myself for providing a larger and more resourceful organizational framework for adequate and faster prosecution of the task.

In order to overcome the tempo-dampening and scale-dampening that the other attitude entails—the attitude of conservative hesitation, proper enough in an ordinary task but not for this kind of thing, which required the already designated and already demonstrated in that effort, the speaker submitted the following observations and considerations which in a later period were to the President appeared to be contributive toward a resolution of the organizational difficulties.

For present writer, as a nonphysicist—this is a quotation from my memorandum—"would not of course venture an opinion alongside of these. But as an economic historian and as a practical economist versed in the conduct of technological research, I have not ventured to convey to the scientists mentioned and to the governmental authorities his hypothesis that the difficulties which loom so large now might well arise from the characteristic physical limitations of the pre-project plant operations that are carried on in the typical university laboratories. If the project is fraught with promise and imperious for national defense, then it seems to him worth while to approximate very soon the conditions of industrial pilot-plant operations. This might entail the building of equipment, machinery, and labor for the construction of adequately scaled and adequately protected physical plant.

"Once we relate the uranium research to national defense, it should be geared in type and tempo to the most advanced technological research that has been carried out in the United States. In the construction of a basis for national defense, then it seems to him worth while to approximate very soon the conditions of industrial pilot-plant operations. This might entail the building of equipment, machinery, and labor for the construction of adequately scaled and adequately protected physical plant.

"When what has taken place in Poland, Denmark, and Norway, and will doubtless go on through other European countries that will be invaded, is that the pacific-minded countries have not brought their national defense up to the quantity and quality required for technological warfare. When the import of the European war is assimilated by the American people and national defense is undertaken as a national enterprise, then we may be confident that we will match in war with the deficiencies of a civilian government and come to surpass it, which means surpassing the German military technology.

In the conviction, then, that "an adequate organizational framework is itself the essence of accomplishment and effectiveness of the value of nuclear research for national defense," the speaker proceeded to sharpen the possible applications of that research for naval operations—

Senator Russell. What was the date of that?

Mr. Stimson. April 20, 1940.

As I say, I proceeded to point out the possible applications for naval operations, on the assumption that the war would in time become global on the part of the Axis, including Japan against the democracies inclusive of the United States.

In that event, the applications in the dual form of telescoped power drive and magnified explosives should aid the United States to overcome the disadvantage under which we labor due to the enormous distances between continental United States and our possessions, and between our possessions and the Japanese homeland.

This was not war mongering, this was adjustment to the import of events as I saw them, as I followed the phenomenal developments.

If I may quote again from the Bible, 2 Timothy 2:20, 1940, the nations were successively "taking the winecup of this fury at the Lord's hands and drinking it." I could see that we would all be engulfed; that on the Continent, only Great Britain would be left; and that we would be the only major continental insular power left in the universe and that then we would have to take action. I saw that we must not let Germany get ahead with atomic research on the kind of application it was working on, a weapon whose essence was tempo for the defense, the elimination of that borrowed time that we all needed so badly in this war.

Thus much as the attempt to relate the applications to strategic and logistic conditions presumed naval dicta, Dr. Briggs' question about a memorandum which I submitted to the President on the dual form of telescoped power drive and magnified explosives should aid the United States to overcome the disadvantage under which we labor due to the enormous distances between continental United States and our possessions, and between our possessions and the Japanese homeland.

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This was not war mongering, this was adjustment to the import of events as I saw them, as I followed the phenomenal developments.
The conference that was held on April 27 at the Bureau of Standards under Dr. Briggs’ able and conciliatory chairmanship did serve to dispel doubts that had been entertained by some members. It also marked further progress in clearing up the difficulties that had been encountered in the consideration of large-scale expenditures that might run up to six figures. That was fantastic, alongside the cost theretofore—

the thousands that were being spent and the money that was being furnished by the margin, the margin that was being supplied out of their own pockets in connection with this work in corresponding amounts. Yet the majority, ac

custom to the small scale of physical laboratories at the universities and the correspondingly reduced scales of the budgets of governmental scientific laboratories,

We were looking for a way to design a large-scale and comprehensive program, and instead insisted on “bit-a-bit” procedures with ranked preferences and time

deferrals. That is the beginning of May the uranium research at Columbia, which was the pathfinding research, had reached the point where expansion was deemed advisa

d and desirable by the whole quartet of scientists concerned—that is, by the direct experimenters, Drs. Fermi and Sällard, and by Dr. George Paget and Prof. Harold Urey.

After a number of conferences by the speaker with the Columbia group, a sort of minute was drafted as of May 10 embodying the consensus as to the

successive stages. In this case, I myself did the secretarial work.

The first point in this minute was:

“The first large-scale experiment would have as its aim to demonstrate beyond any doubt whatever that a chain reaction could be maintained in a system composed of carbon and uranium. This would require about 100 tons of graphite and some 10 to 20 tons of uranium metal. It will also be necessary to design a rather elaborate mechanism to stabilize the chain reaction and to safeguard against overheating as well as the possibility of an explosion.”

The second point was:

“The next stage is to carry out a general survey of all nuclear constants in order to secure preliminary information to be communicated by the President to Congress on the fundamental principles underlying the assurance of the ultimate success of the experiment.

Then as preparatory groundwork for that experiment would come the withdrawal of a system capable of withstanding the enormous pressures and stresses of combustion materials which have to be used in large quantities in the ultimate experiment. This in turn would require the furnishing of the manufacturing of the material in needed quality of each stage.”

As for the quality, the problem of refinement was throughout a very grave one; it was the industrial know-how which had to be acquired, as well as the fundamental scientific research.

In financial terms, the first stage would require expenditures of $30,000 to $50,000; the second stage would require $100,000 to $150,000. The speaker’s view was that in the interest of time-efficiency and even of economy it would be necessary to prepare as much as possible of this equipment before the war was over, provided that adequate funds were made available to begin with. That is the way in which the Board had submitted for a nonprofit organization directed by a mixed board of trustees, none, entered, under the conditions antedating the prospect of large defense appropriations, particularly suited to methodical and economic direction of the work.

The lack of resolution of the organizational difficulties led the speaker to submit an analysis of the situation and resultant recommendations in a communication to the President dated May 11, 1940, together with a note of transmission to General Watson of even date.

The point of departure was—I am coming to the end of this section, that may serve as a terminal point.

The Chairman. Very well, Doctor.

Dr. SACHS. The point of departure was that, according to the advice given to the President, the graphite experiment, which had been part of the work, had been furnished by the Government, was a success. As the communication was coincident with the German march through Belgium, the invasion having begun on May 10, the situation adumbrated in the initial presentation of October 11, 1938, had come to pass. I mean the situation that the Government was able to acquire uranium supplies from all Belgian sources had come to pass. A problem of access to uranium supplies that would be needed on a larger and larger scale had been thrust forward. This in turn threw into sharper relief

the previously described need for that change in the organizational framework “under which the work could proceed with the flexibility required for a going enterprise.”

As the result was therefore requested to designate a legal aide to facilitate the establishment of a nonprofit body which would secure the resources for carrying on the work under conditions where the tenure of the research posts would be assured for the duration, in order to be able to design a large-scale and comprehensive program.

You must see that the job was to transform the conditions and to anticipate the time-order in normal use. Even for getting the scientists, you had to take into account the fact that we were not yet in the stage where we were preparing them from having to work on the biggest asset to the scientist—the knowledge that the results of their research will get published when they do important things. So you have to give them adjustments in salaries. There was no time to delay. If we delayed, men were leaving. Additionally, there was the feeling—a real and genuine feeling—that if invasion of France—why you had to see that all this work, in view of its potential value and its potential danger, was not made known to the potential enemy through the scientific magazines, such as Science and the Physical Review, and related foreign publications.

Is this a good stopping point, Mr. Chairman? I could go on. What do you say, sir?

The Chairman. Doctor, the Senate meets at 12 o’clock.

Dr. SACHS. All right, let me go on, then. This is a very short section.

The Chairman. All right.

Dr. SACHS. This is part 6 of my history, assembled at the end, in August, from the notes and reviews that were made contemporaneously with the development. The heading is: Resolution of the Difficulties and Setting up the Uranium Project, under the New Direction Established by the President on April 20, 1940, for the Direction of All Scientific Developments Related to National Defense.

Dr. SACHS. What was the date that the small-scale stage ended and that you were to go forward on the large scale?

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The Chairman. What is this a good stopping point, Mr. Chairman? I could go on. What do you say, sir?
Gen. Edwin M. Watson,  
The White House, Washington, D.C.

May 14, 1946.

Dear General Watson: Confirming the intimation that I had the honor to convey in my letter to the President and in my covering note to you, I have just received a letter from Dean Peirce, of the department of physics of Columbia University, stating that the initial experiment "has now been concluded with satisfactory result," and that "the absorption cross-section of carbon was found to be encouragingly small * * * only about one-third of the upper limit previously reported in the literature." The detailed meaning of that has been set forth in the letters of Dr. Szilard of May 10 and of April 22, which I forwarded to the President; a copy of the latter was also sent to you. Please advise me before any conference on this is arranged.

In connection with an independent matter having to do with economic and fiscal policies for effectuating national reconstruction and defense, I should appreciate your expressing to the President my readiness to submit certain projects of utility for national defense and the training and reconditioning of the requisite skilled labor. To the original proposals drafted in 1932, there was added in early 1933—when submitted for the National Recovery Act—+ provision authorizing public-works expenditures for national defense, in view of the altered international situation. The ideas and proposals in connection with the original FHA plan submitted in 1933 were later expanded in the second FHA plan that, at the President's behest, was worked out for Governor Eccles' advisers. In keeping with the pattern of these earlier plans, the role of government can be adjusted to specific requirements.

For the instant purpose, the organizational instrumentality proposed is the establishment of a Scientific Council of National Defense, composed of executives, engineers, and economists, acting in behalf of the government, who should be invested with administrative powers for the testing and execution of technical projects of utility for national defense.

Yours sincerely,

Alexander Sachs.

DR. SACHS. The main communication of the speaker contains the first anadumation of a plan similar to that later developed by the President for the direction of the scientific work related to national defense. The new suggestion was made in the settling of proposals which the Speaker was evolve for submission to the President with respect to amortization and other incentive-tax devices for national defense plant construction. It was my belief that industry had to be related to the war effort and that the government, who should be invested with administrative powers for the testing and execution of projects of utility for national defense.

In respect to the specific problem of an organizational framework that would carry forward uranium research on a bigger scale and at a faster tempo, the new conclusion and recommendation of the writer was as follows, against the background that the government was then thinking of going to the Congress with a request for bigger appropriations:

"For the instant purpose, the organizational instrumentalities proposed is the establishment of a Scientific Council of National Defense, composed of executives, engineers, and economists, acting with administrative powers for the testing and execution of technical projects of utility for national defense."

In acknowledging that letter, General Watson on May 16 added an observation regarding the broader suggestion for a mixed executive and administrative group for scientific phases of national defense.

The CHAIRMAN. Was that group formed?

DR. SACHS. That group was formed on June 15. There was an interesting communication and I had received an authorization after an O.K. and an encouraging word from the President to represent the Government in negotiations with the Belgian company representatives for the acquisition of uranium.

The CHAIRMAN. Doctor, there has just been a quorum call from the Senate and I think we will have to stop at this point.

DR. SACHS. May I complete that phase of the story?

The culmination of the foregoing phases of the uranium project came on the day following the German Army's entry into Paris. On June 15, the President established a new committee for the correlation of the scientific efforts of the country concerned with problems of national defense and placed that committee under the chairmanship of Dr. Vannevar Bush, President of the Carnegie Institution of Washington, whose name I have mentioned in the course of my discussion here. This committee included representatives of the Army and Navy and distinguished scientists and, initially, was to be attached to the Council of National Defense, in keeping with the suggestions I had made.

Accordingly, the President advised Dr. Briggs on June 16 that "since the problem on which you are engaged is part of this larger picture," Dr. Bush was requested by him to take over the uranium project and to reconvene the committee.

Now, I make my summary: There was found a larger framework in accordance with the tenor of the speaker's recommendations. Dr. Bush's committee after our entry into the war became the Office of Scientific Research and Development. Associated with him and with Dr. James B. Conant of Harvard was the General Policy Committee, which included the then Vice President, Henry A. Wallace, Secretary of War Stimson, Gen. George C. Marshall, and Army and Navy representatives. The other group of the Army came in 1942.

The uranium project as initially presented by Dr. Einstein and the speaker in October 1941, having by the spring of the next year been reported on favorably by the testing and coordinating committee that the President had appointed under Dr. Briggs' chairmanship, was thus launched on a permanent and progressive career in the wake of our decision after the fall of France to embark on expanding defense.

From then on, it became invested with the importance, the resources and the secrecy available to the Government of the United States in defense and later in war for the translation of an idea into a reality and into an instrument of national policy in war and peace.

The CHAIRMAN. Thank you very much, Doctor.
A GENERAL ACCOUNT OF THE DEVELOPMENT OF METHODS
OF USING ATOMIC ENERGY FOR MILITARY PURPOSES
UNDER THE AUSPICES OF THE
UNITED STATES GOVERNMENT
1940 - 1945

by H. D. Smyth
Chairman of the Department of Physics
of Princeton University
Consultant to Manhattan District
U. S. Corps of Engineers

written at the request of Major General L. H. Groves
United States Army. Publication authorized as of
August 1945

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The ultimate responsibility for our nation's policy rests on its citizens and they can discharge such responsibilities wisely only if they are informed. The average citizen cannot be expected to understand clearly how an atomic bomb is constructed or how it works but there is in this country a substantial group of engineers and scientific men who can understand such things and who can explain the potentialities of atomic bombs to their fellow citizens.

The present report is written for this professional group and is a matter-of-fact, general account of work in the United States since 1939 aimed at the production of such bombs. It is neither a documented official history nor a technical treatise for experts. Secrecy requirements have affected both the detailed content and general emphasis so that many interesting developments have been omitted.

References to British and Canadian work are not intended to be complete since this is written from the point of view of the activities of this country.

The writer hopes that this account is substantially accurate, thanks to cooperation from all groups in the project; he takes full responsibility for such errors as may occur.

H. D. Smyth

July 1, 1945
Dear Mr. Secretary Wallace:

Owing to the death of President Roosevelt and his military aid, General Watson — who was the liaison in the early phases of the atomic bomb project — the momentous Statement on the subject by Secretary Stimson unwittingly contains a large gap in respect to the very inception and the early but arduous development of the project until the right framework for that and cognate projects was evolved in concordance with suggestions that emerged from the initiators.

What lies behind the opening sentence of Part II of Secretary Stimson’s statement is that Dr. Albert Einstein and the writer sought from August through September 1939 to indicate to the President the potential bearing of the uranium research that was being conducted in Germany and in the Democracies on the defense of civilization in the course of the expected unfolding of Nazi aggression. A presentation was made by the writer in behalf of Dr. Einstein and himself at the White House on October 17, 1939, and in the wake of that the President appointed General Watson as liaison.

It was at that point that the scientific division of your present Department was brought in by the President as the organ for evaluation and decision on the advisability of governmental concern with and fostering aid to the development of the uranium research and its applications to national defense. Dr. Lyman J. Briggs, Director of the Bureau of Standards of the Department of Commerce, was designated by the President as Chairman of a committee which included representatives of the Army and Navy and a public group consisting of Dr. Einstein, Dean Acheson of Columbia, and the writer.

As co-initiator with Dr. Einstein and as catalyst for the mixed governmental and university groups in the combination, I have kept a sort of multiple-entry bookkeeping record on the exchanges of correspondence, and affected syntheses of the progress of thought as well as work on the uranium project. The record was thus fused with the reactions and the consequential reshaping of the project with a view to the fulfillment of the national purpose that inspired the President and his advisors.
Mindful then of the importance for American history of the very historic record that was a confluence of interest, thought, and labor of the President and the small group that worked on the problem, I felt it incumbent on me to provide forthwith a fully documented history of the project from its inception up to the establishment in mid-1940 of the new and larger vehicle for the promotion and application of scientific research for national defense.

Accordingly I am submitting herewith — for yourself as Secretary of Commerce, for the White House in memory of the direction which emanated from the Presidency and part of the secretariat, and for Secretary Stimson, whose Department, aided by the Policy Committee on which you served, had the general direction of the applications of the project to military operations — copies of this report:

"Early History Atomic Project in Relation to President Roosevelt, 1939-40"

(27 pages and a score of exhibits).

This report not only throws light on the origins of the projects that are passed over in the report of the War Department issued to the public, but it throws important light in the course of the analysis of this crucial laboratory case on the role that should be accorded to Government in respect to the interrelation of dynamic science and national welfare.

I trust that this report will be useful for the needed historical supplementation as to the respective roles played and services rendered by the late President and his advisors within and outside Government in the early and decisive phases — considering the narrowness of time span and the magnitudes of the issues — of the translation of academic ideas into a weapon of war and prospectively an instrument of peace.

With high regard and a cordial salute,

Yours sincerely,

(signed) Alexander Sachs

Ron. Henry A. Wallace
Secretary of Commerce
Department of Commerce
Washington, D. C.
September 6, 1945

Dear Mr. Secretary Wallace:

In view of the projection in the press and the ferment in Governmental circles of issues revolving around the control of the use of atomic power, may I supplement my transmittal to you of August 23rd by submitting the following series of observations.

I.

1. Our first concern is with the already articulated and rightly emphasized warnings against the exploitation of the atomic bomb as an instrument of divisiveness among the survived triad of hegemonic powers. No wonder that the former isolationists are resuming their old ostrichism and expect that technology can be made a piece of monopolistic autarchy! Actually, of course, such divisiveness and anarchism by the English-speaking world would be the surest means of throwing away victory. The only rational alternative which we not only must demand of our leaders but have a right to attribute to them an inherently desired by them is that the atomic bomb be made the reserve power of the international police for making a reality of the World Security Council.

Considering the portentous magnitude and implications, it would seem to me desirable to project the idea that the Security Council select a major island, say in the Pacific, as a joint possession of the new World Organisation wherein experimental plants be located for manufacturing the supplies. This in turn is to be entrusted to a new combined Chiefs of Staff functioning for the World Security Council and the World Organisation.

Let me pause to underline the concept of the reserve force on what I deem to be an available illuminating analogy with gold reserves. The historic gold standard, despite certain crude popularizations, did not imply a reduction of all values to the basis of gold.

Rather, it admitted the pluralism of economic values in the world - from commodities to capital goods, from tangibles to intangibles, from physical constructs of earning power to securities and all sorts of derivative and symbolic pecuniary claims and rights. But gold was made an interconnecting function of the complex variables of values and was a sensitive instrument of control for signaling and releasing appropriate adjustments when the interrelations between values were on the verge of becoming unbalanced. Correspondingly with respect to the instruments of coercive force subsumed under the general term of military weapons, thinkers with a penchant for over-
simplification are trying to repeat now what they did in the early part
of the war in negating the value of all weapons but one. At that time,
as will be recalled, they were glibly and verbally destroying naval
power and military power in favor of omnivorous air power. So now they
are asserting that tanks, and armies, and naval bases will become wast­
ing weapons and liabilities as against atomic power. As opposed to this
vast and growing school of speculation, I submit that a more appro­
priate and promising concept is that atomic power as a military weapon
should be developed and held as a reserve by the triad of hegemons
powers in trusteeship for the World Organization.

2. From the foregoing military or peace-enforcement aspects we should
turn to an underlying human-welfare aspect that guided the physicists
who were the first to discern the manifold potentialities of atomic
disintegration. In my original submissions to the President on
October 11, 1939 it was stated that the new development held 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 radio­
active elements, so that tons rather than grams of
radium could be made available in the medical field;"

In pursuit of these more intrinsic ends of human life - what we will
do with our security - it would seem to us appropriate to project the
idea that while the reserve force be under central control, the
diversified economic and humanitarian applications be made accessible
to scientists throughout the world. We may even envisage the possi­
bility of the World Organization treating the basic resource and pro­
cess as a patent monopoly and that royalties accrue to the World
Organization from licenses granted for experimentation looking to
and exploitation of eventuating developments in technology and
medicine and the like.

II.

The story by Bert Andrews in the Tribune of August 27th regarding
Presidential insistence on bomb secrecy calls for comment not only
on the policy itself but on the relation between that policy and
the foregoing constructive proposals.

While the story is put in categorical form, I would still deem it
highly improbable that present or, rather, the eventuating policy
would be one of extreme nationalism. In the original announce­
ment of President Truman, it was indicated that it was intended to
place the development under international control. Since we and the
British Commonwealth are already parties to the development, the
term "international control" must imply the inclusion of Soviet Russia
and thus constitute the World Security Council as the control authority. It is difficult even to entertain the notion that upon reflection we would not convert into a virtue the probability that the scientists of other nations possessed of ample resources and organization would in the course of time rediscover the process by which the bomb was produced and detonated. As one whose association with the problem dates far back and as one who has some attunement to the logic of scientific discovery, I would hold that the decisive stage was the emergence from the researches of Drs. Enilard and Fermi in the spring of 1939 of a near probability of a chain reaction involving fast neutrons. The release of the War Department and the imminent publication of Dr. Smyth's report provide a rough but nonetheless pursuable blueprint for the translation of ideas into facts.

Accordingly, the major problem confronting our administration and our associates is the devising of a proper organizational framework adjusted to the triple needs and utilities of a peacetime world, to wit: (1) as a military weapon, (2) as a source of power and as a transformer of technology, and (3) the humanitarian-medical uses.

The organizational framework now looms forth as decisive as it did in the period following the success of the graphite experiment at Columbia in the spring of 1940 and the admission by the Governmental committee appointed by President Roosevelt that large-scale experimentation would stand a chance of success and was therefore deserving of Government support in the interests of national defense. My contemporaneous memoranda throw into sharp relief the decisive choice of the period—namely, between the leisurely bit-a-bitarian procedure of dispersed university experiments and tense and coordinated large-scale experimentation. Now the choice is in a converse direction. If the research from here on remains under the control of the Army, then the military use will set the tone for the others and will come to throttle the independence and initiative which, operating through a pluralism of sources, make for those novelties and mutations in human thought that give us the great discoveries.

On the subject of organizational media, it is the cultural and economic historians who may have more to contribute than the mere military and business administrators. The cultural historian may offer a recollection that can be transmuted from a warning into a constructive lead. The sixteenth century mathematician and inventor, John Napier, had, as was characteristic of the Renaissance Worthies, a diversity of appetites and interests and an attitude of free movement between the theoretical and the practical. Not content with the invention of logarithms and instruments of measurement, he sought to be useful to the cause of freedom and Protestantism in the critical era and the challenge represented by the Armada invasion. Among his works are found suggestions of a primitive tank and reflexive burning mirrors. It is even recorded by him that on finding that one of his devices succeeded in destroying a whole flock of sheep from a considerable distance, he decided to destroy the details regarding this invention,
fearing that mankind could not be entrusted with such a lethal power.

Now the plain deliverance of the history of technology and of culture is that though wars and the needs of wars were the matrix of technical inventions, the intervening periods of peace enabled us to change the swords into plowshares. The historical stimuli, conditions and causes of the transformation were (1) expanded knowledge and freedom of thought, (2) religious toleration and extension of social interchange, and (3) last but not least, the economic system of progressive capitalism. Applying this to the instant issue and evolving situation, it is necessary to seek to discern a far larger scope for atomic energy than that implicit in the contemporaneous guesses as to the potential displacement of this or that fuel or energy within the existing system of economic organization. From the vantage point of cultural-technological history, a major source of new power enlarges the physical geography and transforms the sociographic complex along the dimension of depth. What have remained the desert areas of the world and the sterile spaces are related to the inadequacies and inaccessibilities of water and energy resources. In the light of the reflections given in certain exhibits connected with the formative stages of the project, it is reasonable rather than speculative to say that new worlds will open up, as that the existing world will be enriched. The areas from the Sahara to the Arctic, from the jungle to the arid, will in the course of a time that we can control be transformed by the lifting of the deep-lying water and by making accessible power and heat.

In view of time and other limitations under which I am laboring, the foregoing ideas cannot now and in this place be adequately developed. But they do serve to link up the need not only for a world basis but of a more flexible public vehicle for directing the exploitation of atomic energy. Specifically and pointedly, while the military use should be focalized in the World Security Council, with the civilian experts as auxiliary, the economic and humanitarian uses should be made the reader of access to industry and scientific bodies of all nations coming within the orbit of the World Organization.

Sincerely yours,

Hor. Henry A. Wallace
Secretary of Commerce
Department of Commerce
Washington, D. C.
WASHINGTON, Nov. 28.-(P)—TELLS OF F. D. R.'S INTEREST IN ATOMS—Alexander Sachs of New York City (left), economic adviser and consultant, talks with Maj. Gen. L. R. Groves, chief of the United States atomic bomb development, at a hearing before the Senate atomic energy committee. He said F. D. R. had advised atomic research in 1939. General Groves advised the country Wednesday to build up an adequate stockpile of atomboms before closing down the three big plants devoted to their manufacture.

—A. P. Wirephoto.
WASHINGTON, Nov. 28.—As the man who directed the construction of mankind's most awesome weapon and who was in the service of the atomic bomb, General Groves has been quoted as saying, "No encouragement, period." He is in line with the United States Atomic Energy Commission's stand on the non-use of the atomic bomb in warfare.

General Groves, head of the Manhattan Scientologi project, which developed the atomic bomb, has been quoted as saying, "No encouragement, period." He is in line with the United States Atomic Energy Commission's stand on the non-use of the atomic bomb in warfare.

The Pentagon building, world's largest, main building, was completed last week. The destruction in the bomb area was complete; nothing lived and scarcely anything stood after the two explosions.

The noon illustration shows the Pentagon building, world's largest, main building, was completed last week. The destruction in the bomb area was complete; nothing lived and scarcely anything stood after the two explosions.

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Roosevelt For 'Action' in 1939
On Atom Study

Senators Hear Economist Who Brought Scientists Views to White House

WASHINGTON, D.C. (AP) - The Senate's Atomic Energy Committee heard today that the late President Roosevelt called for "action," in October 1938, which produced the atomic bomb.

The statement came from Alexander Sachs, the witness in a series of public hearings expected to lay the groundwork for legislation for control of a future atomic-bomb industry, including the White House.

Mr. Sachs, a New York economist, testified that he acted as a liaison man between a group of physicists, including Albert Einstein, and the White House. He said the scientists asked him to do so, "because they had heard I was in a position to talk to the President." He explained that he had asked Mr. Roosevelt, on electric-power matters in 1936.

Eventually, he said, he came to advise the President on various other matters, including not only the atomic bomb but "strategic matters." He said he did his advising "without any label" and claimed no official position at the White House.

A big man with a fringe of hair, Mr. Sachs spoke rapidly and with hardly a moment's pause for nearly two hours. He brought along two big black notebooks and flipped through them incessantly, until he reached a memorandum there.

He said the President had told him he would have to serve as a kind of historian for the atomic project, as White House aids had too many other duties.

Mr. Sachs told the committee he had been an economic consultant for Lehman Brothers, New York bankers, but withdrew from that position when his work with the scientists began to take most of his time.

His voice began to fade as he approached the end of his testimony, but he never took time out for a drink of water.

The zigzag trail which led to the spending of more than $2,000,000,000 and the building of Hiroshima and Nagasaki passed through the White House Oct. 11, 1938, Mr. Sachs told the Senate.

It was then, he said, that he informed Mr. Roosevelt of the work done by Dr. Leo Szilard and Enrico Fermi toward splitting the uranium atom.

Mr. Sachs said he told Mr. Roosevelt of German experiments which had barged the export of uranium.

First Witness at Senate's Atomic Energy Hearing

with Senator Brian McMahon, Democrat of Connecticut, chairman of the special Senate committee on atomic energy control, Mr. Sachs was the first witness when the committee started hearings yesterday.
Spoke of Atom to Roosevelt

Sachs Tells Committee of Talks Late in 1939

Washington, Nov. 27. (A. P.) — The late President Roosevelt became interested in the possibility of an atomic bomb as early as the autumn of 1939, a witness declared today, in his first open hearing of the Senate Atomic Energy Committee.

The witness, Alexander Sachs of New York, said that he was informed that the potentialities of the atomic bomb were very much in the mind of the President. He said Roosevelt became very interested in the latent possibilities of nuclear fission after the conservation at the White House, October 11, 1939.

Sachs said Roosevelt called in his secretary, Edwin M. (Pa.) Watson, and told him, "This needs action." Sachs, describing himself as an economic adviser and consultant, declared he served as an advisor to the President on various matters without any label.

Sachs said he long had been interested, as a layman, in theoretical physics and was a friend of numerous scientists, including Dr. Albert Einstein. Acting as their spokesman, he arranged to apprise the President of the latest developments in uranium experiments.

Urged Development's Speed

He said he informed the Chief Executive that he was convinced there was sub-atomic energy all around us and that it was our job to develop it and see that it was not used to blow our neighbors up.

He then quoted the President as having said: "Alex, what you're after is to see that the Nazis don't blow us up.

It was then, Sachs said, that Roosevelt called in Watson and Sachs said the potentialities of the atomic bomb were very much in the mind of the President and that he left with him a copy of a letter written by Einstein on the subject August 2, 1939.

Einstein's letter described the new phenomenon which had resulted from recent experiments, and said he suspected uranium could be turned into a new source of energy in the near future. The refugee scientist recommended that American experimental work in the field be speeded up.

To Proceed Slowly

Senator McMahon, (D. Conn.) committee's chairman, said today that the committee intends to proceed slowly in an effort to insure that atomic energy becomes a blessing to mankind and not a scourge.

Russia has acknowledged receiving the American-British-Canadian declaration on the atomic bomb, the State Department formally said today, but has expressed no views on it.
WASHINGTON, Nov. 27 (AP).—President Roosevelt became interested in the possibility of an atomic bomb as early as the Autumn of 1939, a witness declared today in the first open hearing of the Senate atomic energy committee.

"The witness, Alexander Sachs of New York, said he carried news of the latest scientific developments to the President, including the latest possibilities of nuclear fission.

"After a conversation at the White House Oct. 11, 1939, Sachs said Roosevelt called in his secretary, Gen. Watson, and told him: 'This needs action.'

Sachs described himself as an economic consultant who served as an advisor to the President on various matters. "without any ability."

He said he informed the Chief Executive "that I was convinced there was sub-atomic energy all around us, and that it was our job to develop it, and see that it was not all used to blow our neighbors up."

He then quoted the President as having said:

"Alex, what you're after is to see that the Nazis don't blow us up."

Chairman McMahon (D-Conn.) said his committee intends to proceed slowly to insure "that atomic energy becomes a blessing to mankind and not a scourge."
Senators Told How Einstein Plea Began Atom Race

Alexander Sachs Carried Refugees Warning to Roosevelt

WASHINGTON, Nov. 27—The United States entered the atomic bomb race on Oct. 17, 1939, when the late President Roosevelt convinced that Germany was seeking atomic energy for use in war, told his Colonel, the late Maj. Gen. Edwin Watson, that “this requires action.”

Today the story of how the United States got into the race was told by Alexander Sachs, New York businessman, to the Senate Atomic Energy Committee, headed by Sen. Thomas J. McManus, D.I., Conn., which is hearing the case of the feared consequences.

Mr. Sachs said he went to the White House on Oct. 21, 1939, with a letter from Prof. Albert Einstein, warning of possible consequences to this country of atomic research then going on in Germany.

Mr. Sachs said foreign-born scientists, in this country as refugees, supplied Mr. Roosevelt with much of the information which motivated him in throwing this government into atomic research.

Mr. Sachs said that refugee scientists as Dr. Einstein and Dr. Leo Szilard approached him “because I was in a position to talk to the President.” They knew that Germany was organized to carry out atomic experiments without stint and were fearful that “the safety of the United States would be greatly endangered.”

Embargo Cited

Mr. Sachs testified that Dr. Einstein’s letter to Mr. Roosevelt stated that experiments by Enrico Fermi and Dr. Szilard led Dr. Einstein to expect that uranium could be turned into energy.

Mr. Sachs said he informed Mr. Roosevelt that when the Germans invaded Czechoslovakia, they put an embargo on export of uranium from that country.
In April, Dr. Sachs testified, he was back in the White House with new forebodings of Nazi aggressions and predicting invasions that would deprive the United States of contact with Western Europe. He reported that Dr. Einstein had information of the intensification of uranium research under the leadership of Wettsecker's son, and that Dr. Szilard's work was proving more promising than Dr. Frederic Joliot-Curie's in France.

Dr. Sachs, a man with fluffy iron-gray hair, who testified with a slight accent, told the committee that the President was encouraging and directed that another committee, meeting be held. This was done on April 27, 1940, and Dr. Sachs testified that it was marked by further progress in evoking a willingness to entertain consideration of large-scale expenditures that might run up to six figures. But he added that the majority, used to small physical laboratories and small budgets, were not ready for large-scale and comprehensive programs. They insisted, he said, on "bit-a-bit procedures." The project, which eventually cost $2,000,000, was scaled at this time, the witness said, at $30,000 to $50,000 to cover the first stage and the next to cost from $200,000 to $500,000. The committee, however, was still thinking of raising funds through a non-profit organization. Although some experiments had already been paid for with Government funds.

The Refugees' Search for Insight

Dr. Sachs testified that the atomic problem teetered between a group of scientists and officials, on one side, who felt that it would take some years before the political aspects of the problem could be brought to a usable point, and on the other side, the refugees, who were useful in the political nature of Europe and in scientific developments that were urgent for the good of America.

While restraining from naming individuals, Dr. Sachs paid tribute to the leadership of Dr. Briggs, who thought it right for American scientists "to engage in a mental projection from the normal course of research development to the impact of the atomic energy on the national defense."

On Nov. 3, 1939, the committee sent the President a report entitled "Fissile Use of Uranium for Submarine Power and High Explosive Bombs." They said the project was worthy of strong financial support of the government and recommended the production of four metric tons of pure graphite for immediate experiments which, if successful, should be followed by procurement of fifty tons of uranium oxide.

Early in 1940 Dr. Sachs and Dr. Einstein were dissatisfied with the progress, and scope, of the atomic project, and Dr. Sachs wrote to General Watson, pleading for larger aid that could be based on a favorable evaluation by Dr. Einstein of work then being completed at Columbia University.
ECONOMIST GUIDED EARLY ATOM STEPS

Dr. Alexander Sachs, Before Senate Group, Reveals His First Talk With Roosevelt

GERMANS' STUDIES CITED

They Were Stimulating Factor in Efforts of Our Scientists to Get the Bomb First

By Anthony Lewis

WASHINGTON, Nov. 27 - The late President Roosevelt listened to a persuasive man in the White House on Oct. 11, 1938, two weeks after Poland was crushed, and got interested in atomic energy. Then with characteristic vigor, he brushed aside the hesitaitons of American scientists and officials, set the atomic project on its irrevocable course and pressed it forward in the historic climax that came at Hiroshima after his death.

At the 'early history of the world-shaking discovery unfolded today before the special Senate committee on atomic energy it was disclosed that an economist, not a scientist, was stage manager of the atomic drama. This economist, the man who drew back the curtain on nuclear fission for Mr. Roosevelt, was Mr. Russian-born Alexander Sachs, who served the President as an informal adviser. In the near background when the drama began to act stood Prof. Albert Einstein.

This distinguished physicist read a report of recent experiments a month before the outbreak of World War II and wrote out a prediction of an atomic bomb. He told Mr. Roosevelt that 'such a bomb, carried by ship, could destroy a port and the surrounding region.'

Watch Blessing, Not Scourge

In opening the first session of the Senate "Ruthe Committee" in the Senate chamber, Senator Brian McMahon of Connecticut, said atomic energy might well hold tremendous benefits to mankind, but the moment of testing was necessary to "keep it a blessing to mankind and not a scourge." He added that, specific legislation would not be introduced until all the facts were known. This was interpreted to mean the Senate committee would disregard the controversial antinuclear control bill, now before the House.

It was Dr. Sachs who told the story about Mr. Roosevelt to the committee, and he handed it his written record of the early events-a record interspersed with scientific papers and letters from to the White House. Among them was a letter Einstein had written seven years ago, when, in 1931, he told his colleague, Dr. Leo Szilard, that he had had a chain reaction from the fast neutrons emitted when uranium is split. By chain reaction they meant the splitting of a series of atoms, with the explosion of one atom setting off another until a large mass of uranium was converted into terrific explosive energy. And heat.

Dr. Sachs also told the President that the Fermi and Sillard experiments were only one step ahead of those of a number of physicists, Germany, France, and France, and had its source of uranium. Dr. Sachs said that he was writing to Professor Linus Pauling of California about the possibilities of using uranium in the United States.

Einstein Letter Quoted

"In the Einstein letter President Roosevelt read suggestions for developing and utilizing atomic energy and this provision of the use of atomic forces.

"In the course of the last four months it has been made probable through the work of the joint committee of the United States and France as well as Fermi and Sillard in America, that it may become possible to achieve a nuclear reaction in a large mass of uranium, by which vast amounts of power could be generated. Now it appears this could be achieved in the immediate future.

"This new phenomenon would also lead to the construction of bombs. This would be a weapon of mass destruction. It would end normal politics as we know it. It would be a new kind of armament."

Dr. Sillard's letter was delivered to the President on Oct. 11, 1938, with a letter from Dr. Einstein, Dr. Sillard's colleague and co-discoverer, to the effect that Einstein had written in every-day language: "Dr. Sachs had been dubbed the "economic Jeremiah" for his gloomy views and predictions on Nazi power and war. Yet here was the President, with the stress on the probability of harnessing atomic energy. On this he was able to present a more rational interest for America.

Dr. Sachs, who was also an economic forecaster, had foreseen the atomic age. He had been a member of a working committee on that subject. It was at one moment of hesitation, when some as yet unnamed early workers on the project thought atomic energy was a rather 'remote' thing, that Dr. Watson increased the technical basis for the demands of the committee. "But the boss \"wants it, boys,\" he told us."
Says FDR First Heard Of Atom Bomb in 1939

Washington, Nov. 27 (AP)—The late President Roosevelt became interested in the possibility of an atomic bomb as early as the autumn of 1939, a witness declared today in the first open hearing of the Senate Atomic Energy Committee.

The witness, Alexander Sachs of New York, said he carried the news of the latest scientific developments to the President. He said Mr. Roosevelt became very interested in the latest possibilities of nuclear fission.

After the conversation at the White House Oct. 2, 1939, Sachs said Mr. Roosevelt called in his secretary, Gen. Watson, and told him: "This needs action!"

Sachs, describing himself as an economic adviser and consultant, declared he served as an adviser to the President on various matters "without any label."

He said he informed the Chief Executive: "that I was convinced there was sub-atomic energy all around us and that it was our job to develop it, and see that it was not all used to blow our neighbors up."

He then quoted the President as having said: "Alex, what you're after is to see that the Nazis don't blow us up."

Chairman McMahon (D-Conn.) said his special Senate committee intended to proceed slowly in an effort to insure "that atomic energy becomes a blessing to mankind and not a scourge."
SPOKE OF ATOM TO ROOSEVELT
Sachs Tells Committee of Talks Late in 1939

Washington, D.C., Oct. 11-\-
Senator Sachs, Republican of New York, and one of the President's closest friends, declared today, in the first open hearing of the Senate Atomic Energy Committee, that the President expressed the utmost interest in the possibilities of a atomic bomb as early as the autumn of 1939. Sachs declared today that he carried the news of the latest scientific developments to the President.

The witness, Alexander Sachs, said that he carried the news of the latest scientific developments to the President.

He said that Roosevelt became very interested in the latent possibilities of nuclear fission.

After the conversation at the White House, October 11, 1939, Sachs said Roosevelt called in his Secretary, Edwin M. Watson, and told him: "This needs action."

Sachs, describing himself as an economic adviser and consultant, declared he served as an advisor to the President on various matters without any label.

Sachs said he long had been interested in theoretical physics, and was a friend of numerous scientists, including Dr. Albert Einstein. Acting as their spokesman, he arranged to apprise the President of the latest developments in uranium experiments.

URGED DEVELOPMENT

He said he informed the Chief Executive that he was convinced there was sub-atomic energy all around us, and that it was our job to develop it and see that it was not all used for blow our neighbor's heads off. He then quoted the President as having said:

"Alex, what you're after is to see that the Nazis don't blow us up."

Sachs said the possibilities of the atomic bomb were very much on the President's mind, and he left with him a copy of a letter written by Einstein on the subject August 2, 1939.
McMahon Digging Out Story of $2,000,000,000 A-Bomb Gamble

Einstein Told FDR

How Nazis Embargoed Czech Uranium

By ELIZABETH DONAHUE

WASHINGTON, Nov. 28—The story of how the most dramatic scientific development in the last century—the $2,000,000,000 gamble on atomic energy—became a reality in five years is slowly unfolding before the McMahon Special Atomic Committee of the Senate.

Alexander Sachs, an economist with Lehman-Bros., New York banking firm, who acted as a go-between in the initial stages of the atomic developments—bearing the news from the scientists to FDR—was the first witness.

Warning his listeners to "bear in mind how narrow has been the time" by which the U. S. won the atomic race, Sachs declared the U. S. had an initial advantage in the "response of freedom-loving scientists of other nations to the call of freedom."

On Oct. 11, 1939, Sachs went to President Roosevelt carrying a letter from Albert Einstein, warning that successful atomic developments in Germany posed a serious threat to the U. S. A.

The Einstein letter showed that the German six months earlier, when they overrun Czechoslovakia, had blocked the export of Czech uranium ores. It also pointed to the danger of an impending Nazi invasion of Belgium which might give the German control of uranium deposits in the Belgian Congo.

Despite FDR's official recognition of the urgent need for developing atomic energy for military purposes, the scientists who first brought the matter to his attention began immediately to sense the bureaucratic opposition which culminated in the recent introduction of the Army's May-Johnson atomic control bill.

Immediately following the meeting with Sachs the President demanded the appointment of a special committee composed of scientists and government officials.

Then came the first black period for the scientists who up to then could only predict that if a chain reaction to atom splitting could be achieved, the atom bomb might become a reality.

Meanwhile, between October, 1939 and May, 1940, they worked in oblivion apparently in an atmosphere of official skepticism.

"Dr. Lyman Briggs, head of the U. S. Bureau of Standards, was placed on the President's special committee in the Fall of 1939. Subsequently he turned down Sachs' recommendation that the more prominent scientists be permitted to sit on the committee. He did this in a wire to Sachs dated April 20, insisting that only three scientists and four government officials be allowed places on the President's atomic group.

The official attitude, Sachs told the committee, was one of "conservative hesitation."

A month later, on May 23, 1940, Sachs, convinced that the scientists had reached a crucial stage in their work, wrote FDR's aid, Gen. Watson, that the "matter of uranium is now charged with unpostponable urgencies and require immediate consultation with the President."

Less than a month later President Roosevelt set up the Office of Scientific Research Development headed by Dr. Vannevar Bush.

The Committee headed by Sen. Brien McMahon (D., Conn.) is determined to hear the scientists' side of the whole atomic development and to weigh the pressures and prejudices which reached their climax in the Army's May-Johnson Atomic Control bill.

Meanwhile, responsible sources on Capitol Hill predict that the current hearings may be suddenly interrupted by the introduction of a new bill that will have the tacit, if not the frank, support of the President and high Administration officials.
WASHINGTON, Nov. 27 (AP)—The Senate Atomic Energy Committee heard today that the late President Roosevelt called for "action" in October, 1939, on the research which produced the atomic bomb.

The statement came from Alexander Sachs, first witness in a series of public hearings expected to lead to legislation for control of domestic development of nuclear energy.

Mr. Sachs, a New York economic consultant, testified that he acted as a liaison man between a group of scientists—including Albert Einstein—and the White House. He said the scientists asked him to do so "because they had heard I was in a position to talk to the President." He explained that he had advised Mr. Roosevelt on electric power matters in 1936.

Eventually he said, he came to advise the President on various other matters, including not only the atomic bomb but "strategy." He said he did his advising "without any label," and claimed no official position at the White House.

A big man with a fringe of hair around a bald head, Mr. Sachs spoke rapidly and with hardly a moment's pause for nearly two hours. He brought two big black notebooks and flipped through them incessantly, citing a letter here, a memorandum there.

He said the President had told him he would have to serve as a kind of historian for the atomic project, as White House aids had too many other duties.

Mr. Sachs told the committee he formerly served as an economic consultant for Lehman Brothers, New York bankers, but withdrew from that position when his work with the scientists began to take most of his time.

His voice began to fade as he approached the end of his testimony, but he never took time out for a drink of water.

The "zig-zag" trail which led to the spending of more than $2,000,000,000 and the blasting of Hiroshima and Nagasaki, passed through the White House Col. 11, 1939, Mr. Sachs told the Senators. It was then, he said, that he informed Mr. Roosevelt of the work done by Drs. Leo Szilard and Enrico Fermi toward splitting the uranium atom.

Mr. Sachs said he told Mr. Roosevelt of German experimentation and that the Nazis had embarked the export of uranium from Czecho-Slovakia after seizing that country. After the conversation, he said the President called in his secretary, General Edwin M. Watson, and told him: "This needs attention."

"The potentials were very much in the mind of the President," Mr. Sachs said. "He said, 'Don't let Alex go without seeing me again.'"

Mr. Sachs said he left the President a letter from Dr. Einstein describing developments to date and urging that research work be pressed.

In opening the hearing, Chairman Brian McMahon, Democrat of Connecticut, predicted that atomic energy will affect every phase of life and declared that no time must be lost in dealing with the problems of control.

Major General Leslie Groves, head of the super-secret Manhattan project, is due to testify tomorrow. He will be followed by Dr. Harold Urey and other scientists.
To Mr. Alexander Sachs:

Thought you would like to see this.

November 30, 1945

Alexander Sachs

[Handwritten note:]

Very Much in the mail

Sachs trusted his aide Mr. Robert J. Brehm to handle a letter from the President asking for permission to discuss the matter of uranium research with the United Nations. In opening the letter, Chairman Vincent M. McNair, who was Mr. Brehm's brother-in-law, told him: "This was a delicacy." The letter from Mr. Brehm was addressed to the President of the United Nations and said: "I have written to the President of the United States, asking him to take the matter of uranium research into the United Nations. He has written to me from New York, saying that he would have to see me to discuss the matter further."

Smaller box notes:

Presidential adviser

F.D.R. SPEEDED

ATOM RESEARCH

SENATORS TOLD

Adviser Tells of Liaison Role for Scientists

Washington, D.C., Oct. 4-5

Secretary of War, Army and Navy, and Labor

R. W. SACHS

[Handwritten note:]

To Dr. Melvin Palti

Handwritten note:

November 30, 1945

Alexander Sachs
ECONOMIST GUIDED EARLY ATOM STEPS

Dr. Alexander Sachs, Before Senate Group, Reveals His First Talk With Roosevelt

GERMANS' STUDIES CITED

They Were Stimulating Factor In Efforts of Our Scientists to Get the Bomb First

By ANTHONY LEVIERO
Special to The New York Times

WASHINGTON, Nov. 27 — The President, Dr. Franklin D. Roosevelt, listened to a talk by Dr. Alexander Sachs, before the Senate Group, on Nov. 3, 1939, two weeks after Poland was invaded and had an interest in atomic energy.

With characteristic vigor, he brushed aside the hesitations of American scientists and officials, and set about stimulating their efforts to develop atomic power. With Dr. Emerick, the vocable course, and pressed it toward the historic climax that came at Hiroshima after his death.

At that time, the world-shaking discovery unfolded today before the special Senate committee on atomic energy. It was not a scientist, but a stage manager of the atomic drama. This economist, the man who pulled the curtain on nuclear-fission, was the Russian-born Dr. Alexander Sachs, who served the President at the White House.

In the near background, when the President began to act, Prof. Albert Einstein. This distinguished German, a reader of recent experiments a month and a day before the outbreak of World War II in Europe and wrote down a prediction of what would happen after atomic power.

Dr. Sachs, in his talk to the Senate Group, said that the scientific community would disregard the controversial atomic energy control bill now before Congress.

It was Dr. Sachs, who told the story about Dr. Roosevelt, to the committee, and he handed it a note on his own record interlined with scientific papers and letters from all over the world, including the White House. Among them were later the famous Sachs letter, which, to all intents and purposes, became the first atomic bomb letter.

The letter was a report, by the American physicist, Dr. Leo Szilard, recounting his own experiences with the famous physicist, Dr. Niels Bohr, in Copenhagen, and to Dr. Sachs, that he had predicted the invention of atomic energy, and that he, Dr. Sachs, would be the one to discover it.

Dr. Sachs, in his letter, said that Dr. Szilard discovered the source of energy in the Belgian Congo, and that he, Dr. Sachs, added that he predicted the invention of atomic power, but that he, Dr. Sachs, discovered it first.

He also added that the idea of atomic energy was not new, and that he, Dr. Sachs, had studied it in his own laboratory. It was a report, by the American physicist, Dr. Leo Szilard, recounting his own experiences with the famous physicist, Dr. Niels Bohr, in Copenhagen, and to Dr. Sachs, that he had predicted the invention of atomic energy, and that he, Dr. Sachs, would be the one to discover it.

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Atom Messenger Boy

By Peter Edison

The Senate adjourned Tuesday when a self-styled
committeeman named Alexander Sachs took
the witness stand and for two
hours refused to let go. In that
time he delivered a nonstop lecture
on the history of civilization
that was far deadlier than any
atomic bomb ever conceived.

The committee room was small
and crowded. The air was warm.

The cigars smoked by Chairman
Braden McMahon (D., Conn.) and
Sens. Tom Connally (D., Tex.)
were strong. Maybe it was the
atmosphere or not the first
atomic witness's testimony, but
in the interest of accurate reporting it must be
recorded that toward the end of the proceedings
Sen. Connally's lowest chin dropped to his vest
and his eyes closed. While Sen. Arthur Vandenberg (R.,
Mich.) propped his chin in the angle of his thumb
and first two fingers, and his eyes closed, too.

They were concentrating.

Anyway, when the quorum call came for the
Senate to file back to the floor of the Capitol at
high noon, Mr. Sachs still had five years to go.

He had got from his version of Genesis—"In the
beginning there was a political concept and a
moral concern."—up to June, 1940—which marked
the fall of Paris and the German occupation
by President Roosevelt.

Chairman McMahon tried several times to stop
the lecture, but Mr. Sachs paid no attention and
went on, blithely, one quotation from Exodus, St. John,
Clementeau, and the Irish poet, Yeats, and having
finished, he turned to something else.

It was his day and he enjoyed it
bravely, whether any one else did or not.

At one point he said, his role was to be a
"resonator" to the President's "idea. At another
point, Mr. Sachs called Mr. Roosevelt the best
"lawyer's going to be—too busy to be historian:"
"Pre-Waterston's going to be too busy to be historian.
You've got to be it."

At still a third point, Mr. Sachs said, he did not hesitate to be a glorified
message-bearer. Maybe that's what resinator and
historian mean—message-bearer.

Anyway, Mr. Sachs finally got a word in without
any one asking him, that he was the man who
wrote the first memo on atomic energy from
Albert Einstein to President Roosevelt. This was
in his name and it rates him right alongside Paul
Revere, the fellow whose name nobody can remember,
but who carried the message to Concord;
and the three other fellows who brought it to God news
from Ghent to Aix. Boy, page, Robert Hubbard and
two poets.

Mr. Sachs said to the Senators, "You gentlemen
are punch drunk from printer's ink.

The Senators all laughed at that. Printer's ink
isn't the only thing you can get punch drunk on.

Mr. Sachs told the Senators, "You gentlemen
are punch drunk from printer's ink."

The Senators all laughed at that. Printer's ink
isn't the only thing you can get punch drunk on.
by the House.

It was Dr. Sachs who told the story of Dr. Roosevelt at the dinner, and he had it written word of those early events as a nurse interpreted with scientific papers and letters from the White House. Among them was the case of Dr. Einstein's disease, from which he made the diagnosis of what Dr. Einstein had a clinical diagnosis of typhus, or a relapse of the pneumonia of the brain. The disease, which was first reported in 1914, was not recognized until by Dr. Bellard in the United States, where the disease was most common, and where it had been successfully treated in some cases. Dr. Sachs also told the President that the fact that the patients were affected with a nervous condition, and that he had published his findings with an advisory committee of the United States, where the disease was most common, and where it had been successfully treated in some cases. Dr. Sachs also told the President that the fact that the patients were affected with a nervous condition, and that he had published his findings with an advisory committee of the United States, where the disease was most common, and where it had been successfully treated in some cases.
ECONOMIST GUIDED EARLY ATOM STEPS

Dr. Alexander Sachs, Before Senate Group, Reveals His First Talk With Roosevelt

GERMANS' STUDIES CITED

They Were Stimulating Factor in Efforts of Our Scientists

by ANTHONY LEYBOK

WASHINGTON, Nov. 14—The late President, Roosevelt, revealed in a persuasive manner to the White House on Oct. 11, 1932, that he was interested in the atomic energy project. This interest was evidenced by his discussions of the project with Dr. Leonard Salz, a scientist who had been involved in early research in the field.

The late President's interest in the atomic energy project was revealed in a recent statement made by Dr. Salz. According to Dr. Salz, the late President had expressed interest in the project in 1932, at a time when the project was still in its early stages.

Dr. Salz, who is a physicist, has been involved in research in the field of atomic energy since the early 1930s. He has been a member of the team that has been working on the development of the atomic bomb.

The late President's interest in the project was also evidenced by his discussions with Dr. Salz on the subject.

In a recent statement, Dr. Salz said that the late President had expressed interest in the project in 1932, at a time when the project was still in its early stages.

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Sachs Becomes
'Paul Revere'
Of Atom Age

Self-Styled Economic Jer-

niah Leaves Senate Com-
mittee Bewildered

By Peter Nixon

WASHINGTON, D.C.—The senator's
chairman's desk he was working over
in the Senate committee room, the
chairman of the committee, Alexander
Sachs, took the floor with a
message not to be taken lightly.

"I wish to express my
disappointment in the way the
committee has been handling this
matter," he said. "I am writing
to you today to express my
disappointment in the way the
committee has been handling this
matter."
WASHINGTON, Nov. 29.—The United States has such a head start in the atomic-arms race, Maj. Gen. L. H. Groves asserted today, that no nation could ever overtake it "for all time to come—provided the rules are the same."

The rules, he told the Senate Atomic Energy Committee, are secrecy. Amplifying, he said: "If they have secrecy and we have secrecy, we'll be ahead."

An entirely different view of an atomic-arms race was presented by Nobel Prize winner Harold Urey, a colleague of General Groves in the development of the atomic weapon.

"We are making bombs and storing them," Professor Urey declared, "and thus are a threat to other countries and are guilty of beginning the atomic-arms race. If continued, it will lead to world disaster."

The University of Chicago chemistry professor took the position that atomic bombs must not be made by any country, or stored, for their place in the world "if we are to have any feeling of security on this all-too-small planet." He urged strict atomic control by the United Nations Organization.

General Groves, who favors continued production of the bomb, said that if the United States should share its atomic knowledge and know-how with the rest of the world, there is a likelihood that other nations will also do so "because they'll find out something they won't share with us."

General Groves estimated that it might be possible for another nation to produce an atomic bomb within 15 or 20 years if it did so in complete secrecy, although with help from the United States, Great Britain, and Switzerland (for fine machine tools and so on) the time might be reduced to 3 or 7 years.
**Man Behind the Atom**

By DEXTER TREAD

Dr. Alexander Sachs, who convinced President Roosevelt that the U.S. must back atomic energy research, must be rated as a major prophet. He has been predicting with remarkable accuracy for more than 15 years. That is why the man behind the bomb must be listened to when he speaks.

Today he is ready to tell what the discovery of atomic energy can mean to mankind.

"People should realize this is the challenge of our generation," he says. "We have to predicate more on what the discovery of atomic energy means before we can reach solutions. Disasters must precede preserving for the world.

"But for an understanding of the whole international political order solution is possible," Sachs said. "The United Nations meeting is the head, and speaks with feeling."

"The atomic problem transcends the limitations of nationalism. But the new idea that we have atomic energy first has prevented the reignitions of the doctrine."

What if Germany has a bomb? It is a matter of nationalistic solution is impossible. Unless we try it, it is not likely to be possible. If it is not, the result will be our destruction.

And this is what happens if a nation doesn't have atomic energy.

A gifted scientist, a man of world security, a man of stature in the technical language. He is a man of absolute simplicity in words and his words are so simple that they cannot be understood by the uninitiated.

It is probable that the establishment of a world council of atomic scientists will lead to the establishment of a united front of nations. It must be done by the world. It will be a matter of safety.

The future of the world will depend on the establishment of the world council of atomic scientists. The future of the world is in the hands of the scientists. The future of the world is in the hands of the scientists. The future of the world is in the hands of the scientists. The future of the world is in the hands of the scientists.
From: J. E. Pogue.

F. D. INTEREST IN ATOM TOLD

Washington, Nov. 27 (AP).—The late President Roosevelt became interested in the possibility of an atomic bomb as early as the autumn of 1939, a witness declared today in the first open hearing of the Senate Atomic Energy Committee.

The witness, Alexander Sachs of New York, said he carried the news of the latest scientific developments to the president.

After the conversation at the White House Oct. 11, 1939, Sachs said Mr. Roosevelt called in his secretary, Gen. Edwin M. (Pa) Watson and told him: "This needs action."

Sachs, describing himself as an economic adviser and consultant, declared he served as an advisor to the President on various matters without any label. Sachs said he long had been interested in theoretical physics and was a friend of numerous scientists, including Dr. Albert Einstein.
November 29, 1945

Dear Dr. Einstein:

As one who has had the privilege of collaborating with you in the evocation of President Roosevelt's interest and aid in the research which culminated in the atomic bomb, and hopefully the applications of nuclear energy to peace and welfare, I take the liberty, after deliberation, to endorse and reinforce the request of the American Nobel Center for your participation in the dinner scheduled for December 10th on "Winning the Peace." Fully realizing how numerous must be the demands upon your time and effort in behalf of causes and how consistently generous your responses have been, I would shrink from even the appearance of pressing you. But this does seem to represent a unique opportunity for making an appeal to the very Powers, Great Britain and the United States, in possession of the atomic bomb and atomic energy discoveries to rethink themselves of their obligation to the Jewish people. For the pyramiding pyre that the Nazis have so triumphantly made of Eastern and Continental Jewry presents the Christian Powers that have emerged victorious with a challenge of Atonement, so that the near vanishing remnant can, through rerooting in the recognized national homeland, become a "saving remnant."

The notable role that Jews have played in first perceiving the danger of Nazi acquisition and then laboring in the task of time-telescoped conquest of the weapon and the power source for the democracies constitutes another symbolic challenge to the major English-speaking Powers, whose moral ideals and political institutions have such deep roots in the religion and culture of the People of the Book.

It is therefore most fitting that you be the one to voice the cause of Jewry and Palestine at this forthcoming dinner and the conviction that the military victory can be translated into peace only if the wrong of the ages be righted.

I need hardly add that everything will be done to spare you all possible strain and burden, - ranging all the way from the physical accommodations of calling for and returning you to your home, up to the prompt submission to you of proposed suggestions and observations - particularly by Mr. Marvin Lowenthal - for inclusion in your talk. If direct attendance is out of the question, then the device that was used by Justice Frankfurter of telephoning his address could be followed.

Please do not hesitate to wire or telephone me (office telephone, Hanover 2-5590; residence 171 West 57th Street, telephone Columbus 5-2775) of your decision and of any ways in which I can be of use in this or in any other connection.

With kind and high regard,

Cordially yours,

ALEXANDER SACHS

Dr. Albert Einstein
Princeton, New Jersey
September 21, 1945

Dear Mr. Secretary Wallace:

There are still further reflections that I have accumulated during my vacation on the problems presented by the discovery and applications of nuclear energy that seem to me starred with an interest and value pertinent for the crucial and grave decisions that will have to be made by this Administration. It is in that thought that I beg leave to submit them to you.

1. First and foremost, the general concept of America's responsibility for evolving a right long-term policy for the use of the military weapon as an instrument of peace enforcement gains sharpness and emphasis by relating it to America's origination of the Kellogg-Briand treaties. That leadership in the renunciation of aggressive warfare as a political weapon places us in an anomalous position with reference to the possession and use of a weapon that is the archetype of aggression and surprise. Justice Jackson, as our representative on the war criminals trials, has given a new life and significance to the Kellogg treaties by making them the legal foundation for the trial of the participating leading factors in the war of aggression unleashed by Germany.

The totalitarian weapon of the atomic bomb presents manifold dilemmas, particularly to the United States as a democratic power with a definitely civilian-minded citizenry that has not yet acquired the habits of mind and the structure of institutions corresponding to and requisite for its weight and importance in the complex of material, military and correlative powers. The totalitarian weapon did not grow directly out of the nature of totalitarian war. Rather, as is implicit through the subdued presentation of my historical narrative of the inception and early history, the atomic bomb, which was barely completed this summer and thus contributed to foreshortening the war by the order of half a year, could not have been translated into reality, but for an act of organized political foresight on the part of politically-minded physical scientists and scientifically-minded social and economic scientists. Through this fusion and mediation, the great President at the helm of the United States perceived the potentialities; and after two-thirds of a year of the kinds of delays - due to the intractability of institutional habits - that might well have proved fatal, the trio of political physicists and scientific-politicians influenced the great statesman to establish a framework and a pace of operation for the prosecution of the project that led to success.
Now, it is this fundamental summary of what had taken place that must be placed in the perspective of the American and the western democratic processes. The very representative democratic institutions of the western democracies have, in respect to the use of instruments of aggression, combined with surprise, been at a disadvantage over against countries ruled by unitary executives that do not require advance consultation with and debate by representatives and diverse and divergent elements in the body politic and social.

Jumping intervening steps, your "illative" mind - to use Cardinal Newman's expression - will reach the conclusion that the totalitarian character of the new weapon threatens to obliterate the opportunity for the time-borrowing inherent in defense, and by imperiling the democratic institutions, with their delays and deliberations, renders imperative the task of making the weapon safe for us. That safety can only arise through a social invention involving a trans-national organization for the use of power as a reserve force, along the lines of my initial exposition to you.

2. Renan's remark that he wished he could write in polychromatic ink to encompass the qualifications requisite for certain statements, - that remark is particularly pertinent to the reaction voiced by some concerned with spiritual and moral values that the atomic bomb is a new danger to the human race. As against that, I would hold that the correct view is that the bomb is but another, albeit highly crucial, instance of the eternal ambivalence and conflict in human nature between good and evil. Totalitarian warfare has produced a totalitarian weapon. The peril from the new knowledge comes from the dualism in man's nature, which I need hardly say is the great deliverance and abiding truth of ethical religions. It is an essential condition of our existence that we can use the power of knowledge to destroy ourselves or to redeem ourselves. The new knowledge can lead to a climactic demonstration of what has been called "the soul death when a man's darkness comes from his own light."

But on variable scales of extent and potency this has obtained ever since man, in fulfillment of the divine urge within him, has been the inventor and the user of tools that he fashioned and of the resources of nature that he uncovered and redirected in spatial and temporal positions. Gunpowder was discovered and used not only for the destruction of man, but also for the blasting of rocks. The telescope has been a war weapon as well as the unveiling of the heavens. It has been the tool by which commanders have extended their vision and thereby the areas of military operations. It, like all the other instruments of vision, has aided navigation and the opening up of continents.

The list can, of course, be extended indefinitely all the way from the age - for converting materials to human use, or for hacking
human bodies to pieces—to steam, gas and electric power, to telegraphy and telephony, radio and radar. Going back over a half-century in the social-technological applications of an invention made a half-century earlier, when manufactured gas from coal was placed in homes and gas mains were spread through cities, a mere turning of a tap or tampering with the mains would enable an evil person to deal destruction to single or numerous individuals and small to extensive areas.

What has happened since is that we have come closer to the most fundamental of the secrets of nature. As a result, the very integration of the use of those secrets into the human and social fabrics of a technologically interconnected world has raised to a sort of nth degree the scope for evil and at the same time the scope for good. Safety devices have come along with inventions, but no safety device is fool-proof or evil-proof. In sum, then, the discovery and the use of nuclear energy is no new moral or spiritual problem—that is, no problem that in principle has not already existed in the use of material and mechanical resources and electronic energies.

5. There is another point of special import for those concerned with the right and moral use of power. The bringing of the researches on atomic power to what in the light of past patterns must be regarded as a premature birth itself shows the limited validity of the conventional distinction and controversies over pure vs. applied and the so-called disinterested vs. socially directed scientific research. In this connection, I would direct your attention to the enclosed clipping which condenses the Smyth Report. In the opening parts it is shown that the refugee scientists felt earlier and far more keenly than the native American scientists the need of pressurizing the research with vigor and speed. This gains sharpness from the account of the inception that I have myself given. The role played by my memorandum of March 10, 1939, which I am resubmitting herewith, may be summed up under this head: In the beginning was a political-ethical purpose evoked by the individual who played the part of intermediary for the scientists, for which end he made them the more articulate and provided the proper mise-en-scene for an effective presentation of the idea to the President. As Drs. Einstein and Sillard and the writer had a kinship of outlook and concern about the future of the world, it may be said with literal accuracy that in this respect they were political moralists first and scientists and economists second.

4. While space and time are lacking to develop this theme, it points the way to a reorientation on the traditional dichotomy between pure and applied science. The more one goes into the human histories of the leaders in the van of medical, scientific and related progress, the more it is borne in upon one that the great scientific advances
in western civilisation, in contrast with the limited character of ancient science, may to a considerable extent be due to the intervening spiritual and religious progress made by humanity. Even in the case of the self-styled agnostic scientists, their work could not have taken place but for the prior religious tradition and the accumulated cultural institutions inspired by that tradition.

As one who has made researches — even though not yet set down in published form — on the generative role of religious and cultural forces in and upon the course of scientific and social institutionalisms, I believe that, given time and opportunity, a cogent and indeed irrefutable case can be made out for the following theses:

(a) As against the earlier conventional histories written in terms of conflicts between religion and science, or laterally between capitalism and social welfare, western civilisation as it has taken form since the Renaissance and the Reformation has been molded and impelled by a uniquely variable and progressive synthesis of the transmitted and even transformed Christian-Hebraic-Hellenic traditions.

(b) As against the view of conventional historians that accord exclusive credit for science to the Hellenic tradition, I submit that our civilisation's transcendence of the cleavage between the theoretical and the practical, the ideal and the actual, and the correlative cleavages in Hellenism between classes and acquiescence in our institution of slavery, — this transcendence is due to the religious tradition and inspiration and the correlative discontent with the so far attained progress in translating ideals into reality. It is significant that the other religious traditions that have been operative in the world — from Buddhism, Shintoism to Confucianism, and to a large extent, Mohammedanism — have only in rare exceptions been similarly motivated and sustainedly directed; and in those exceptions interaction with Christianity and the Hebraic tradition; through the rediscovery and restudy of the original Bible, have played an influential role.

(c) The scientist-type of individual differs from the philosopher and the priest types of antiquity and the corresponding types of non-western civilisations and religions. For, while detached from mundane and practical affairs, he is motivated by the fusion of the theoretical and the practical, the personally contemplative and the community-promotive aims. His dedication is not to the study of nature for nature's sake and the finding of individuals' liberation from the troubles and perplexities of the world, but for adding to the sum total of the union of science and
human welfare that western scientists through the ages have represented as a community of secular saints.

In the light of these fundamental cultural postulates regarding our society, the accelerated development of nuclear energy for practical purposes must be regarded as opening up not merely a new frontier of the mind, but a new frontier on the interrelated fronts of political, economic and social action by and for our progressing civilization.

5. Thus envisaged, the atomic bomb dramatizes the complex of political, economic and educational issues dealt with in the released report of Dr. Vannevar Bush, "Science, The Endless Frontier." The accompanying tabulation based on included data throws into relief the need for making the intertwined pursuit and application of science and technology a more significant and more sustained factor in our national economy. Putting it in concrete terms, before the war total expenditures of all agencies - governmental, private-industrial and public-foundation types - have ranged between 2% and 3% of national income and have shown a tendency, particularly in the industrial allocations, to rise moderately with increased national income. During the war, expenditures under governmental auspices have, of course, risen very sharply and have themselves grown from a level of around 1% of national income in the prewar to 43% in the year 1944. Even if for the postwar we adopt the optimistic assumption that total expenditures on pure and applied science will aggregate the highest war-governmental expenditures and the highest prewar industrial expenditures, the combination would amount to 6% of the national income in 1944.

Now, the first problem presented to our society by the spectacle of the war-augmented expenditures and the war-induced acceleration of the birth of scientific applications is that a science-minded society needs a sustained upward trend in the investment share of its national income and resources for scientific research and its human applications.

This in turn calls for a revision of some of our concepts of the role of governmental solicitude for long-term national defense and national progress. The moderate and in part unsound, because far from adequate, program of the Bush report and the more sweeping, but in parts unsound, because still inadequate, program of the Kilgore Bill have led to the reemergence of an all too typical controversy on the antithesis of private initiative vs. governmental regimentation. The bemusement with that antithesis has played its part in the neglect of an opportunity to rationalize the Murray Bill. It is based on a sort of secular Calvinism that assumes the total depravity of man's uncontrolled political nature and the abounding grace of man's unregulated
economic nature. A salient instance of that type of thought was the argument of the great Joseph Choate before the Supreme Court of 1895 that the then proposed 2% income tax had "scattered to the winds the great fundamental principle of private property." Current instances of that type of thought are found in the vogue that has been built up among business and banking elements for the far from theoretically valid and the socially dangerous writings of von Mises and von Hayek.

The issue of making scientific research and scientific applications a major instead of a minor factor in our life challenges us to find a way out of such artificial dilemmas by creative thought and action in the realm of political economy for the sake of international peace and sound social and economic progress.

Here endeth the lesson as it may be encompassed in this letter, but still not the whole of the lesson that needs to be articulated in order that our leaders and our people act with that understanding heart and that generous sagacity needed for the present emergency, as it was needed and exemplified in the actions taken by President Roosevelt and the American people in lend-lease to Britain and its extension to Russia, and in the whole great moral strategy of the political conduct of our Allied relations during the war.

Sincerely yours,

Hon. Henry A. Wallace
Secretary of Commerce
Department of Commerce
Washington, D. C.
October 11, 1945

Dear Mr. Secretary Wallace:

Harking back to your letter at the end of last month, I desire to state that I had hoped that in the course of my visit to Washington in the closing week of the month I might be able to see you in regard to it and cognate matters. I since learned that you were on a trip that included attendance at the closing sessions of the Chicago conference.

In connection with your proposed request for correction of the deficiencies in the reports that have been issued by and under the auspices of the War Department, it would seem to me advisable to allude in summary form to a set of considerations which not only are necessary for providing a correct historical perspective, but also for a correct orientation towards the pressing policies of the present and the future. In the interest of effectiveness of presentation and in recognition of the pressures upon your own time, I will attempt to set forth my conclusions and leave for an accompanying or subsequent memorandum the supporting considerations.

1. The Smyth Report as well as the summary releases by the War Department to the press have relegated to the background and to a very large extent eclipsed the role of the President and his relationship towards (a) the civilian originators of the project and in particular the proponent and spokesman who continued in an advisory capacity to the President, and (b) the civil servants and the civilian agency within Government who aided the effectuation of his policy over a period when representatives of the military Services were initially opposed and later relatively indifferent to the project.

2. The overemphasis in these reports on the operational side and on the later stages, which date from 1945, contrast very markedly with the British White Paper entitled "Statements Relating to the Atomic Bomb." The British White Paper devotes the preponderance of its space and attention to (a) the background of the idea; (b) the initiation of governmental concern and the intermediary and catalytic role played by Lord Cherwell, who—apart from the permanent scientific supervisory tasks assigned by Mr. Churchill to him when he was still P. A. Lindemann, the professor of physics at Oxford—was, with respect to
this project, the analogue to the present writer; and (c) the vicissitudes of the project, including the disappointing delays on this side until (d) after the exchanges of missions and our entry into combat war, a pooling of British and American scientific thought and organisational-experimental procedures was effected, leading to (e) the integration of pilot plant and production stages on a magnified scale, which is the main subject matter of the Smyth and War Department Reports.

The Report's shortcomings in conceptual framework and in content have produced errors of omission and errors of commission. The main consequence of the errors of omission is that the originaive ideas and the processes of their adoption are lost sight of and their end-product, the plant construction and outward production, loses so large and springs forth as a sort of emanation from a self-activated interest of the Services in what was going on in the scientific laboratories. The true history, of course, is quite different: For in the beginning was the idea and the travail to incarnate the idea through the individuals who were infused with the convictions of the President and his advisers.

Notes: In this connection, if and when the time-scale of a full historic report be made to cover the periods from 1939 up to the launching of the plant construction - that is, to encompass the stages beyond the end of the writer's Special Report with the transfer of the project in June 1940 to the suggested and newly organized Committee for Scientific Research and Development - then it would be necessary to include adequate recognition for the contributions made not only by the refugee scientists, but also the contribution by a refugee technologist-businessman, namely Mr. Boris Pregel, who as an associate in Paris of the Union Minière du Haut-Katanga, had acquired great knowledge and effective skills which, when he came over here, were, according to information that had contemporaneously come to me, placed literally and efficaciously at the service of the university experimenters and later the governmental agencies.

5. The War Department reports, by their neglect of the origins, the struggle and the travail, leave the impression of a sort of linear progression from 1939 on. The deviation from the actual course of events that that represents could, if this
were the appropriate place, be proved by chapter and verse. All this has a forward as well as backward reaching significance. For the dominant note in my presentation to the President of March 10, 1939 was that it was incumbent upon the United States "to use the time-drafts that still can be made on the Bank of History for the preparedness ... that will become more and more urgent and inevitable for all members of Western Civilization as a result of past errors committed." And prospectively the dominant note that has to be struck is, in the language of my letter to you of September 21st "that the totalitarian character of the new weapon threatens to obliterate the opportunity for the time-borrowing inherent in defense and, by imperilling the democratic institutions, with their delays and deliberations, renders imperative the task of making the weapon safe for us."

4. The desirable fuller and juster picture of the checkered historic career of the project is also necessary for an understanding of the process by which democracy had to grope its way into a proper organizational framework for the effectuation of a task that was utterly unprecedented and beyond the capacities of not only business as such, but also the compartmentalised aggregations of separate and scattered university laboratories, governmental departments and technical divisions of the diverse business corporations.

For the incarnation of the idea into a body corporate, there had to be a realisation from the inception – along the lines of the exposition in my memorandum of April 20, 1940 (forming Exhibit 17 of the Special Report) of the new type of organisation of unification of activities and human instruments that could transcend the differences in the divisions and could telescope in space and in time what would otherwise have remained dispersed and successive, and thus prevented us from accomplishing the task in time.

Notes: In this connection, the services rendered by the Bureau of Standards and Dr. Briggs – notwithstanding the excessive burdens placed upon an understaffed and underfinanced Bureau and an overwhelmed grand old man – need to be accorded signal recognition. For without the co-ordinating efforts and continuous application to the effectuation, with all too limited resources, of the wish of the President, the project would have died in infancy.

This, too, has a most important bearing on the present and the future. For none of the bills
before Congress is at all adequate for (a) the proper organization of scientific activities under governmental auspices, or (b) the prosecution of peacetime and civilian discoveries and applications of nuclear physics. It is regrettable that the testimony given so far, inclusive of that of the scientifically trained administrators, has remained blinkered and cast in the mold of the prewar organizational concepts and mechanisms, and that neither the Administration nor Congress has seen fit to secure the leisurely and reflective evocation of the lessons of the atomic bomb project under prewar and war conditions for the necessarily altered and reoriented postwar.

5. The correct history can thus be a prelude to the corresponding creative act of adjustment of the atomic bomb and atomic energy to the ends of peaceful international relations and the perpetuation of the far-reaching economic and welfare potentialities. And for all this, Government and representative citizenship need to be utilized, lest both in the military and civilian applications we become victimized by Maginot-mindedness.

In sum, in contrast with the reports, I submit that the distinctiveness of the history is not the culminating stage of the technological production on unparalleled scale, but rather the telescoping – as distinguished from the established pattern – of the time-serialization of the stages of (a) theoretical experimentation, (b) slow-motion groping in numerous university laboratories, (c) cognate experimentation as a side-line to the other activities of institutions focused into applied science and technology, (d) then the organization of single or multiple pilot plant developments by corporations concerned in the main with promotion of established products, and finally (e) the launching of commercial production and that, in turn, on scales ranging from small to large.

With high regard,

Yours sincerely,

Hon. Henry A. Wallace
Secretary of Commerce
Department of Commerce
Washington, D. C.
OFFICE OF STRATEGIC SERVICES
WASHINGTON, D.C.

21 September 1943

Dear Alexander:

Thank you for allowing me to read your excellent report.

I look forward to the day when it may receive a wider audience than the privileged few. History deserves the full story of the Atomic Project. The nation is indebted to you for the catalytic function which you performed.

"We may never know by our beginning". How could the project have ended other than successfully when you - the drift intermediary between committee room, laboratory, and planning board - helped lay its foundations so well?

The report is returned herewith as you requested.

Sincerely,

William J. Donovan
Director

Dr. Alexander Sachs
72 Wall Street
New York, New York
21 September 1945

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The report is returned herewith as you requested.

Sincerely,

(sgd) BILL

William J. Donovan
Director

Dr. Alexander Sachs
72 Wall Street
New York, New York
Extracts from
NOTES ON THE
A.T.T. MEETING OF ECONOMISTS
September 28, 1945

General Ayres then asked Dr. Alexander Sachs if he would be willing to
depart from the usual conventions of our meeting and reveal to the group
insofar as he could the very extensive part that he had played in the develop-
ment of the atomic bomb. After much urging, Dr. Sachs said that as an amateur
he had been following physical research and before the war he had been interested
in helping refugee scientists and to the extent that he had savings he gave
them to bring such scientists to this country. In the 30s he reached certain
conclusions and became convinced that war was inevitable and that it would be
a different kind of war than those in the past. In the spring of 1939 an
article was published first mentioning the fission of uranium. The early
work done here in America on that subject was more important than that done
elsewhere in the world. It is impossible to do justice to the prewar work.
As a result of the publication of this article Dr. Sachs and a number of his
associates began to discuss the implication of the fission of uranium for the
war. It is to be noted that in its beginning it was a political concept
rather than a scientific concept that was motivating. The idea was evolved
out of this discussion that the American Government should have knowledge of
the developments with respect to uranium and should have a fostering influence.
It was urgent because America has a distinct disadvantage with respect to
weapons of a surprise kind. Totalitarian governments have a very great ad-
Vantage. On August 2, 1939, before the outbreak of World War II, a remarkable
letter to Mr. Roosevelt was written, signed by Dr. Einstein. Some time later
it was delivered to President Roosevelt by Dr. Einstein's friend, Dr. Alexander
Sachs, along with supporting scientific memoranda and data. Both Einstein
and Sachs believed that catastrophe hung over the human race and that in the
course of that catastrophe atomic energy would have a part. Dr. Einstein
pointed out the possibility of nuclear chain reaction in a large mass of
uranium, which if exploded in a port would destroy the whole port with some
of the surrounding territory. Mr. Roosevelt grasped the situation and it may
be said that the letter and the interview were the beginning of the atomic
bomb project well before the United States was at war. From then on the problem
was an awful one of convincing people. The native scientists were not in favor
of the project. However, on Nov. 1, 1939 a report was made favorable to the
project. It required that a small experiment be conducted in chain reaction.
Dr. Sachs reported that to his everlasting credit President Roosevelt grasped
fully what it was all about and instructed General Watson to act as liaison, and
asked Dr. Lyman Briggs of the Bureau of Standards to constitute a committee of
the armed services, a committee on which Dr. Sachs served as representing the
President. The experiment was conducted at Columbia on a small scale but
turned out astonishingly favorably with a result that the Briggs Committee was
able to recommend further action.

Throughout the early development the whole project was handicapped by
lack of funds, by the difficulty of persuading people and by the fact that the
thing itself could not be talked about except in greatest secrecy. It became
evident to Dr. Sachs that a bigger and better functioning organization with more finances was needed to take the place of the Briggs Committee and fortunately there was an executive scientist available with financing in the person of Dr. Vannevar Bush. Dr. Sachs recommended his views to the President, performed his own disappearance from the scene and that was the genesis of the National Research Defense Committee under Vannevar Bush which handled the $2 billion and produced the atomic bomb.

Dr. Sachs recounted some of the early disappointments including the failure to get hold of a supply of uranium in Belgium most suitable to the project which because of American dallying fell into the hands of the Germans. He referred briefly to a series of interchanges between this country and the British which resulted in most of the basic work on a pilot plant being performed in the United States before the United States entered the war.

Beyond this point in the development he said that he was not permitted to make further disclosures. He did, however, feel that it was appropriate to make certain observations. He noted that even though the bomb business was much further under way before we got into the war than most people dreamed of, the bomb was not completed until the very end of the war. This nation had the most time-borrowing of the nations at war and in modern warfare it is very hard indeed to engage in time-borrowing. The problem today is whether you are going to survive in the present, whether you are not going to survive in the future. We have the type of warfare in the world that gives you no time to prepare today. Totalitarian governments have a tremendous advantage in this sort of thing over the democracies. They normally and naturally concentrate the scientific aptitudes and energies within their countries into the development of surprise weapons. During this war many of the weapons which we later used were copied from the Germans. It was only through the wit of the President to perceive and the genius, the friendship, patriotism and the intelligence in a group of scientists not acting as scientists but acting in a political way that we were able to get the most original of all government projects under way, to get it ahead of the Germans and yet to get it done only as the war came to a close. The weapons of science are so potent and can be so new that there is no safety to be had in disarmament programs or in having control or inspection over and in other countries. The apparently peaceful airplane may in the future carry a few capsules by which the territory over which it flies may be left destroyed. We must most carefully consider the implications of weapons which are so thorough and instantaneous as to give you no time at all. This rears the problem which is now supremely important with regard to political and social structures. It raises the query as to what kind of government is required. The government may have to devise instruments of its own because the cleavage between pure and applied science has obviously vanished. Our own atomic bomb project illustrates perhaps for the first time the simultaneous carrying on of pure research, pilot plant and production plant. But having been done once, it becomes the model particularly for totalitarian states for the future. The role of scientists in economic life has vastly increased. We should bear in mind that the history of inventions, if we step outside of inventions in the industrial revolution and in the countries (democracies) where they flourished most, has been not invention for peacetime purposes but invention in the construction of weapons. The peacetime application has followed the weapons' perfection. It is possible that this war has restored the historical patterns, for it has demonstrated that science, for a while the source of peacetime invention, can also be drafted and must be drafted as a source of invention for war.
Dear Dr. Einstein:

Mindful of our close collaboration in 1939 and 1940, through the mediation of Dr. Szilard, I desire to transmit for your own records copy of a report which I prepared for a Cabinet officer synthesizing on the basis of contemporaneous memoranda that I kept the presentation of the project to President Roosevelt in October, 1939 and the ensuing developments up to the establishment by the President, in accordance with suggestions submitted, of the special Committee on Scientific Research and Development. I am also enclosing copy of a message sent on September 7th to the conference convened by my friend Raymond Swing, embodying some considerations as to the altered world situation and the opportunity for leadership presented to the United States.

With high regard,

Sincerely yours,

Dr. Albert Einstein
Princeton, New Jersey
June 8, 1944.

Dear General Watson:

When I was with the President this morning, I got one copy of the enclosed memorandum initialed by the President but overlooked the fact that two copies were initialed by Mr. Churchill and, therefore, copies need the President's initials. I am, therefore, sending you one copy by hand with the request that the President initial it in order that the records of both Great Britain and this country may be complete. If you will send it back to me when it is completed, I will greatly appreciate it.

Sincerely yours,

Henry L. Stimson
Secretary of War.

Major General Edwin M. Watson,
Military Aide to the President,
The White House.
Collaboration between the Authorities of the United 
States of America and the United Kingdom in the 
matter of Tube Alloys.

We hereby appoint Sir R.I. Campbell, K.C.V.O., 
to succeed Colonel the Rt. Hon. J.J. Llewellyn, C.B.E., 
M.C., M.P., with effect from the 10th December, 1943, 
as a Member of the Combined Policy Committee which was 
set up under the Articles of Agreement governing 
collaboration between the Authorities of the United 
States of America and the United Kingdom in the matter 
of Tube Alloys; which were approved by us on the 19th 
August, 1943.

\[\text{Signature}\]

S/ W.S.C.
THE SECRETARY OF COMMERCE
WASHINGTON 25

September 20, 1945

Mr. Alexander Sachs
72 Wall Street
New York 5, New York

Dear Alexander Sachs:

Enclosed is a proposed letter which I intend sending to Secretary Patterson. Do you have any corrections or additions to make?

Sincerely yours,

H. A. WALLACE

Enclosure
Honorable Robert F. Patterson  
Secretary of War  

Dear Secretary Patterson:  

I received recently a letter from Secretary Stimson dated September 13, 1945, with regard to the early history of the atomic bomb in 1939 and 1940.  

After studying the Smyth Report and also the material submitted to me by Alexander Sachs, I cannot help reaching the conclusion that the Smyth Report does not do justice to the part played by President Roosevelt and those who stimulated him to action on October 11, 1939. Neither, it seems to me, is sufficient credit given to the part played by Dr. Lyman Briggs in the latter part of 1939. When the permanent record is prepared, it seems to me these deficiencies should be corrected.  

Sincerely yours,  

H. A. Wallace
THE SECRETARY OF COMMERCE  
WASHINGTON 25  

September 18, 1945  

Mr. Alexander Sachs  
72 Wall Street  
New York 5, New York  

Dear Alexander Sachs:  

Enclosed is copy of a letter I received from Secretary Stimson. I haven't written him in reply, but from what I have seen of the Smyth Report there is no adequate recognition of the part which President Roosevelt played under the stimulus of you and your friends.

Sincerely yours,  

File Wallace  

Enclosure
COPY

War Department
Washington

September 13, 1945.

Dear Mr. Secretary:

The material transmitted by your letter of September 7 does indeed present a dramatic story. As you doubtless know, the early stages of the development of the project with which this material deals has been covered in the Smyth Report. I am retaining the documents to be put with the official files on this subject.

Sincerely yours,

(signed) Henry L. Stimson

Secretary of War.

Honorable Henry A. Wallace, Secretary of Commerce.
Commerce Department
Washington, D.C.
December 7, 1945

Dr. Mordecai M. Kaplan
c/o The Society for the Advancement of Judaism
15 West 86th Street
New York 24, N.Y.

Dear Dr. Kaplan:

The following is a brief resume of the conference I had with Dr. Einstein - the full details of which I will give you at another time.

"..."

Those who have indicated the ability to search and seek after truths unbound by dogmas and traditions should be engaged to attack and solve these problems such as was done to produce the atomic bomb and is now being done to find a cure for cancer.

"..."

He indicated his anxiety to serve with this group to produce the foregoing but - HE WOULD HAVE TO BE ASKED - FIRST -

As to whether a world or England would respect the combined efforts and results of such a group he commented: "A state no larger than a Jewish State with knowledge of the formula for the atomic bomb could scare the British Fleet to the bottom of the ocean."

"..."

In order to remind each Zionist of his daily task a small white parchment containing the four portions of the law, inclosed in a red mezuzah with a blue Star of David background be attached to the doorpost of every home that is completely Zionist, namely, where each and every member of the household over the age of 15 is a member of some branch of the Zionist Organization.

That a complete boycott, socially and economically, be adopted by Zionists against all Jews who are either non-Zionists or Anti-Zionists.

"..."

As an example, the local situation could be improved if competent leaders (not necessarily Rabbis) were placed in charge of the following Departments to effectively function in a manner indicated by the title:

(1) Executive Department. (The type of leaders and leadership Herzl referred to in Altneuland.)

(2) Educational Department. (In conjunction with a publicity and propaganda division that would know how to drive the story of Zionism home in a simple manner capable of reaching the level of intelligence of those for whom it is intended.)
(5) **A Police and F.B.I. Department.** (To deal in a proper, militant manner, if necessary, against non-Zionists and Anti-Zionists.)

(4) **A Jewish Commonwealth Office.** (Whose purpose it would be to protect the Jewish State established by the Mandate in a manner comparable to the methods used by the British Colonial Office to destroy it.)

(5) **A Public Relations Department.** (Staffed with diplomats that would know how to deal with men in public office and public opinion.

(6) **A Legal Department.** (To protect the rights of Zionism under national and international agreements.)

Some of these Departments exist at this time in name - and name only. Under Einstein's plan there will be little or no room for picture taking or the personal aims, ambitions and exploitations of those who now occupy positions of trust for which they are not suited.

................

Yours very truly,

SG. A. Dann
November 21.

Mr. Alexander Sachs,
1 South William street,
New York City.

Dear Sir:

I am the Baltimore Sunpaper reporter who called you by telephone last week to ask about the truth of a reported incident in connection with the early development of the atomic bomb.

This incident had to do with the reportedly unsuccessful efforts of a foreign-born scientist to interest either Army or Navy in atomic energy for military purposes. Later the scientist was reported to have visited Einstein, and then to have called upon you.

In our telephone conversation you referred me to the Smyth report. After looking into this report I have concluded that the story in which I am interested probably is contained in 3,4 (Pages 46 and 47), and that the scientist probably was Professor Enrico Fermi.
As I first heard the story, the scientist who approached the Army and Navy received the brush-off. But the Smyth report does not indicate that Professor Fermi received any such treatment. And since my conversation with you, I have also talked by telephone with Dr. Pegram at Columbia. He tells me that he knows nothing about Fermi or any other scientist being slighted in this connection.

I was particularly interested, when I called you, in obtaining a detailed account of the manner in which the Army and Navy had been approached on the proposition of atomic energy for military purposes. After talking with Dr. Pegram and reading the Smyth report, I am of the opinion that the story has been pretty completely told.

But I would be glad to have your opinion on this.

Yours truly,

Lee McCandless.

Lee McCandless.
Dear Leo:

I should very much appreciate your comments on the enclosed clipping of an article by John J. O'Neill in Sunday's New York Herald-Tribune, setting forth some hypotheses regarding the atomic bomb as a weapon of naval warfare.

As a mere lay student, I should like to ask whether account need not be taken of certain recent researches regarding the presence in water of radioactive elements.

I should also be particularly interested in your reaction to Mr. O'Neill's views as to the greater vulnerability of submarines than surface ships, apart from the fact of the lesser detectability of submarines to the attacker.

With kind regards,

Cordially yours,

Dr. Leo Szilard
1155 East 57th Street
Chicago, Illinois
September 5, 1945

Dear Gustl:

As the initiator of what might be called the pre-history of the project through your introducing Dr. Sillard to me, I desire to make available to you, for your strictly personal perusal, an historical account of the early phases of the work on the atomic bomb which I prepared for a Cabinet officer. Accordingly, I am enclosing herewith copy of the report entitled "Early History Atomic Project in Relation to President Roosevelt, 1939-40," August 8-9, 1945

That report excluded from its purview all matters even bordering on the present technical features. Rather, it focused on (a) the procedure by which the idea - after having been presented to and accepted by the President - was converted from a possibility into a concrete project, and (b) the fostering guidance by which an appropriate organizational framework was established for its prosecution and effectuation.

The contemporaneous record that the writer kept encompassed not only the facts but the now scarcely recapturable meanings that were attached to them; and so the periodic synoptic views submitted by him served as a catalyst for the very desired vital change in scope and tempo of the work on the project.

Thus the report may be regarded as a laboratory test of the continuing need by our society, in economic and political policy-making, of organs of reflection for the sake of better direction of the historical flux. For as the late Justice Holmes observed, echoing Spinoza, one of "the modes in which the inevitable comes to pass is through effort," - including the effort at insight and perspective on current "historification."

I should appreciate your returning this document to me at your early convenience.

Sincerely yours,

Dr. Gustav Stolper
52 Wall Street
New York City
August 23, 1945

Dear Mr. Secretary Wallace:

Thank you for your kind note of August 21st.

As implicit in the present phase are the questions of correcting the inadequacy in the published accounts and, equally importantly, according such recognition to the part played by the Bureau of Standards as will serve to dramatize the scope for leadership by Governmental agencies in the interrelations of science and national welfare, I believe you will be interested in an amplification of the second page of my letter to you of August 10th.

As you will note from that letter, the unavailability to the publicity people of the War Department of an orientation on the early history of the project - that they would have secured had President Roosevelt been alive - led them to leave an enormous gap between the very origins - in respect to which those who introduced the project to President Roosevelt are referred to merely anonymously - and the establishment in mid-1940 of the Committee for Scientific Development headed by Dr. Bush.

Those who had an opportunity to see the large report prepared by Dr. Smyth - already out of print - tell me that in that report the gap is not so large because the names and dates connected with the initiation of the project are set forth therein. But it would seem that there is lacking not only perspective, but articulation of the services that were rendered by the Bureau of Standards as well as the initiators, so that the periods corresponding to what one might call the infancy and adolescence of the project encompassed between the summer of 1939 and the summer of 1940 remain a comparative blank, even in the full-length history prepared by the War Department.

Without trying at this point to review what was presented in the special report sent you for submission to Secretary Stimson and consequential action, it may be worth while to etch in certain salient features of that report.

In the months before the outbreak of the war in 1939 a trio composed of Dr. Einstein, Dr. Leo Szilard and the writer literally together spelt out the broader scientific significance and social implications of the new advance in nuclear research that was made at Columbia University by Dr. Szilard and Dr. Fermi working as an experimental team. By a leap of thought
we overcame the hesitations and cautions entertained by Dr. Fermi — as set forth on pages 1 and 2 of my review-memorandum of April 20, 1940, forming Exhibit 17 of the material sent you. We thus reached the conclusion as to the probability of the establishment of a chain reaction or a cumulative process in fast, as distinguished from slow, neutrons, which meant that an atomic bomb could be within reach of attainment. Then, concerned as we were over the prospect of war outbreak and the probability of initial Nazi victories — the present writer's interpretation of the period being embodied in the memorandum of March 10, 1939 forming Exhibit 1 — we not only concluded that the President must be advised, but also evolved a program of action for accelerating the research in this country, for collaborating with scientists in Great Britain and France, and for creating conditions of secrecy so that there would be no leak to the enemy of civilization of the progress being made on this side. We had to await a clearing by the President of the then insuperable obstacles presented by the neutrality legislation before I could secure his attention under conditions permitting the right presentation and articulation of the far-reaching significance of the incipient research. Thanks to the opportunity accorded by the President at the conference at the White House of October 11, 1939, a liaison was established with General Watson, and an inter-governmental committee was formed under the chairmanship of Dr. Briggs, Director of the Bureau of Standards, Lt.-Col. Adams for the Army, and Commander Hoover for the Navy. The non-governmental people selected by the President to serve as the coordinators were Dr. Einstein and myself. But as Dr. Einstein, on account of shyness and varying health, could never attend, I deemed it necessary that someone be added, and suggested Dean Fagym, the head of the Department of Physics of Columbia University, by reason of his administrative importance for the work pursued at Columbia.

From then on the task was three-fold: First and foremost was to stimulate and accelerate the governmental group to give its approval of the project. It is to the shining credit of Dr. Lyman Briggs that he was able to get this committee to authorize and accord approval in his report of November 1, 1939. The second task was the reconnaissance of the types of research that were then deemed pertinent and the determination, so to speak, of a schedule of priorities. Third, and as the goal, the securing without delay of the necessary financial aid for the prosecution of the Columbia research that in the opinion of the initiators of the project was deemed to be at once most crucial and most promising. For at the time, the eminent academicians from the outside who were brought into the circle of confidence were more eager for a distribution of aid to all
sectors of the field than concentration of financial support. It is in connection with the latter two tasks that Dr. Briggs's aid was so notable and so decisive. Parenthetically, this setting of the problem — alluded to in the penultimate paragraph of my letter of August 10th — has a far-reaching bearing on the relationship of Government to scientific research, in that, to put it at the very least, there is urgent need under our system for not merely coordination against centrifugal tendencies in university research, but provision of organs of unification and focusing of national will on national urgencies in scientific progress connected with national welfare.

Reverting to the body of the report, from the spring of 1940 on and the successive unfolding of the Nazi aggressions over the Continent it became poignantly clear to the writer and his colleagues that the indispensable condition for the effectuation of the project was to lift it out of the slow-motion configuration in which university research is embedded, as contrasted with commercial research — described in the already noted memorandum of April 20, 1940. Hence the labors of the second quarter of 1940, as fully documented in my report and exhibits, were focused on the establishment of a Scientific Council for National Defense. In the early phases where the Government appropriations were so inadequate, the provision of funds for the graphite experiment that was so crucial was a great and most desirable contribution, that again was canalized through the Bureau of Standards. But the financial requirements had to be so very much larger. The incidental information that came to me of the interest evinced by the Carnegie Institution and its Director, Dr. Bush, reinforced my convictions regarding the advisability and the necessity of the establishment of a new organizational instrument by the President. This was finally effected by the Presidential action of June 15th, 1940, as recorded in the report and exhibits.

Mindful of your participation in the policy committee that had been appointed by President Roosevelt and of your present relationship to the Bureau of Standards, it has been my desire to make available to you this and the prior material in furtherance of such effort as you might be making in the way of representations to Secretary Stimson regarding the needed revision and reorientation on the historical origins and the initial development of the project.

Sincerely yours,

Hon. Harry A. Wallace
Secretary of Commerce
Department of Commerce
Washington, D. C.
CONFERENCE WITH WALDO COHEN

I.

1. In the administrative level, the important figures were Bush, Conant, K. T. Compton. In the second, or the creative scientific level, it was Urey, Fermi, Wigner, R. J. Oppenheimer, S. K. Allison of Chicago, Teller, A. H. Compton, and Leo Szilard.

The first group worked very closely with the military and was in a sense part of it. The third group, or the mass of individual scientists, was made up as follows: In the Oak Ridge, Tennessee, Project, there was the Clinton Laboratories, which had 200 scientists. Under the auspices of Columbia University there was the Manhattan District Project of about 200. In Chicago there were the Metallurgical Laboratories, with about 100. Then there were small groups at Iowa State, and at Berkeley, California, or the Lawrence group.

These groups were very much bound by the restrictions imposed by the military. The restrictions were so great that a common saying was that "all of us had to break the secrets in order to get our work done." At Oak Ridge the military took charge in the middle of 1945.

2. The associations which had been formed are built around the scientific groups in the various projects. First there was the Association of Los Alamos; second, the Association of Oak Ridge Scientists at the Clinton Laboratories; then the Atomic Scientists at Chicago; and finally, the scientists in the Manhattan District. All these groups are now concerned over the political and social implications.
II.

Some of the radio-active materials which occur or can be made in existing units will aid biology and medicine in the investigation phase and in the therapeutic phase.

Even before the discovery of the atomic bomb there had been a great deal of work on what is called radio-active tracers.

For example, at Oak Ridge one of us wanted to know whether in an automobile there was a leak from the cooling system to the combustion system of the engine. How can one tell that the water coming out of the exhaust pipe came from the cooling system? He put in the cooling system a little radio-active sodium and then tested the exhaust pipe with a Geiger counter, a device for measuring radioactivity. If he found radio-active sodium in the exhaust, it proved where the leak occurred.

This has also been used in medical diagnosis to detect the percentage of phosphorus going into the bone by putting a little radio-active stuff in the blood and the excreta. The basic thing about the tracer is that chemically it cannot be separated from the thing it traces. It can also be used as a therapeutic agent.

In industry, to detect the efficiency of what is put in in terms of what is gotten out, all you need to do is to add a certain amount of radio-active sodium at the input end and measure the radio-activity of the final product. The ratio of input to the output in radio-activity will indicate the efficiency.

III.

1. In respect to power, Oppenheimer and also Allison have thought that that was the next thing. Both the pilot plant at the Clinton Laboratories and at Hanford Engineering Works in Washington may permit that. For there the plutonium piles are producing power, but the power is not in usable form, because it is not equipped to run at high temperatures.
The plutonium piles at Hanford Engineering Works are raising the
temperature of the Columbia River noticeably. The plutonium piles at Hanford
are producing power of the order of 100,000 k.w. At the Clinton Laboratories
there is consideration of building different piles for power. It is thought
that there could be produced what are called *breeders* - that is, they will
produce more of the material - the uranium or plutonium - than is used up.

2. As to the immediacy, the experimentation with other
materials would be thorium. Silicon is remote. If it is made to work, we
would have an inexhaustible material.

The main thing is the possibility of cheap isolated power plants
without connection with a resource fuel like coal. It will not be necessary
to feed enormous quantities of the raw material, like coal, and bring the coal
over long distances, with the freight charges.

Such a power plant could be started in the Nevada desert. The Great
American Desert starts from New Mexico and goes to Canada, and covers the states
of Washington, Oregon, Idaho, Nevada, Arizona and New Mexico. The Imperial
Valley of California would be a desert without irrigation.
Later on, there were all kinds of difficulties about getting the supply to which I referred. In the following year there was another refugee, an industrialist engineer, by the name of Pregel, who made available very valuable supplies to Columbia University for the experiments of Dr. Szilard and Professor Fermi, for which he was thanked by Dean Pegram.

Following those discussions, I broached the problem of the supply of uranium for the United States.

I pointed out that the biggest supply of uranium was in the hands of the Belgians. I pointed out that even if they sent it to France, it would not come to us, that we had to open diplomatic negotiations.

Incidentally, that industrialist I mentioned, Pregel, who at that time was in France and was a French citizen, had asked his own government to make arrangements with the Belgians and he had asked it in 1939.

That prescience on the part of these refugees, gentlemen, was operative because they were united by a political sensitivity along with their respective expertises as scientists and technologists.
Extract From

Paper by Dr. Arthur E. Morgan Entitled

"The Prussian Bird in the American Nest"

... Then there comes the atomic bomb. Alexander Sachs, who was directly effective in bringing the atomic bomb project to the attention of the President, states that both the army and the navy opposed the project (though two individuals in the service were interested). This most powerful of all military forces, therefore, like so many other concepts requiring ranging imagination, would have been lost if the West Point and Annapolis judgment had not been overruled by an imaginative President, with the encouragement of the civilian head of the U. S. Bureau of Standards, Lyman J. Briggs, who did see the possibilities.

Mr. Sachs holds that such limitation is not the characteristic of the military mind alone, but of the highly specialized mind in general.
In Berlin, back in the early 1920's, I came upon something I thought the most irrational conduct I could well imagine. It was a mass meeting, held in the hall of the Philharmonic, to protest against the theory of relativity of Dr. Albert Einstein. The meeting was crowded, and, as I recall it, was addressed by at least one fairly reputable scientist. The purpose of the meeting, of course, was anti-semitic, and the intention was to disparage the scientific work which had already won world-wide notice and acclaim for Dr. Einstein. I simply could not understand how anyone in his right mind hoped to prove that the theory of relativity was wrong by declaiming against it in a mass meeting.

As early as 1905, Dr. Einstein clearly stated that mass and energy are equivalent. He also stated that this equivalence might be found by the study of radioactive substances. He set down his formula, E equals mc, perhaps the most startling and far-reaching assertion of its kind ever made. For it says that energy is the equivalent of mass, multiplied by square of the speed of light. To put this statement into numbers, and quoting the Smyth report, one kilogram of matter—just over two pounds—if converted into energy, would give 25,000,000,000 kilowatt hours of energy, or as much as is generated in nearly two months by the entire electric power equipment of the United States. So scientists have been familiar with this concept for a long time. Some of them accepted it as probably true, but undemonstrable. Some dared to believe that one day atomic energy would be unlocked and give man the use of power beyond his most fantastic dreams, since he then could wield the basic power of the universe itself.

I am not going into the history of the development of atomic research. I do wish it could be made simple and could be grasped by everyone. For unless the mind fathoms at least a little of the depths of meaning of man using atomic power, there can be no wise political action which makes that use safe and beneficial.

HISTORY OF ATOMIC BOMB

But tonight I am going to tell a little of the history of the development of the atomic bomb which has not been more than referred to in the government release on the project.

It brings me once more to the name of Dr. Einstein. The mass-meeting in the Philharmonic in Berlin had not affected the theory of relativity, but the organized bigotry behind it had led the great physicist and mathematician to go abroad, and finally to take up his home at Princeton. And there, on August 2, 1939, just a month before the outbreak of World War II, he wrote a remarkable letter. It is not as remarkable as that formula that E equals mc. But it is the letter that appropriately led to the development of the atomic bomb and the demonstration of the validity of the formula. So it was a step to the expansion into another dimension of the power available to the human race.
This letter was addressed to "P.D. Roosevelt, President of the United States, White House, Washington." It starts with the sentence: "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."

ALEXANDER SACHS VISITS ROOSEVELT

It happens that this letter did not reach President Roosevelt until after the outbreak of war. It was not posted to him. It was taken to him, along with scientific memoranda and data, by Alexander Sachs, of New York City. Mr. Sachs is one of the most brilliant of living economists. He also is a noted student of world affairs, and one of the most brilliant analysts of them. And he is a friend of Dr. Einstein. Both he and Dr. Einstein believed in August, 1939 that catastrophe hung over the human race, and that in the course of that catastrophe atomic energy would have a part. They felt they must bring the latest news of atomic research to the knowledge of the President in the cause of national defense.

Let me quote another passage from Dr. Einstein's letter to President Roosevelt. "In the course of the last four months it has been made probable," he stated, "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 achieved in the immediate future." Dr. Einstein went on: "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."

This was a few months after Hitler had seized Prague, and Dr. Einstein told the President that Hitler theretofore had stopped the sale of uranium from the Czechoslovakian mines. This action, he suggested, was linked with the fact that the son of the German Secretary of State von Neurath was attached to the Kaiser Wilhelm Institute in Berlin, where some of the American work on uranium was at that time being repeated. Dr. Einstein recommended that the President appoint someone on his behalf to keep government departments informed of developments, who also could give attention to obtaining a supply uranium for the United States, and that experimental work in this country should be speeded up.

With the material Mr. Sachs took to President Roosevelt on October 11th, 1939, was a memorandum by the physicist Szilard, one of the men whose work at Columbia had brought uranium research to the brink of culmination. His statement reported that investigations so far had been limited to chain reactions based on the action of slow neutrons. "At present," he said, "it is an open question whether such a chain reaction can also be made to work with the fast neutrons which are not slowed down. There is reason to believe," he continued, "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." I hardly need to interpolate that the fast reactions were made to work, which is the secret of the atomic bomb as it finally was used.
BRIGGS COMMITTEE SET UP

To his everlasting credit, President Roosevelt grasped fully what he was told, instructed his aide, General Watson, to act as liaison in the matter, and asked Dr. Lyman Briggs of the Bureau of Standards to constitute a committee of the armed services, a committee on which Mr. Sachs served as representing the President.

There were tedious delays before the atomic project was to be turned over to the entirely new National Research Committee under Dr. Vannevar Bush, which brought the bomb to reality. Of the several physicists consulted, some were anything but sanguine of success. Dr. Einstein and Professor Szilard were the ones most outspokenly confident that results could be achieved. A preliminary experiment at Columbia had to be waited for. It was on a small scale, but it turned out astonishingly favorably, so the Briggs Committee was able to recommend further action. But, in the meantime, priceless months were dribbling away, and the Germans were working with all scientists available to them on uranium.

Our Navy Department put up $6,000 to buy some materials. And another memorandum about atomic power by Professor Szilard spoke of the possibility of driving battleships with atomic engines. If only slow neutrons were utilized, a ton of uranium, he said, would equal 3,000 tons of oil; if the fast neutrons could be utilized, one ton of uranium would equal 300,000 tons of oil. A battleship with such a reserve of energy could stay away from fuel resources almost indefinitely.

On March 7th, 1940, Dr. Einstein felt the need for greater haste. This was during the "Phoney War" period, with the invasion of the western democracies imminent. "Since the outbreak of the war," he wrote, "interest in uranium has intensified in Germany. I have now learned that research there is being carried out in great secrecy and that it has been extended to another of the Kaiser Wilhelm institutes, the Institute of Physics." Dr. Einstein spoke of the need to keep scientists in the democracies from publishing their work on setting up a chain reaction in uranium. Dr. Szilard himself had written up a method for setting up the chain reaction. Later the effort was made to have the physicists in the democracies withhold their work from publication, so as to keep news of it from the Germans. The British agreed, but because one manuscript already had been inadvertently published, the French balked. Later of course, this research became the top secret of all top secrets.

PROJECT EXPANDS.

The war itself was to bring pressure on the project at this stage. By April 27th, after the invasion of Norway, the Briggs Committee was ready to recommend further action, as the doubtful Thomases among its members became much less doubtful. On May 10th, the very day of the German invasion of Holland, Belgium and France, the four chief Columbia University scientists, Fermi, Szilard, Pegram and Urey, were ready to plump for a large-scale experiment, that would cost anything up to half a million dollars.
And so it became clear that a bigger and better functioning organization was needed to take the place of the modest Briggs Committee. Mr. Sachs recommended his views to the President, and that was the genesis of the National Research Defense Committee under Vannevar Bush, which handled the $2,000,000,000 and produced the atomic bomb. Naturally what this committee accomplished is the main part of the story. But before this could be done there had to be a chain of actions, which in the field of government can be as difficult to assure as in treating the atoms of uranium. Genius, friendship, and patriotism, and in the President, the intelligence to know what it all could mean, had to combine to get the most original of all government projects under way.

To come back to that anti-Einstein mass meeting in Berlin, indirectly it served this country, fabulously, as did the tyranny in Germany and Italy, in bringing us the services of great scientists whose joint efforts produced the release of atomic energy.