Forgotten Creators of the German Atomic Bomb

Dr. Todd H. Rider thor@riderinstitute.org

riderinstitute.org/revolutionary-innovation

2 June 2025 Bad Honnef US-German WE Heraeus Seminar

The American and the German Atomic Bomb Projects and Their Legacies

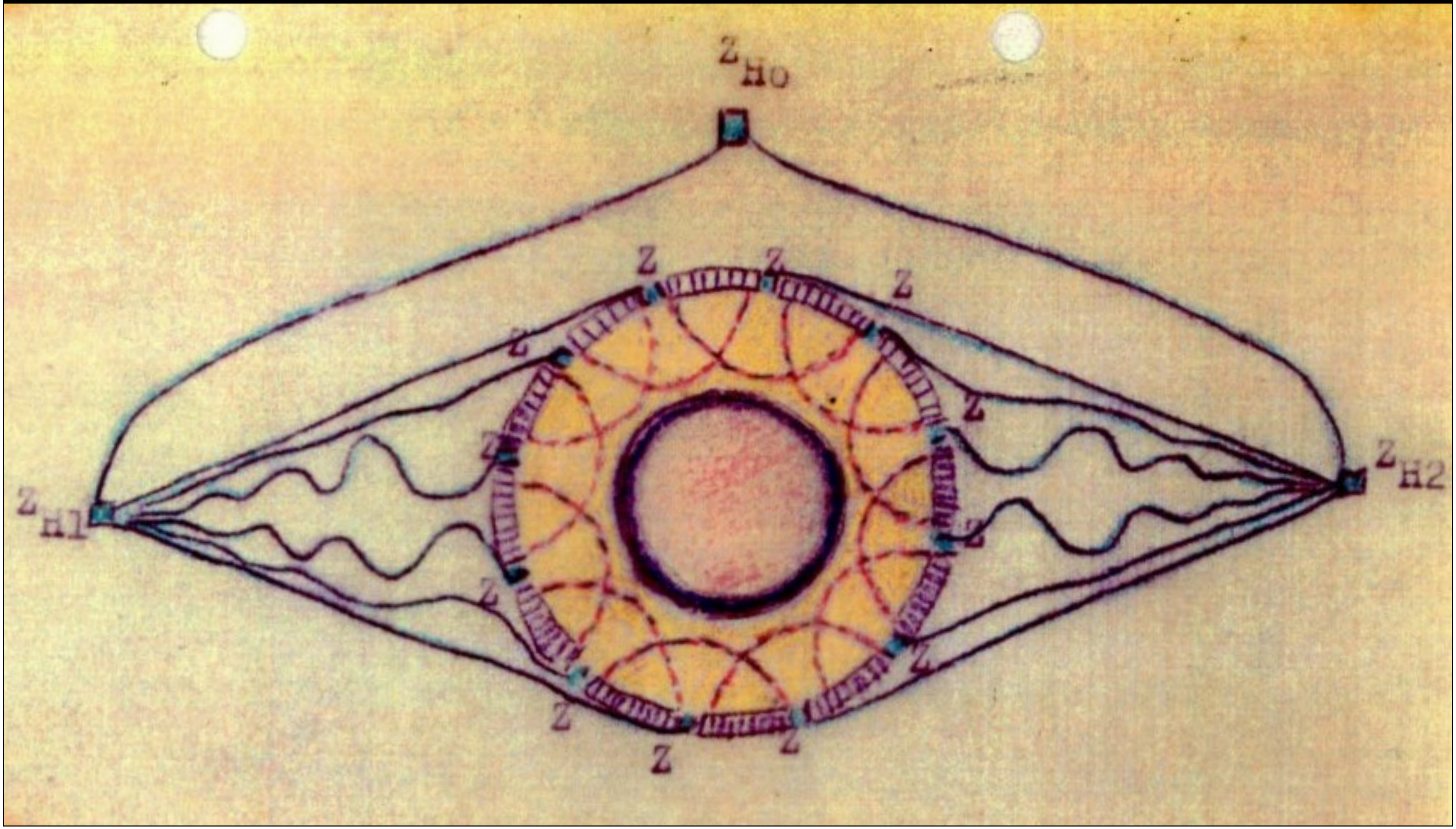
Der Welt Erbe gewänne	The whole world can be
zu eigen,	possessed by one
wer aus dem Rheingold	who from the Rhinegold
schüfe den Ring,	forges the Ring,
der maß lose Macht	which can bestow
ihm verlieh’.	immeasurable power.

Richard Wagner, *Das Rheingold*, Scene I, Wellgunde (1854)

Forgotten Creators of the German Atomic Bomb

Dr. Todd H. Rider thor@riderinstitute.org

riderinstitute.org/revolutionary-innovation



Acknowledgments

American Institute of Physics Bohr Library & Archives (Maryland)
Archiv der Max-Planck-Gesellschaft (Berlin-Dahlem)
Archiv der Österreichischen Akademie der Wissenschaften (Vienna)
Atomkeller Museum (Haigerloch)
Bayerische Staatsbibliothek (Munich)
Bornholm Defence Museum
Bornholm Museum
Bundesarchiv Militärarchiv (Freiburg)
Deutsches Historisches Institut (Moscow)
Deutsches Historisches Museum (Berlin)
Deutsches Museum (Munich)
Deutsches Technikmuseum (Berlin)
Foundation Centre for German Communication (Netherlands)
Franklin D. Roosevelt Presidential Library (Hyde Park, NY)
Gedenkdienstkomitee Gusen (Austria)
Historisch-Technisches Museum Peenemünde
Historisch-Technisches Museum Versuchsstelle Kummersdorf
Hoover Institution (Stanford, California)
Jonastalverein (Arnstadt)
KZ-Gedenkstätte Mittelbau-Dora (Nordhausen)
Nationaal Archief (The Hague, Netherlands)
National Air and Space Museum (Washington, DC)
Norwegian Industrial Workers Museum (Vemork)
Princeton University Library Special Collections (New Jersey)
Sachverständigenbüro Staude (Limbach-Oberfrohna)
Schweizerisches Bundesarchiv (Bern)
Schweizerische Nationalbibliothek (Bern)
Staatsarchiv, Staatskanzlei Obwalden (Sarnen, Switzerland)
Standortübungsplatz (Truppenübungsplatz) Ohrdruf
Technisches Museum Wien (Vienna)
U.K. Imperial War Museum Archive (Duxford)
U.K. National Archives (Kew)
University of Vienna
U.S. Air Force Historical Research Agency (Alabama)
U.S. Combined Arms Research Library (Kansas)
U.S. Holocaust Memorial Museum (Washington, DC)
U.S. Library of Congress
U.S. National Archives at Atlanta (Morrow, Georgia)
U.S. National Archives at Boston (Waltham, Massachusetts)
U.S. National Archives at College Park (Maryland)
U.S. National WWII Museum (New Orleans)
Villa Folke Bernadotte (von Ardenne house, Berlin)
Yad Vashem Holocaust Resource Center (Israel)

Guido Abate
Joseph E. Backofen, Jr.
Umberto Bartocci
Christian Bergner
David Bleecker
Stefan Brauburger
Gordon James Brown
David Cassidy
Casey Clarke
George Cully
Frank Döbert
Andrzej Ditrich
Gernot Eilers
Silke Fengler
Friedrich Georg
Charlie Hall
István Hargittai
Rudolf Haunschmied
Michael Haupt
Gunther Hebestreit
Philip Henshall
Marko Herceg
Manfred Höfert
Dieter Hoffmann
Karl-Heinz Huhn
Carter Hydrick
Guy Inchbald
Rainer Karlsch
Adam Kretschmer
Wolf Krotzky
Tom Kunkle
Norberto Lahuerta
Benjamin Levin
Kathy Lowney
Manuel Lukas
Jaroslav Mareš
Diane McWhorter
Thomas Mehner

Marek Michalski
Günter Nagel
Yorck Neudenberger
Michael Neufeld
Douglas M. O'Reagan
William Pellas
Philip Pesavento
Heiko Petermann
Fritz Pfeiffer
Jaroslav Pilar
Lee Pondrom
Johannes Preuss
Bruce Cameron Reed
Georg Ribienski
Luca Russo
Rolf-Harald Ruthke
William Schneck
Wolfgang Schwanitz
Brian R. Scott
Rick Sheridan
D. Ray Smith
Henry Stevens
Family of Heinz Stoelzel
David Strozzi
Andreas Sulzer
Matthias Uhl
Mark Wade
Mark Walker
Stephen Walton
Alex Wellerstein
Ed West
Kevin, Cathy,
and Peter Wilson
Clive R. Woodley
Benjamin Zusman
My family for their
patience and support

This Work Only Uses Information from Unclassified Sources, Such As:

Atzeni, Stefano, and Jürgen Meyer-Ter-Vehn. 2004. *The Physics of Inertial Fusion: Beam Plasma Interaction, Hydrodynamics, Hot Dense Matter.* Oxford, U.K.: Oxford University Press.

Benedict, Manson, Thomas H. Pigford, and Hans Wolfgang Levi. 1981. *Nuclear Chemical Engineering.* 2nd ed. New York: McGraw-Hill.

Coster-Mullen, John. 2012. *Atom Bombs: The Top Secret Inside Story of Little Boy and Fat Man.* Self-published.

Ford, Kenneth W. 2015. *Building the H Bomb: A Personal History.* World Scientific Publishing.

Fortov, Vladimir E. 2016. *Extreme States of Matter: High Energy Density Physics.* 2nd ed. Berlin: Springer.

Glasstone, Samuel, and Philip J. Dolan. 1977. *The Effects of Nuclear Weapons.* 3rd ed. Washington, D.C.: U.S. Government Printing Office.

Goncharov, G. A. 1996a. American and Soviet H-Bomb Development Programmes: Historical Background. *Physics--Uspekhi* 39:10:1033-1044. www.globalsecurity.org/wmd/library/report/1996/goncharov-h-bomb.pdf

Goncharov, G. A. 1996b. Thermonuclear Milestones. *Physics Today* 49:11:44--61.

Goncharov, G. A., and Lev D. Riabev. 2001. The Development of the First Soviet Atomic Bomb. *Physics-Uspekhi* 44:1:71--93.

Gsponer, André, and Jean-Pierre Hurni. 2009. *The Physical Principles of Thermonuclear Explosives, Inertial Confinement Fusion, and the Quest for Fourth Generation Nuclear Weapons.* Geneva: Independent Scientific Research Institute. http://isri.ch/wiki/_media/publications:ag-09-01.pdf

Hansen, Chuck. 1988. *U.S. Nuclear Weapons.* New York: Orion.

Hansen, Chuck. 2007. *Swords of Armageddon.* 2nd ed. www.uscoldwar.com.

Krehl, Peter O. K. 2009. *History of Shock Waves, Explosions and Impact: A Chronological and Biographical Reference.* Berlin: Springer.

Lindl, J. D. 1998. *Inertial Confinement Fusion.* Berlin: Springer.

Morland, Howard. 1981. *The Secret That Exploded.* New York: Random House.

Pondrom, Lee G. 2018. *The Soviet Atomic Project: How the Soviet Union Obtained the Atomic Bomb.* Singapore: World Scientific.

Reed, Bruce Cameron. 2015. *The Physics of the Manhattan Project.* 3rd ed. Berlin: Springer.

Reed, Bruce Cameron. 2019. *The History and Science of the Manhattan Project.* 2nd ed. Berlin: Springer.

Rhodes, Richard. 1986. *The Making of the Atomic Bomb.* New York: Simon and Schuster.

Rhodes, Richard. 1995. *Dark Sun: The Making of the Hydrogen Bomb.* New York: Simon and Schuster.

Serber, Robert. 1992. *The Los Alamos Primer: The First Lectures on How to Build an Atomic Bomb.* Berkeley: University of California Press.

Smyth, Henry DeWolf. 1945. *Atomic Energy for Military Purposes.* Princeton: Princeton University Press.

Sublette, Carey. 2019. *The Nuclear Weapon Archive: A Guide to Nuclear Weapons.* nuclearweaponarchive.org

Wellerstein, Alex, and Edward Geist. 2017. The Secret of the Soviet Hydrogen Bomb. *Physics Today* 70:4:40.

Winterberg, Friedwardt. 1981. *The Physical Principles of Thermonuclear Explosive Devices.* New York: Fusion Energy Foundation.

Winterberg, Friedwardt. 2010. *The Release of Thermonuclear Energy by Inertial Confinement: Ways Towards Ignition.* Singapore: World Scientific.

NARA RG 374, Microfilm A1218. Manhattan District History. https://ia802303.us.archive.org/26/items/ManhattanDistrictHistory/

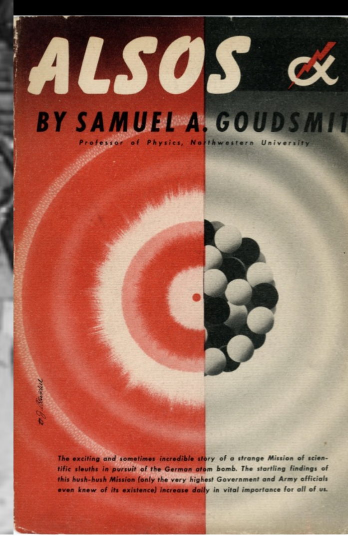
Complete set of slides and more available at riderinstitute.org/revolutionary-innovation

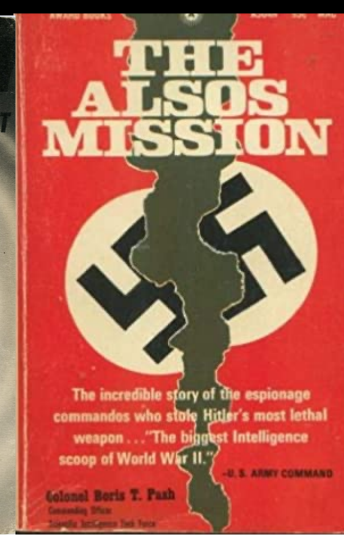
Slides correspond to the 15 sections of *Forgotten Creators* Appendix D:

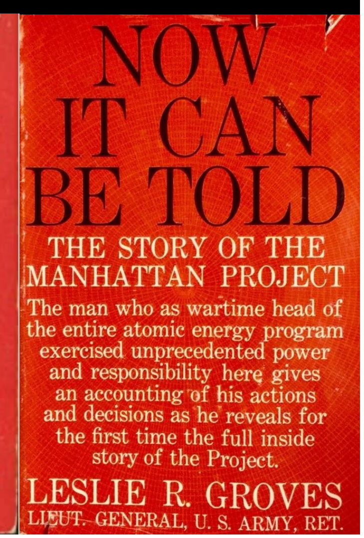
1. Conventional view of the wartime German nuclear program
2. Origins and organization of the German nuclear program
3. Sources of uranium and thorium
4. Enrichment of uranium-235 (^{235}U)
5. Breeding plutonium-239 (^{239}Pu) or uranium-233 (^{233}U) in fission reactors
6. Breeding ^{239}Pu or ^{233}U in electronuclear systems
7. Production of heavy water (D_2O) and other nuclear-related materials
8. German fission bomb design (explosive yield ~ tens of kilotons)
9. German hydrogen bomb design (explosive yield ~ megatons)
10. October 1944 test explosion on the Baltic coast
11. ~November 1944 test explosion in Poland
12. March 1945 test explosions in Thuringia
13. Wartime/postwar Axis belief in the reality of German nuclear weapons
14. Wartime/postwar Allied belief in the reality of German nuclear weapons
15. Conclusions and further work

1. Conventional View of German Program: Alsos

At the end of the war, the U.S.-led Alsos Mission searching for nuclear work found an incomplete fission reactor at Haigerloch, some papers on basic nuclear physics, and apparently not much else, according to the public accounts.





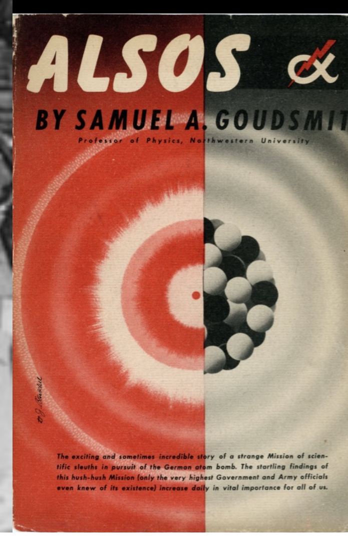


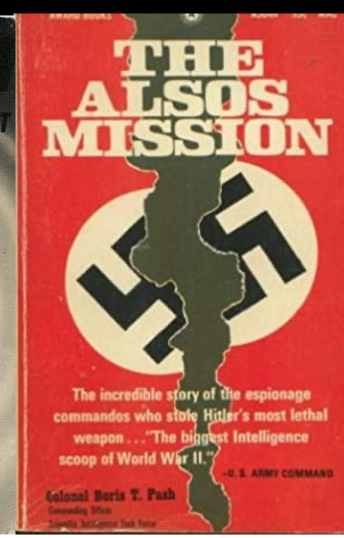
1. Conventional View of German Program: Alsos

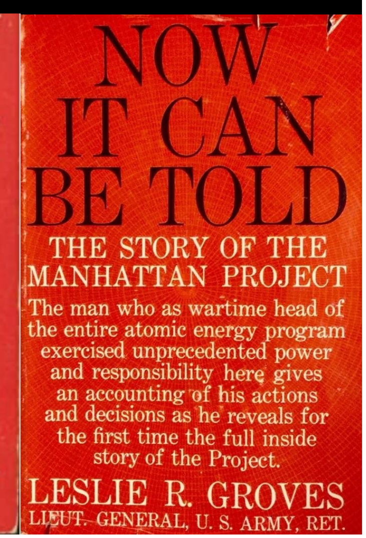
At the end of the war, the U.S.-led Alsos Mission searching for nuclear work found an incomplete fission reactor at Haigerloch, some papers on basic nuclear physics, and apparently not much else, according to the public accounts.

Alsos failed to properly investigate numerous specific organizations, scientists, and locations that could have revealed a more advanced nuclear program.

If any more advanced nuclear work had in fact been discovered, that information would have been automatically classified at the time, and could remain classified or buried in archives and unreleased to this day.



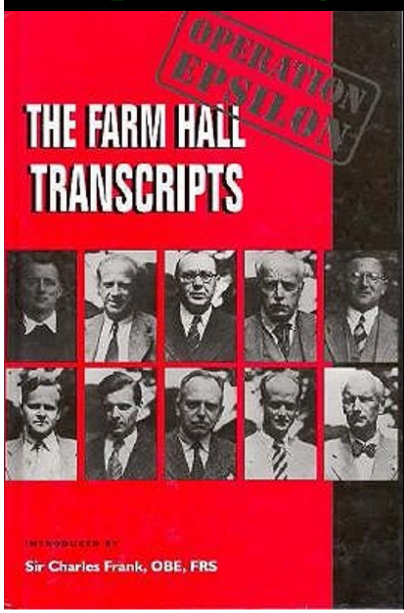


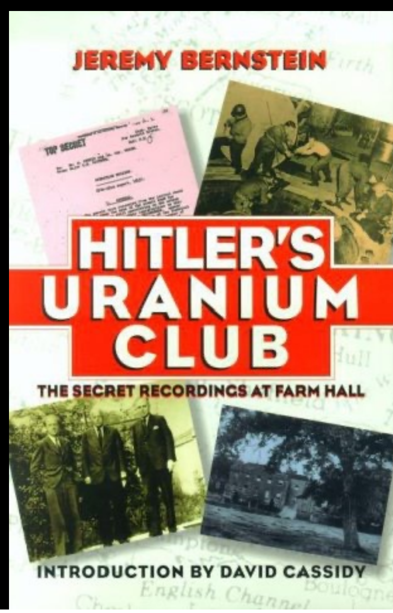


1. Conventional View of German Program: Farm Hall

10 scientists (Erich Bagge, Kurt Diebner, Walther Gerlach, Otto Hahn, Paul Harteck, Werner Heisenberg, Horst Korsching, Max von Laue, Carl Friedrich von Weizsäcker, and Karl Wirtz) were kept under house arrest July 1945–January 1946 at Farm Hall, U.K., where their conversations were secretly recorded.

The transcripts record the scientists' surprise at news of the 6 August 1945 Hiroshima bombing and do not reveal significant apparent knowledge of nuclear weapons design and development.

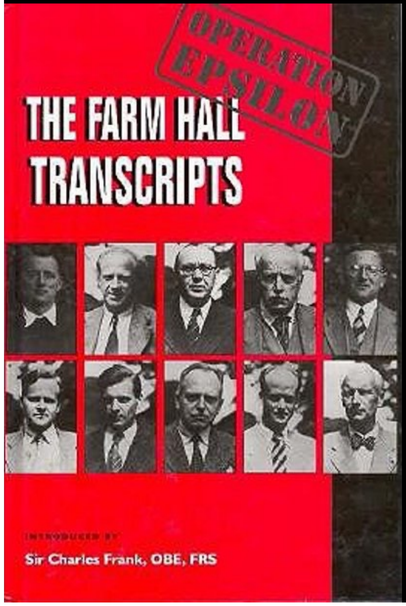


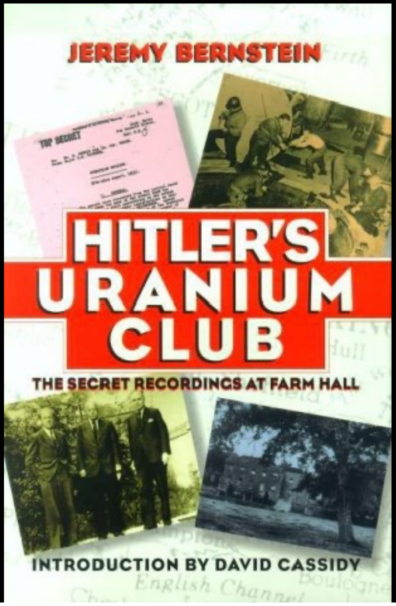


1. Conventional View of German Program: Farm Hall

10 scientists (Erich Bagge, Kurt Diebner, Walther Gerlach, Otto Hahn, Paul Harteck, Werner Heisenberg, Horst Korsching, Max von Laue, Carl Friedrich von Weizsäcker, and Karl Wirtz) were kept under house arrest July 1945–January 1946 at Farm Hall, U.K., where their conversations were secretly recorded.

The transcripts record the scientists' surprise at news of the 6 August 1945 Hiroshima bombing and do not reveal significant apparent knowledge of nuclear weapons design and development.





A huge number of relevant nuclear scientists were not at Farm Hall.

Those who were there suspected surveillance and presumably conducted their conversations accordingly.

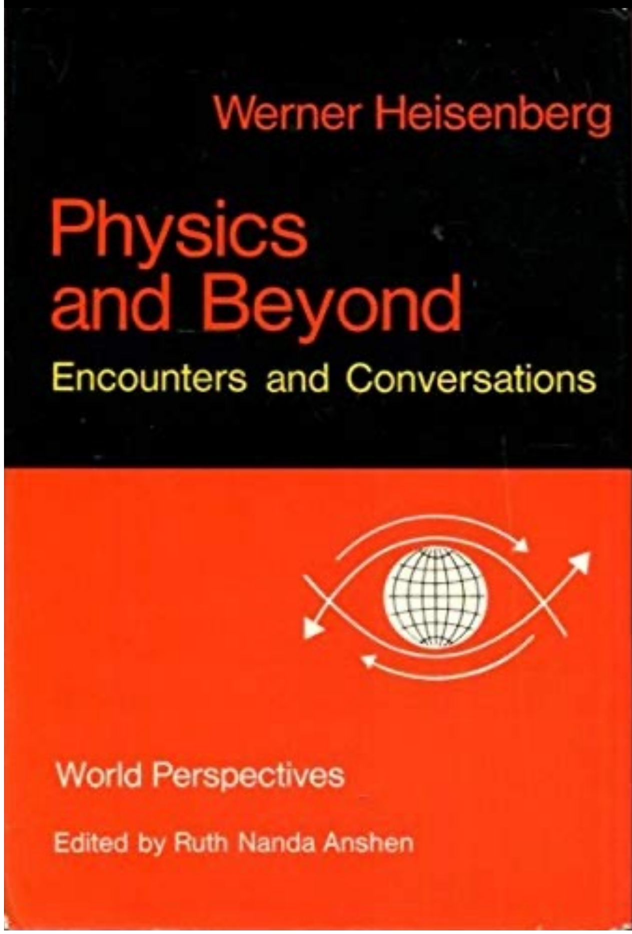
The preserved transcripts document only a small fraction of the discussions that would have occurred among ten people and their British attendants during those six months.

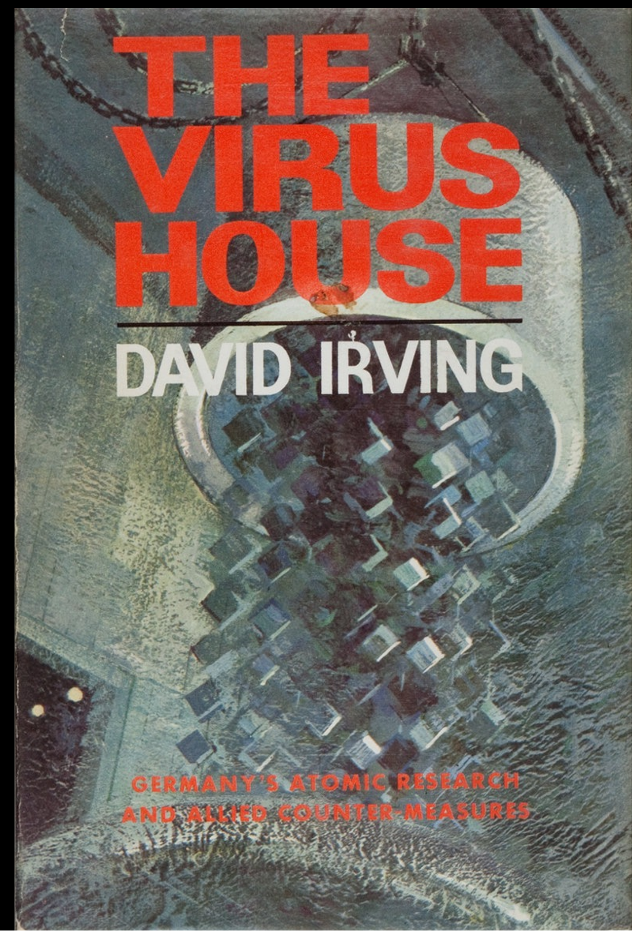
The transcripts are English translations, which may not accurately reflect the original German conversations.

Oddly, both the original recordings and the original German transcripts just happen to have been completely lost.

1. Conventional View of German Program: Public Remarks

In their public interviews and writings in the years after the war, German nuclear scientists professed a lack of desire, plans, materials and/or political support to produce nuclear weapons for the Third Reich.



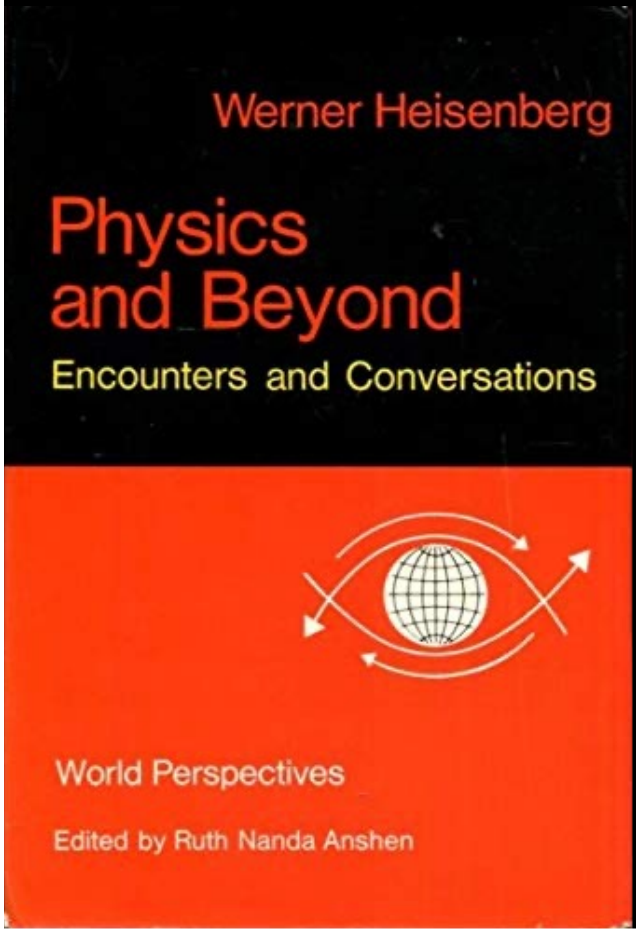


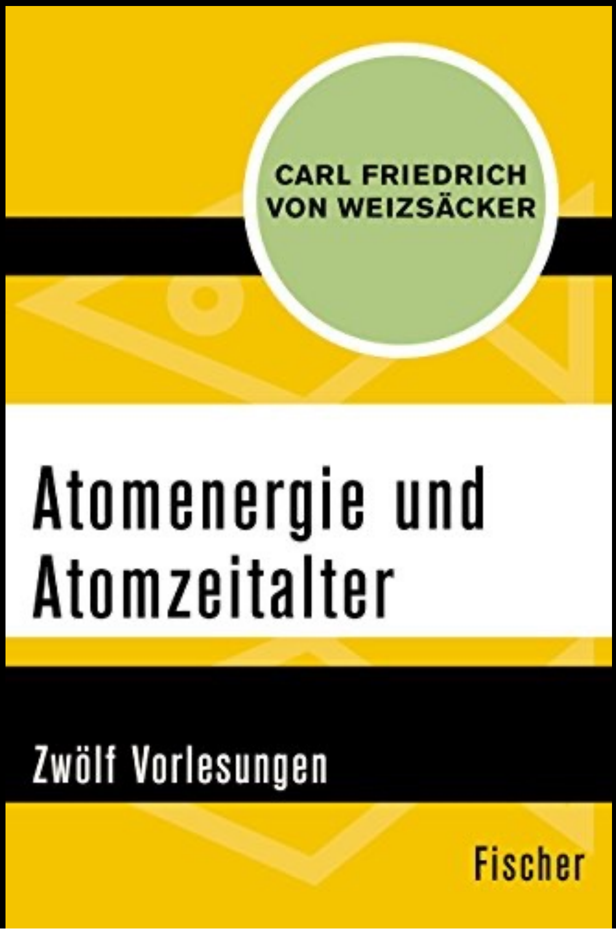
1. Conventional View of German Program: Public Remarks

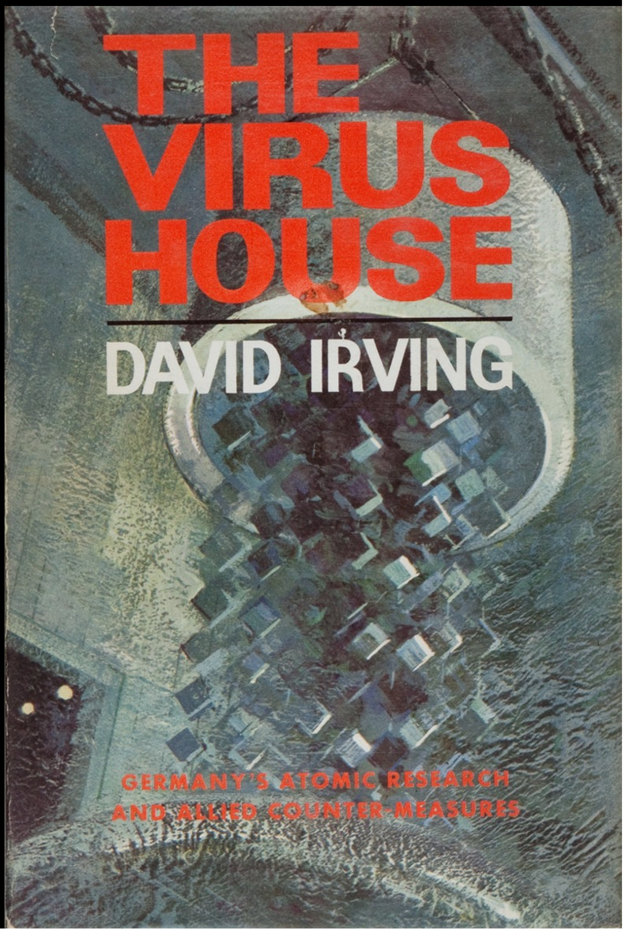
In their public interviews and writings in the years after the war, German nuclear scientists professed a lack of desire, plans, materials and/or political support to produce nuclear weapons for the Third Reich.

Only a small number of nuclear scientists went on the public record.

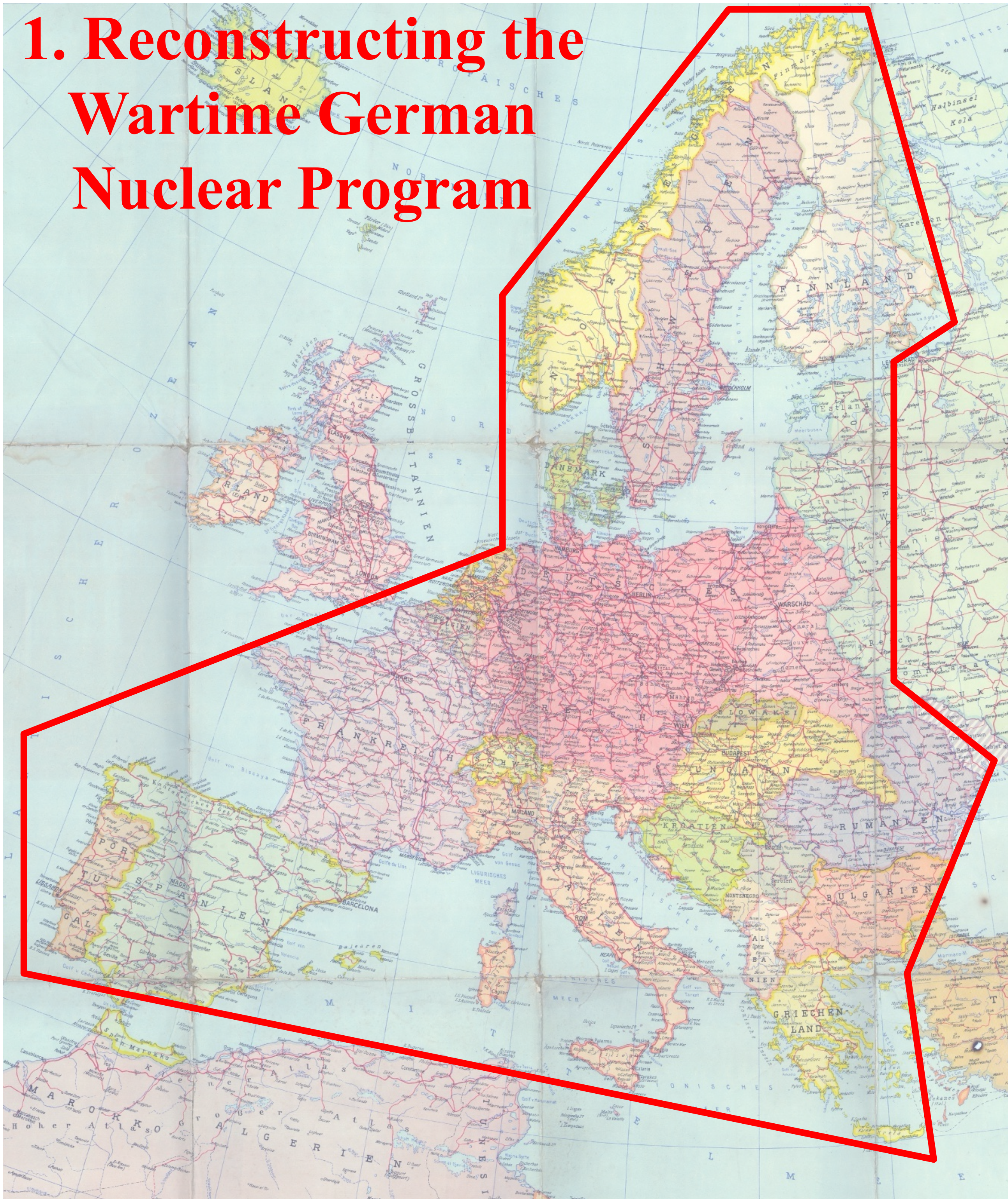
It was in their best personal interests to downplay the wartime German nuclear program, their knowledge of it, and their support for it.







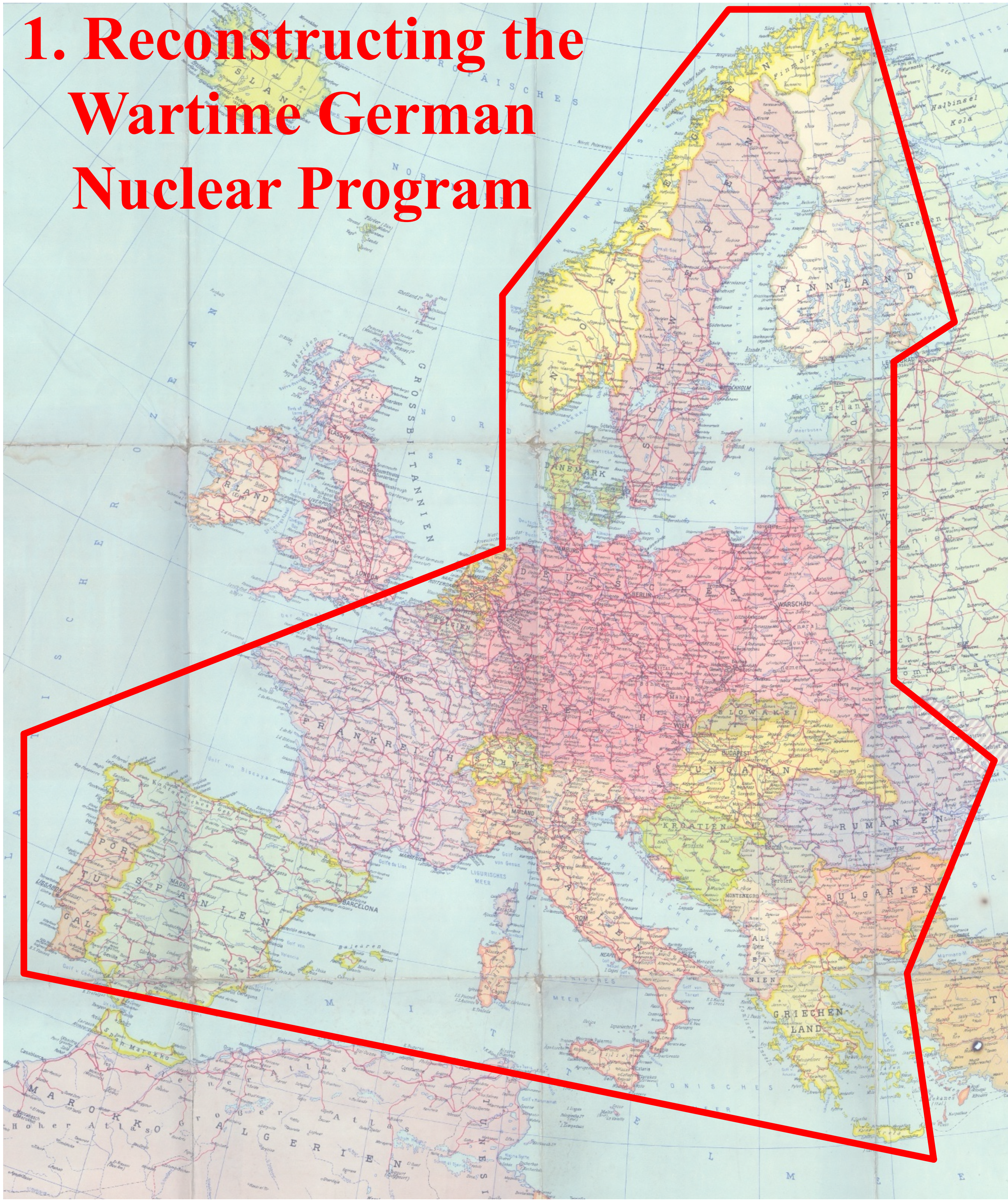
1. Reconstructing the Wartime German Nuclear Program



The German nuclear program was coordinated by the Heer 1930s-1942 and SS 1942-1945, was highly compartmentalized, and was spread over:

- **German-controlled Europe from Norway to Bulgaria, plus several nominally neutral countries (Sweden, Switzerland, Portugal, Spain).**
- **Many government branches (Heer, Luftwaffe, Kriegsmarine, SS, Reichspost, Organisation Todt, etc.).**
- **Many companies (I.G. Farben, AEG, Siemens, Degussa/Auer, Treibacher, etc.).**
- **Many research organizations (KWI branches, universities from Strassburg to Königsberg, etc.).**
- **Many underground facilities.**

1. Reconstructing the Wartime German Nuclear Program



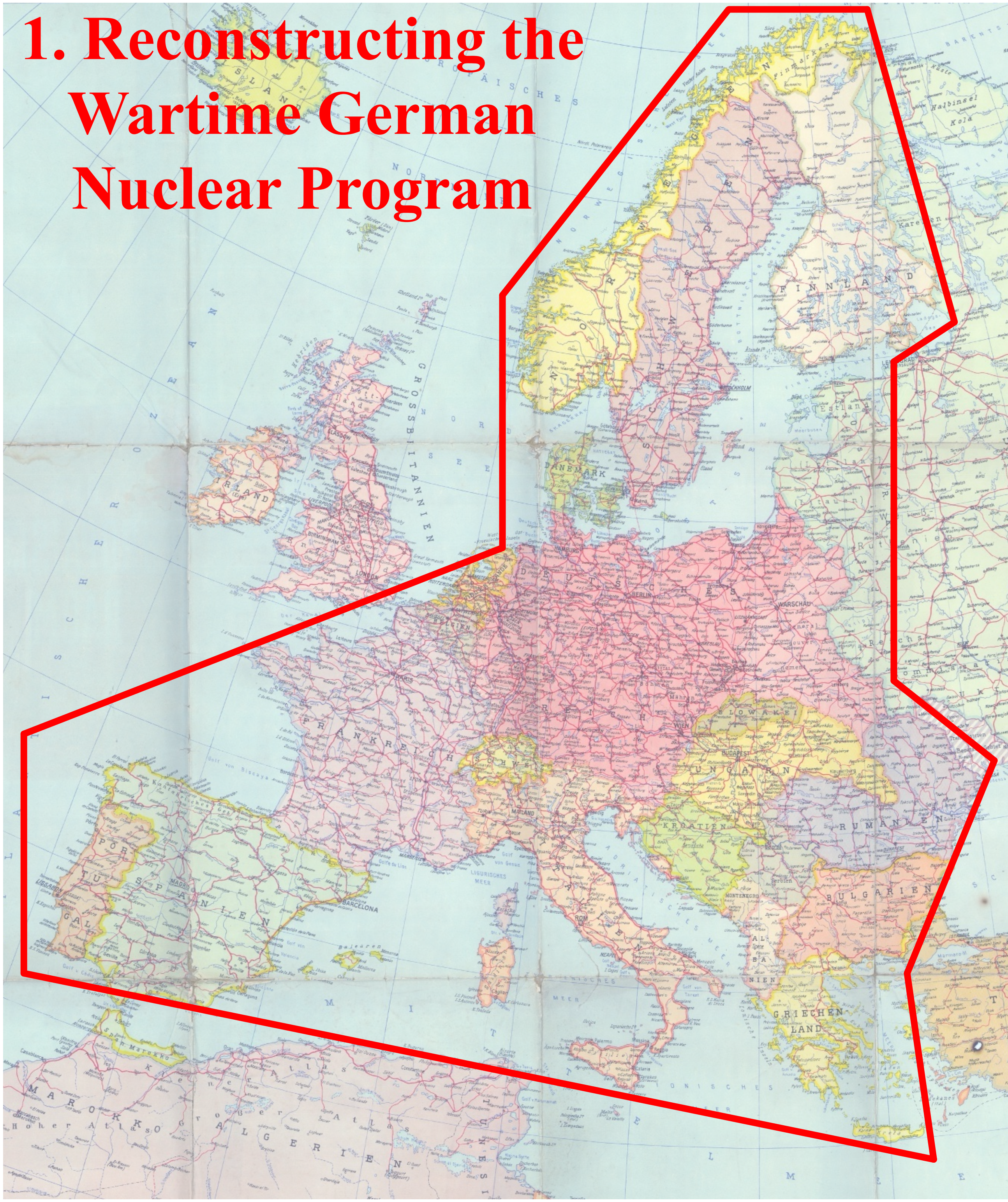
The German nuclear program was coordinated by the Heer 1930s-1942 and SS 1942-1945, was highly compartmentalized, and was spread over:

- **German-controlled Europe from Norway to Bulgaria, plus several nominally neutral countries (Sweden, Switzerland, Portugal, Spain).**
- **Many government branches (Heer, Luftwaffe, Kriegsmarine, SS, Reichspost, Organisation Todt, etc.).**
- **Many companies (I.G. Farben, AEG, Siemens, Degussa/Auer, Treibacher, etc.).**
- **Many research organizations (KWI branches, universities from Strassburg to Königsberg, etc.).**
- **Many underground facilities.**

The highly distributed, compartmentalized, and redundant organization of the program made it:

- **Much more resistant to wartime Allied intelligence and bombing.**
- **Much more challenging for modern historians to reconstruct.**

1. Reconstructing the Wartime German Nuclear Program



The German nuclear program was coordinated by the Heer 1930s-1942 and SS 1942-1945, was highly compartmentalized, and was spread over:

- **German-controlled Europe from Norway to Bulgaria, plus several nominally neutral countries (Sweden, Switzerland, Portugal, Spain).**
- **Many government branches (Heer, Luftwaffe, Kriegsmarine, SS, Reichspost, Organisation Todt, etc.).**
- **Many companies (I.G. Farben, AEG, Siemens, Degussa/Auer, Treibacher, etc.).**
- **Many research organizations (KWI branches, universities from Strassburg to Königsberg, etc.).**
- **Many underground facilities.**

The highly distributed, compartmentalized, and redundant organization of the program made it:

- **Much more resistant to wartime Allied intelligence and bombing.**
- **Much more challenging for modern historians to reconstruct.**

Other difficulties for modern historians include:

- **Germany destroyed/buried much at end of war.**
- **Many different organizations from different countries found and removed different pieces of the German program, and still keep much of it classified even 80 years later.**
- **Rediscovering the wartime program tarnishes the modern public images of all of the former Axis, Allied, and neutral countries that were involved.**

2. Origins of the German Nuclear Program

1920s: Georg Stetter, Fritz Houtermans, and others began working on nuclear energy release

2. Origins of the German Nuclear Program

1920s: Georg Stetter, Fritz Houtermans, and others began working on nuclear energy release

1934: Ida Tacke Noddack published theoretical predictions of uranium fission and plutonium production

Uber das Element 93.

Von Dr.-Ing. IDA NODDACK, Berlin. (Eingeg. 10. September 1934.)

Vor etwa vier Monaten wurde in dieser Zeitschrift über die Lücken des Periodischen Systems berichtet[1]). Am Schluß der Arbeit wurde auf die Möglichkeit der Entdeckung von Transuranen (d. h. Elementen, die im System auf das Uran folgen) eingegangen.

Wenige Wochen später erschienen zuerst in der Tagespresse, dann auch in der Fachliteratur Nachrichten, daß es zwei Forschern, Prof. *Fermi* in Rom und Ingenieur *Koblic* in Joachimsthal, unabhängig voneinander gelungen sei, das Element mit der Ordnungszahl 93 zu entdecken.

Wir wollen uns zunächst mit den Angaben von Fermi[2]) beschäftigen. *Fermi* hat die Frage untersucht, ob man die von *Curie* und *Joliot* entdeckte sogenannte induzierte Radioaktivität, die beim Beschießen von Atomkernen mit α-Strahlen entsteht, auch durch die Einwirkung von Neutronen hervorrufen kann.

Er brachte in ein Glasgefäß Berylliumpulver und Radiumemanation. Die Emanation emittiert α-Strahlen, diese treffen auf die Atomkerne des Berylliums und lösen in ihnen Neutronen aus. Die Neutronen durchdringen die Wände des Glasgefäßes und können auf in der Nähe befindliche Stoffe einwirken. *Fermi* brachte eine Reihe von Elementen in elementarer Form oder als Verbindungen in die Nähe seiner Strahlenquelle, ließ die Neutronen einwirken und setzte dann die bestrahlten Stoffe vor einen Geiger-Zähler. Zahlreiche Elemente sandten nach Bestrahlung mit Neutronen eine Zeitlang β-Strahlen aus, wiesen also in der Tat induzierte Radioaktivität auf[3]). Auf die Hypothesen, die *Fermi* zur Erklärung der zum Teil recht verwickelten Erscheinungen aufstellt[4]), soll hier nicht eingegangen werden, da uns nur ein Fall, die angebliche Entstehung des Elements 93, interessiert. Zum Studium der induzierten Radioaktivität des Urans brachte *Fermi* Uranylnitratlösung, die er von allen radioaktiven Zerfallsprodukten befreit hatte, in die Nähe seiner Neutronenquelle. Mit Hilfe des Geiger-Zählers konnte er zeigen, daß die Lösung durch die Bestrahlung radioaktiv geworden war und β-Strahlen aus-

1) *I. Noddack*, diese Ztschr. 47, 301 [1934].

2) *E. Fermi*, Nature 133, 898 [1934].

3) Natürlich wird nicht die Gesamtzahl der Atome des bestrahlten Stoffes radioaktiv, sondern nur eine unwägbare Menge, in diesem Fall einige hundert Atome.

4) *E. Fermi*, Nature 133, 757 [1934].

sandte. Die Auswertung der Abklingungskurve ergab, daß nicht nur ein, sondern mindestens fünf radioaktive Elemente von verschiedenen Halbwertszeiten entstanden waren, wobei es bisher, wie *Fermi* betont, noch unsicher ist, ob diese Elemente nacheinander oder nebeneinander entstehen.

Es gelang nun *Fermi*, eins dieser neu entstandenen Radioelemente, und zwar eins mit der Halbwertszeit 13 min, auf chemischem Wege abzutrennen. Er verfuhr dabei so, daß er die bestrahlte stark salpetersaure Uranylnitratlösung mit etwas Manganosalz versetzte, zum Kochen erhitzte, und dann Natriumchlorat zugab. In dem ausgeschiedenen Mangandioxyd war der größte Teil der β-Aktivität mit der Halbwertszeit von 13 min enthalten. *Fermi* versucht nun zu beweisen, daß das Radioelement, dem diese β-Aktivität zukommt, mit keinem bekannten Element in der Nähe des Urans isotop ist. Er setzt zu diesem Zweck zu der salpetersauren Lösung von bestrahltem Uranylnitrat nacheinander β-strahlende Isotope folgender Elemente: Protactinium (91), Thor (90), Actinium (89), Radium (88), Wismut (83) und Blei (82) und fällt dann Mangandioxyd mit Natriumchlorat. Alle die genannten β-strahlenden Elemente gehen nach *Fermi* nicht in den Niederschlag. Da das unbekannte Radioelement aber in die Manganfällung geht, und da es seinem Verhalten nach auch nicht mit Radon (86) und Ekacäsium (87) isotop sein kann, zieht *Fermi* den Schluß, daß es das unbekannte Element 93 (vielleicht auch 94 oder 95) sein könnte.

Diese Beweisführung ist nicht stichhaltig. Die Tatsache, daß *Fermi* nicht nur den bekannten unmittelbaren Nachbarn des Urans, das Protactinium, mit seinem neu entstandenen β-Strahler vergleicht, sondern mehrere Elemente bis herab zum Blei, beweist, daß er eine Reihe aufeinander folgender Abbauprozesse (unter Abgabe von Elektronen, Protonen und Heliumkernen) für möglich hält, die schließlich zur Bildung des Radioelements mit der Halbwertszeit 13 min führen. — Wenn er aber das tut, ist nicht einzusehen, warum er zwischen Uran (92) und Blei (82) das Element Polonium (84) nicht berücksichtigt, und warum er gerade beim Blei Halt macht; denn die alte Anschauung, daß die ununterbrochene Reihe radioaktiver Elemente beim Blei oder vielmehr beim Polonium ausgeführter Versuch zeigte, daß dieses Element nahezu quantitativ in den MnO_2-Niederschlag eingeht[5]). Der Beweis, daß das neue Radioelement die Ordnungszahl 93 hat, ist also noch keineswegs geglückt, da *Fermi* ihn nur durch ein unvollkommen durchgeführtes Ausschlußverfahren versucht hat.

Man kann ebensogut annehmen, daß bei dieser neuartigen Kernzertrümmerung durch Neutronen erheblich andere „Kernreaktionen" stattfinden, als man sie bisher bei der Einwirkung von Protonen- und α-Strahlen auf Atomkerne beobachtet hat. Bei den letztgenannten Bestrahlungen findet man nur Kernumwandlungen unter Abgabe von Elektronen, Protonen und Heliumkernen, wodurch sich bei schweren Elementen die Masse der bestrahlten Atomkerne nur wenig ändert, da nahe benachbarte Elemente entstehen. Es wäre denkbar, daß bei der Beschießung schwerer Kerne mit Neutronen diese Kerne in mehrere größere Bruchstücke zerfallen, die zwar Isotope bekannter Elemente, aber nicht Nachbarn der bestrahlten Elemente sind.

Auch der Befund, daß das neue Radioelement in saurer Lösung bei Fällung von Rheniumsulfid in diesen Niederschlag geht, spricht nicht für 93; denn erstens absorbiert das Rheniumsulfid gern andere Stoffe, und zweitens läßt die Voraussage der vermutlichen Eigenschaften von 93 es noch keineswegs sicher erscheinen, daß dieses Element ein säurebeständiges Sulfid bilden würde.

Weiterhin würde sich aus den Versuchen von *Fermi*, wenn seine Deutung richtig wäre, die von ihm nicht erwähnte Folgerung ergeben, daß aus dem β-strahlenden Element 93 das Element 94 entstehen müßte. Dieses Element sollte man verhältnismäßig leicht chemisch von 93 trennen können.

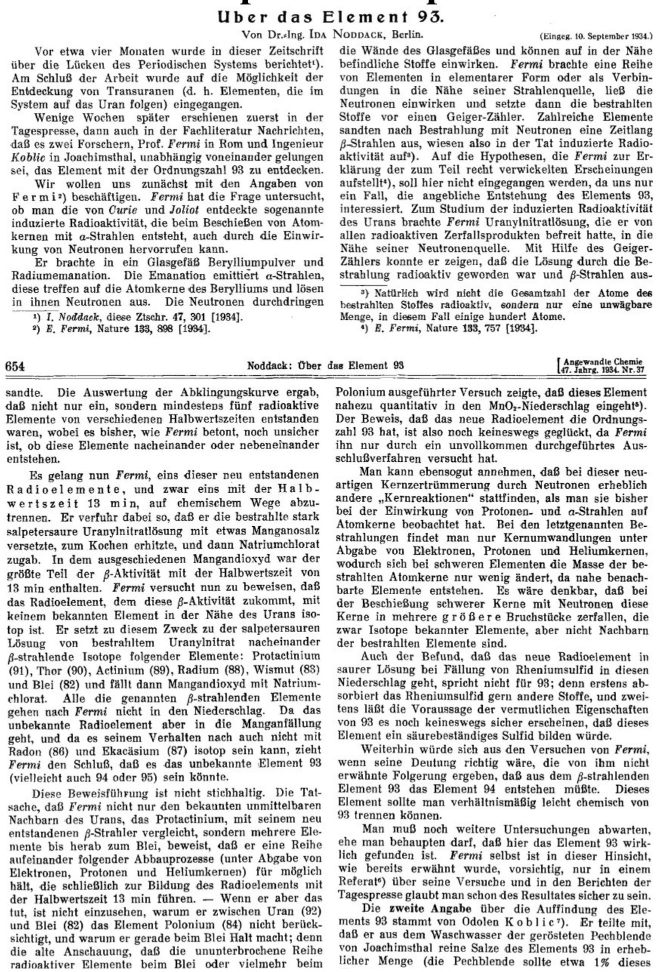
Man muß noch weitere Untersuchungen abwarten, ehe man behaupten darf, daß hier das Element 93 wirklich gefunden ist. *Fermi* selbst ist in dieser Hinsicht, wie bereits erwähnt wurde, vorsichtig, nur in einem Referat[6]) über seine Versuche und in den Berichten der Tagespresse glaubt man schon des Resultates sicher zu sein.

Die **zweite Angabe** über die Auffindung des Elements 93 stammt von Odolen Koblic[7]). Er teilte mit, daß er aus dem Waschwasser der gerösteten Pechblende von Joachimsthal reine Salze des Elements 93 in erheblicher Menge (die Pechblende sollte etwa 1% dieses

2. Origins of the German Nuclear Program

1920s: Georg Stetter, Fritz Houtermans, and others began working on nuclear energy release

1934: Ida Tacke Noddack published theoretical predictions of uranium fission and plutonium production



Uber das Element 93.

Von Dr.-Ing. Ida Noddack, Berlin. (Eingeg. 10. September 1934.)

Vor etwa vier Monaten wurde in dieser Zeitschrift über die Lücken des Periodischen Systems berichtet[1]). Am Schluß der Arbeit wurde auf die Möglichkeit der Entdeckung von Transuranen (d. h. Elementen, die im System auf das Uran folgen) eingegangen.

Wenige Wochen später erschienen zuerst in der Tagespresse, dann auch in der Fachliteratur Nachrichten, daß es zwei Forschern, Prof. *Fermi* in Rom und Ingenieur *Koblic* in Joachimsthal, unabhängig voneinander gelungen sei, das Element mit der Ordnungszahl 93 zu entdecken.

Wir wollen uns zunächst mit den Angaben von Fermi[2]) beschäftigen. *Fermi* hat die Frage untersucht, ob man die von *Curie* und *Joliot* entdeckte sogenannte induzierte Radioaktivität, die beim Beschießen von Atomkernen mit α-Strahlen entsteht, auch durch die Einwirkung von Neutronen hervorrufen kann.

Er brachte in ein Glasgefäß Berylliumpulver und Radiumemanation. Die Emanation emittiert α-Strahlen, diese treffen auf die Atomkerne des Berylliums und lösen in ihnen Neutronen aus. Die Neutronen durchdringen die Wände des Glasgefäßes und können auf in der Nähe befindliche Stoffe einwirken. *Fermi* brachte eine Reihe von Elementen in elementarer Form oder als Verbindungen in die Nähe seiner Strahlenquelle, ließ die Neutronen einwirken und setzte dann die bestrahlten Stoffe vor einen Geiger-Zähler. Zahlreiche Elemente sandten nach Bestrahlung mit Neutronen eine Zeitlang β-Strahlen aus, wiesen also in der Tat induzierte Radioaktivität auf[3]). Auf die Hypothesen, die *Fermi* zur Erklärung der zum Teil recht verwickelten Erscheinungen aufstellt[4]), soll hier nicht eingegangen werden, da uns nur ein Fall, die angebliche Entstehung des Elements 93, interessiert. Zum Studium der induzierten Radioaktivität des Urans brachte *Fermi* Uranylnitratlösung, die er von allen radioaktiven Zerfallsprodukten befreit hatte, in die Nähe seiner Neutronenquelle. Mit Hilfe des Geiger-Zählers konnte er zeigen, daß die Lösung durch die Bestrahlung radioaktiv geworden war und β-Strahlen aus-

1) *I. Noddack*, diese Ztschr. 47, 301 [1934].
2) *E. Fermi*, Nature 133, 898 [1934].
3) Natürlich wird nicht die Gesamtzahl der Atome des bestrahlten Stoffes radioaktiv, *sondern* nur eine unwägbare Menge, in diesem Fall einige hundert Atome.
4) *E. Fermi*, Nature 133, 757 [1934].

sandte. Die Auswertung der Abklingungskurve ergab, daß nicht nur ein, sondern mindestens fünf radioaktive Elemente von verschiedenen Halbwertszeiten entstanden waren, wobei es bisher, wie *Fermi* betont, noch unsicher ist, ob diese Elemente nacheinander oder nebeneinander entstehen.

Es gelang nun *Fermi*, eins dieser neu entstandenen Radioelemente, und zwar eins mit der Halbwertszeit 13 min, auf chemischem Wege abzutrennen. Er verfuhr dabei so, daß er die bestrahlte stark salpetersaure Uranylnitratlösung mit etwas Manganosalz versetzte, zum Kochen erhitzte, und dann Natriumchlorat zugab. In dem ausgeschiedenen Mangandioxyd war der größte Teil der β-Aktivität mit der Halbwertszeit von 13 min enthalten. *Fermi* versucht nun zu beweisen, daß das Radioelement, dem diese β-Aktivität zukommt, mit keinem bekannten Element in der Nähe des Urans isotop ist. Er setzt zu diesem Zweck zu der salpetersauren Lösung von bestrahltem Uranylnitrat nacheinander β-strahlende Isotope folgender Elemente: Protactinium (91), Thor (90), Actinium (89), Radium (88), Wismut (83) und Blei (82) und fällt dann Mangandioxyd mit Natriumchlorat. Alle die genannten β-strahlenden Elemente gehen nach *Fermi* nicht in den Niederschlag. Da das unbekannte Radioelement aber in die Manganfällung geht, und da es seinem Verhalten nach auch nicht mit Radon (86) und Ekacäsium (87) isotop sein kann, zieht *Fermi* den Schluß, daß es das unbekannte Element 93 (vielleicht auch 94 oder 95) sein könnte.

Diese Beweisführung ist nicht stichhaltig. Die Tatsache, daß *Fermi* nicht nur den bekannten unmittelbaren Nachbarn des Urans, das Protactinium, mit seinem neu entstandenen β-Strahler vergleicht, sondern mehrere Elemente bis herab zum Blei, beweist, daß er eine Reihe aufeinander folgender Abbauprozesse (unter Abgabe von Elektronen, Protonen und Heliumkernen) für möglich hält, die schließlich zur Bildung des Radioelements mit der Halbwertszeit 13 min führen. — Wenn er aber das tut, ist nicht einzusehen, warum er zwischen Uran (92) und Blei (82) das Element Polonium (84) nicht berücksichtigt, und warum er gerade beim Blei Halt macht; denn die alte Anschauung, daß die ununterbrochene Reihe radioaktiver Elemente beim Blei oder vielmehr beim Polonium ausgeführter Versuch zeigte, daß dieses Element nahezu quantitativ in den MnO_2-Niederschlag eingeht[5]). Der Beweis, daß das neue Radioelement die Ordnungszahl 93 hat, ist also noch keineswegs geglückt, da *Fermi* ihn nur durch ein unvollkommen durchgeführtes Ausschlußverfahren versucht hat.

Man kann ebensogut annehmen, daß bei dieser neuartigen Kernzertrümmerung durch Neutronen erheblich andere „Kernreaktionen" stattfinden, als man sie bisher bei der Einwirkung von Protonen- und α-Strahlen auf Atomkerne beobachtet hat. Bei den letztgenannten Bestrahlungen findet man nur Kernumwandlungen unter Abgabe von Elektronen, Protonen und Heliumkernen, wodurch sich bei schweren Elementen die Masse der bestrahlten Atomkerne nur wenig ändert, da nahe benachbarte Elemente entstehen. Es wäre denkbar, daß bei der Beschießung schwerer Kerne mit Neutronen diese Kerne in mehrere größere Bruchstücke zerfallen, die zwar Isotope bekannter Elemente, aber nicht Nachbarn der bestrahlten Elemente sind.

Auch der Befund, daß das neue Radioelement in saurer Lösung bei Fällung von Rheniumsulfid in diesen Niederschlag geht, spricht nicht für 93; denn erstens absorbiert das Rheniumsulfid gern andere Stoffe, und zweitens läßt die Voraussage der vermutlichen Eigenschaften von 93 es noch keineswegs sicher erscheinen, daß dieses Element ein säurebeständiges Sulfid bilden würde.

Weiterhin würde sich aus den Versuchen von *Fermi*, wenn seine Deutung richtig wäre, die von ihm nicht erwähnte Folgerung ergeben, daß aus dem β-strahlenden Element 93 das Element 94 entstehen müßte. Dieses Element sollte man verhältnismäßig leicht chemisch von 93 trennen können.

Man muß noch weitere Untersuchungen abwarten, ehe man behaupten darf, daß hier das Element 93 wirklich gefunden ist. *Fermi* selbst ist in dieser Hinsicht, wie bereits erwähnt wurde, vorsichtig, nur in einem Referat[6]) über seine Versuche und in den Berichten der Tagespresse glaubt man schon des Resultates sicher zu sein.

Die **zweite Angabe** über die Auffindung des Elements 93 stammt von Odolen Koblic[7]). Er teilte mit, daß er aus dem Waschwasser der gerösteten Pechblende von Joachimsthal reine Salze des Elements 93 in erheblicher Menge (die Pechblende sollte etwa 1% dieses

1934: Erich Schumann (shaped charge expert) hired Kurt Diebner (nuclear physicist) for army weapons program

2. Origins of the German Nuclear Program

1920s: Georg Stetter, Fritz Houtermans, and others began working on nuclear energy release

1934: Ida Tacke Noddack published theoretical predictions of uranium fission and plutonium production

Uber das Element 93.

Von Dr.-Ing. Ida Noddack, Berlin. (Eingeg. 10. September 1934.)

Vor etwa vier Monaten wurde in dieser Zeitschrift über die Lücken des Periodischen Systems berichtet[1]). Am Schluß der Arbeit wurde auf die Möglichkeit der Entdeckung von Transuranen (d. h. Elementen, die im System auf das Uran folgen) eingegangen.

Wenige Wochen später erschienen zuerst in der Tagespresse, dann auch in der Fachliteratur Nachrichten, daß es zwei Forschern, Prof. *Fermi* in Rom und Ingenieur *Koblic* in Joachimsthal, unabhängig voneinander gelungen sei, das Element mit der Ordnungszahl 93 zu entdecken.

Wir wollen uns zunächst mit den Angaben von Fermi[2]) beschäftigen. *Fermi* hat die Frage untersucht, ob man die von *Curie* und *Joliot* entdeckte sogenannte induzierte Radioaktivität, die beim Beschießen von Atomkernen mit α-Strahlen entsteht, auch durch die Einwirkung von Neutronen hervorrufen kann.

Er brachte in ein Glasgefäß Berylliumpulver und Radiumemanation. Die Emanation emittiert α-Strahlen, diese treffen auf die Atomkerne des Berylliums und lösen in ihnen Neutronen aus. Die Neutronen durchdringen die Wände des Glasgefäßes und können auf in der Nähe befindliche Stoffe einwirken. *Fermi* brachte eine Reihe von Elementen in elementarer Form oder als Verbindungen in die Nähe seiner Strahlenquelle, ließ die Neutronen einwirken und setzte dann die bestrahlten Stoffe vor einen Geiger-Zähler. Zahlreiche Elemente sandten nach Bestrahlung mit Neutronen eine Zeitlang β-Strahlen aus, wiesen also in der Tat induzierte Radioaktivität auf[3]). Auf die Hypothesen, die *Fermi* zur Erklärung der zum Teil recht verwickelten Erscheinungen aufstellt[4]), soll hier nicht eingegangen werden, da uns nur ein Fall, die angebliche Entstehung des Elements 93, interessiert. Zum Studium der induzierten Radioaktivität des Urans brachte *Fermi* Uranylnitratlösung, die er von allen radioaktiven Zerfallsprodukten befreit hatte, in die Nähe seiner Neutronenquelle. Mit Hilfe des Geiger-Zählers konnte er zeigen, daß die Lösung durch die Bestrahlung radioaktiv geworden war und β-Strahlen aus-

[1]) *I. Noddack*, diese Ztschr. 47, 301 [1934].

[2]) *E. Fermi*, Nature 133, 898 [1934].

[3]) Natürlich wird nicht die Gesamtzahl der Atome des bestrahlten Stoffes radioaktiv, sondern nur eine unwägbare Menge, in diesem Fall einige hundert Atome.

[4]) *E. Fermi*, Nature 133, 757 [1934].

sandte. Die Auswertung der Abklingungskurve ergab, daß nicht nur ein, sondern mindestens fünf radioaktive Elemente von verschiedenen Halbwertszeiten entstanden waren, wobei es bisher, wie *Fermi* betont, noch unsicher ist, ob diese Elemente nacheinander oder nebeneinander entstehen.

Es gelang nun *Fermi*, eins dieser neu entstandenen Radioelemente, und zwar eins mit der Halbwertszeit 13 min, auf chemischem Wege abzutrennen. Er verfuhr dabei so, daß er die bestrahlte stark salpetersaure Uranylnitratlösung mit etwas Manganosalz versetzte, zum Kochen erhitzte, und dann Natriumchlorat zugab. In dem ausgeschiedenen Mangandioxyd war der größte Teil der β-Aktivität mit der Halbwertszeit von 13 min enthalten. *Fermi* versucht nun zu beweisen, daß das Radioelement, dem diese β-Aktivität zukommt, mit keinem bekannten Element in der Nähe des Urans isotop ist. Er setzt zu diesem Zweck zu der salpetersauren Lösung von bestrahltem Uranylnitrat nacheinander β-strahlende Isotope folgender Elemente: Protactinium (91), Thor (90), Actinium (89), Radium (88), Wismut (83) und Blei (82) und fällt dann Mangandioxyd mit Natriumchlorat. Alle die genannten β-strahlenden Elemente gehen nach *Fermi* nicht in den Niederschlag. Da das unbekannte Radioelement aber in die Manganfällung geht, und da es seinem Verhalten nach auch nicht mit Radon (86) und Ekacäsium (87) isotop sein kann, zieht *Fermi* den Schluß, daß es das unbekannte Element 93 (vielleicht auch 94 oder 95) sein könnte.

Diese Beweisführung ist nicht stichhaltig. Die Tatsache, daß *Fermi* nicht nur den bekannten unmittelbaren Nachbarn des Urans, das Protactinium, mit seinem neu entstandenen β-Strahler vergleicht, sondern mehrere Elemente bis herab zum Blei, beweist, daß er eine Reihe aufeinander folgender Abbauprozesse (unter Abgabe von Elektronen, Protonen und Heliumkernen) für möglich hält, die schließlich zur Bildung des Radioelements mit der Halbwertszeit 13 min führen. — Wenn er aber das tut, ist nicht einzusehen, warum er zwischen Uran (92) und Blei (82) das Element Polonium (84) nicht berücksichtigt, und warum er gerade beim Blei Halt macht; denn die alte Anschauung, daß die ununterbrochene Reihe radioaktiver Elemente beim Blei oder vielmehr beim Polonium ausgeführter Versuch zeigte, daß dieses Element nahezu quantitativ in den MnO_2-Niederschlag eingeht[5]). Der Beweis, daß das neue Radioelement die Ordnungszahl 93 hat, ist also noch keineswegs geglückt, da *Fermi* ihn nur durch ein unvollkommen durchgeführtes Ausschlußverfahren versucht hat.

Man kann ebensogut annehmen, daß bei dieser neuartigen Kernzertrümmerung durch Neutronen erheblich andere „Kernreaktionen" stattfinden, als man sie bisher bei der Einwirkung von Protonen- und α-Strahlen auf Atomkerne beobachtet hat. Bei den letztgenannten Bestrahlungen findet man nur Kernumwandlungen unter Abgabe von Elektronen, Protonen und Heliumkernen, wodurch sich bei schweren Elementen die Masse der bestrahlten Atomkerne nur wenig ändert, da nahe benachbarte Elemente entstehen. Es wäre denkbar, daß bei der Beschießung schwerer Kerne mit Neutronen diese Kerne in mehrere größere Bruchstücke zerfallen, die zwar Isotope bekannter Elemente, aber nicht Nachbarn der bestrahlten Elemente sind.

Auch der Befund, daß das neue Radioelement in saurer Lösung bei Fällung von Rheniumsulfid in diesen Niederschlag geht, spricht nicht für 93; denn erstens absorbiert das Rheniumsulfid gern andere Stoffe, und zweitens läßt die Voraussage der vermutlichen Eigenschaften von 93 es noch keineswegs sicher erscheinen, daß dieses Element ein säurebeständiges Sulfid bilden würde.

Weiterhin würde sich aus den Versuchen von *Fermi*, wenn seine Deutung richtig wäre, die von ihm nicht erwähnte Folgerung ergeben, daß aus dem β-strahlenden Element 93 das Element 94 entstehen müßte. Dieses Element sollte man verhältnismäßig leicht chemisch von 93 trennen können.

Man muß noch weitere Untersuchungen abwarten, ehe man behaupten darf, daß hier das Element 93 wirklich gefunden ist. *Fermi* selbst ist in dieser Hinsicht, wie bereits erwähnt wurde, vorsichtig, nur in einem Referat[6]) über seine Versuche und in den Berichten der Tagespresse glaubt man schon des Resultates sicher zu sein.

Die **zweite Angabe** über die Auffindung des Elements 93 stammt von Odolen Koblic[7]). Er teilte mit, daß er aus dem Waschwasser der gerösteten Pechblende von Joachimsthal reine Salze des Elements 93 in erheblicher Menge (die Pechblende sollte etwa 1% dieses

1934: Erich Schumann (shaped charge expert) hired Kurt Diebner (nuclear physicist) for army weapons program

1934-1938: AEG, I.G. Farben, and Auergesellschaft patented high-voltage fusion neutron generators and tritium breeders

PATENT SPECIFICATION

Convention Date (Germany): Feb. 9, 1937. **508,233**

Application Date (in United Kingdom): Feb. 7, 1938. *No. 3845/38.*

Complete Specification Accepted: June 28, 1939.

COMPLETE SPECIFICATION

Method for Carrying out Nuclear Reactions

We, Degea Aktiengesellschaft (Auergesellschaft), of 16—19, Rotherstrasse, Berlin, O.17, Germany, a German Company, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Artificial nuclear reactions are initiated by the bombardment of nuclei with light elementary particles. With the use of charged particles (protons, α particles) energies of 10^5 to 10^7 volts are necessary for overcoming the coulombic repulsion powers, in order to ensure a sufficient yield for the penetration of the particles into the bombarded nucleus.

Such a repulsion does not exist for neutrons, so that neutrons of small speed can penetrate into nuclei and produce reactions, as experiments actually show.

Unfortunately, there are no direct sources producing neutrons; they arise, if nuclei, for example, Be, are irradiated with α-particles of high energies (about 10^6 volts) or γ-rays very rich in energy (about 2.10^6 volts) or by bombardment of certain nuclei with fast particles of the heavy isotope of hydrogen. As sources of α-particles of sufficiently high energy, only the naturally radioactive elements have hitherto been available. In the two other cases, for accelerating elementary particles it is necessary to have recourse to the use of very considerable amounts of energy. With the remaining hitherto known methods for the production of elementary particles rich in energy, which have been used directly, or indirectly through the production of very hard Röntgen rays, for the production of neutrons and generally for the initiation of nuclear reactions, there came to be used an acceleration of the desired particles in high vacuum. This method indeed produces definite speeds, but only at the expense of very heavy outlay in the matter of electro-technical apparatus for building up an increase in the current density of the accelerated particles, and also gives a greater absolute yield from the nuclear reactions. The output attained in this way probably corresponds, at best, to that of a few grams of radium. The method of repeated secondary acceleration by means of high frequency alternating fields (Cyclotron) certainly produces greater absolute yields than those just stated, but necessitates however a great increase in the expense of apparatus (extremely large magnets).

The present invention therefore proposes to allow the nuclear reactions to take place under completely different conditions, namely, in the gas phase, under a mean numerical concentration of more than 10^{19} molecules of the gas per cubic centimetre, and preferably under a concentration corresponding to a pressure of one atmosphere at normal temperature of 18° C. Since in this case, a selective acceleration of elementary particles is not possible, the attainment of a thermal equilibrium with very high temperatures (greater than 10^{7}° C.) is the objective. For reasons of energy consumption such conditions can only be maintained by extraordinarily high momentary outputs and only for very short times. Accordingly, this invention contemplates the production of energies of 100 watt seconds and more during intervals of 10^{-6} second and less, corresponding to momentary outputs of 100,000 kilowatts and more.

Theoretical calculations based on experiments with exploding wires, and also observations made in connection with mercury discharges in which the number of glowing atoms could be determined with some degree of certainty, lead to the conclusion that high temperatures of the order specified occur with condenser discharges in the gaseous phase. Such operating conditions have in themselves the advantage that because of the practically complete ionisation in the discharge canal the braking action of the electron cloud falls away, and therefore still larger yields of the nuclear reactions are to be expected than have been observed hitherto with neutral atoms. It is therefore proposed for the realisation of the operating conditions set forth above, to utilise condenser discharges. For this it is necessary that

1) the gas concentration (number of molecules per cubic centimetre) be so great

UNITED STATES PATENT OFFICE

2,251,190

METHOD OF PRODUCING NEUTRONS

Hartmut Israel Kallmann, formerly known as Hartmut Kallmann, Berlin-Charlottenburg, and Ernst Kuhn, Berlin, Germany, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Germany, a corporation of Germany

Application March 10, 1939, Serial No. 261,156
In Germany March 16, 1938

16 Claims. (Cl. 250—84)

This invention relates to a method for the production of neutrons, particularly by the interaction of deuterons.

In order to obtain neutrons with the aid of ions with relatively slight acceleration (for instance 300 kv.) the nuclear reaction

$$D+D=He_3+n$$

is employed. The procedure in this connection is to bombard a layer containing heavy hydrogen nuclei with heavy hydrogen ions or deuterons. For the layer containing hydrogen, use is often made of ice, sal ammoniac, phosphoric acid and similar substances in which ordinary hydrogen is replaced by heavy hydrogen. These layers very rich in hydrogen have the disadvantage that they conduct heat and electricity poorly and are therefore easily destroyed by ionic bombardment. It would be better if more resistant layers were used, for instance, metallic layers. That is possible, however, only when metals that contain large amounts of dissolved or adsorbed hydrogen are employed. These are a few such metals, but they have the disadvantage that they gradually give off hydrogen in the vacuum. It would be still better therefore if substances could be used that contain hydrogen adsorbed only on the surface or in a surface layer but give it off to the outside less easily. These substances placed in the ion stream give only a small output of neutrons when impinged on vertically since the thickness of the adsorbed hydrogen layer is very small in comparison with the range of the ions projected into the metal. Nuclear processes can occur therefore only in a fractional portion of the path of the ions. In case, however, the path of the ions is maintained as nearly as possible entirely within the thin hydrogen layer, a large neutron output is obtained with the aid of these thin adsorbed hydrogen layers.

A principal purpose of the invention is the provision of a highly efficient method for the production of neutrons by the interaction of deuterons. According to the invention this is attained by allowing the stream of ions to impinge on the layer at an angle,—preferably in as grazing a manner as possible.

The adsorption layer containing hydrogen need not consist of pure hydrogen. It might under certain conditions be more advantageous if the adsorption layer consists of gases or vapors containing hydrogen, for instance, methane or water. This is particularly satisfactory when these substances are adsorbed especially strongly.

The body impinged on by the ions is preferably made of a substance that strongly adsorbs the molecules containing heavy hydrogen and at the same time possesses only a slight retarding capacity for the impinging ions. Carbon and beryllium have been found useful for these reasons. It is especially desirable to employ substances that adsorb the molecules containing hydrogen in as thick a layer as possible. This can be accomplished for instance by using, as adsorption body, a substance that is porous or roughened at least at the surface.

The surface of the adsorbing body is heated up by the energy of the impinging ions. In this way the giving off of the adsorbed substance is promoted. It is, therefore, advisable to cool the adsorbing body. This cooling has the advantage, moreover, that at low temperature the adsorbed layer adheres much more firmly. A reduction of the temperature of only 10° C., for instance from 20° C. room temperature to 10° C., can produce a considerable improvement. In many cases, it is advisable to use solid carbon dioxide or even liquid air for the cooling.

The adsorbed layer can be produced in the usual way, for instance by taking up heavy hydrogen or molecules containing heavy hydrogen from the surroundings, for instance from the gas chamber; but it may also be produced by bombarding the surface with heavy hydrogen ions. It is advisable to free the surface intended for the adsorption of heavy hydrogen as far as possible from other adsorbed molecules, such as ordinary hydrogen, for example, by heating in vacuum.

The replacement of the hydrogen given off during the ion bombardment can be accomplished, for instance, by simultaneous or subsequent bombardment with ions containing heavy hydrogen. This bombardment can be accomplished, for instance, with advantage from a different direction, for example, from the back or at a more acute angle from the front, than the bombardment for producing neutrons. The replacement of the heavy hydrogen may be accomplished, for example, by diffusion or by adsorption from the surroundings.

The principles of the invention are illustrated in the accompanying drawing in which:

Fig. 1 is a diagrammatic representation of apparatus embodying the principles of the invention; and

Fig. 2 is a partial diagrammatic representation of a modified embodiment of the invention.

2. Origins of the German Nuclear Program

1920s: Georg Stetter, Fritz Houtermans, and others began working on nuclear energy release

1934: Ida Tacke Noddack published theoretical predictions of uranium fission and plutonium production

Uber das Element 93.

Von Dr.-Ing. Ida Noddack, Berlin. (Eingeg. 10. September 1934.)

Vor etwa vier Monaten wurde in dieser Zeitschrift über die Lücken des Periodischen Systems berichtet[1]). Am Schluß der Arbeit wurde auf die Möglichkeit der Entdeckung von Transuranen (d. h. Elementen, die im System auf das Uran folgen) eingegangen.

Wenige Wochen später erschienen zuerst in der Tagespresse, dann auch in der Fachliteratur Nachrichten, daß es zwei Forschern, Prof. *Fermi* in Rom und Ingenieur *Koblic* in Joachimsthal, unabhängig voneinander gelungen sei, das Element mit der Ordnungszahl 93 zu entdecken.

Wir wollen uns zunächst mit den Angaben von Fermi[2]) beschäftigen. *Fermi* hat die Frage untersucht, ob man die von *Curie* und *Joliot* entdeckte sogenannte induzierte Radioaktivität, die beim Beschießen von Atomkernen mit α-Strahlen entsteht, auch durch die Einwirkung von Neutronen hervorrufen kann.

Er brachte in ein Glasgefäß Berylliumpulver und Radiumemanation. Die Emanation emittiert α-Strahlen, diese treffen auf die Atomkerne des Berylliums und lösen in ihnen Neutronen aus. Die Neutronen durchdringen die Wände des Glasgefäßes und können auf in der Nähe befindliche Stoffe einwirken. *Fermi* brachte eine Reihe von Elementen in elementarer Form oder als Verbindungen in die Nähe seiner Strahlenquelle, ließ die Neutronen einwirken und setzte dann die bestrahlten Stoffe vor einen Geiger-Zähler. Zahlreiche Elemente sandten nach Bestrahlung mit Neutronen eine Zeitlang β-Strahlen aus, wiesen also in der Tat induzierte Radioaktivität auf[3]). Auf die Hypothesen, die *Fermi* zur Erklärung der zum Teil recht verwickelten Erscheinungen aufstellt[4]), soll hier nicht eingegangen werden, da uns nur ein Fall, die angebliche Entstehung des Elements 93, interessiert. Zum Studium der induzierten Radioaktivität des Urans brachte *Fermi* Uranylnitratlösung, die er von allen radioaktiven Zerfallsprodukten befreit hatte, in die Nähe seiner Neutronenquelle. Mit Hilfe des Geiger-Zählers konnte er zeigen, daß die Lösung durch die Bestrahlung radioaktiv geworden war und β-Strahlen aus-

[1]) *I. Noddack*, diese Ztschr. 47, 301 [1934].
[2]) *E. Fermi*, Nature 133, 898 [1934].
[3]) Natürlich wird nicht die Gesamtzahl der Atome des bestrahlten Stoffes radioaktiv, sondern nur eine unwägbare Menge, in diesem Fall einige hundert Atome.
[4]) *E. Fermi*, Nature 133, 757 [1934].

sandte. Die Auswertung der Abklingungskurve ergab, daß nicht nur ein, sondern mindestens fünf radioaktive Elemente von verschiedenen Halbwertszeiten entstanden waren, wobei es bisher, wie *Fermi* betont, noch unsicher ist, ob diese Elemente nacheinander oder nebeneinander entstehen.

Es gelang nun *Fermi*, eins dieser neu entstandenen Radioelemente, und zwar eins mit der Halbwertszeit 13 min, auf chemischem Wege abzutrennen. Er verfuhr dabei so, daß er die bestrahlte stark salpetersaure Uranylnitratlösung mit etwas Manganosalz versetzte, zum Kochen erhitzte, und dann Natriumchlorat zugab. In dem ausgeschiedenen Mangandioxyd war der größte Teil der β-Aktivität mit der Halbwertszeit von 13 min enthalten. *Fermi* versucht nun zu beweisen, daß das Radioelement, dem diese β-Aktivität zukommt, mit keinem bekannten Element in der Nähe des Urans isotop ist. Er setzt zu diesem Zweck zu der salpetersauren Lösung von bestrahltem Uranylnitrat nacheinander β-strahlende Isotope folgender Elemente: Protactinium (91), Thor (90), Actinium (89), Radium (88), Wismut (83) und Blei (82) und fällt dann Mangandioxyd mit Natriumchlorat. Alle die genannten β-strahlenden Elemente gehen nach *Fermi* nicht in den Niederschlag. Da das unbekannte Radioelement aber in die Manganfällung geht, und da es seinem Verhalten nach auch nicht mit Radon (86) und Ekacäsium (87) isotop sein kann, zieht *Fermi* den Schluß, daß es das unbekannte Element 93 (vielleicht auch 94 oder 95) sein könnte.

Diese Beweisführung ist nicht stichhaltig. Die Tatsache, daß *Fermi* nicht nur den bekannten unmittelbaren Nachbarn des Urans, das Protactinium, mit seinem neu entstandenen β-Strahler vergleicht, sondern mehrere Elemente bis herab zum Blei, beweist, daß er eine Reihe aufeinander folgender Abbauprozesse (unter Abgabe von Elektronen, Protonen und Heliumkernen) für möglich hält, die schließlich zur Bildung des Radioelements mit der Halbwertszeit 13 min führen. — Wenn er aber das tut, ist nicht einzusehen, warum er zwischen Uran (92) und Blei (82) das Element Polonium (84) nicht berücksichtigt, und warum er gerade beim Blei Halt macht; denn die alte Anschauung, daß die ununterbrochene Reihe radioaktiver Elemente beim Blei oder vielmehr beim Polonium ausgeführter Versuch zeigte, daß dieses Element nahezu quantitativ in den MnO_2-Niederschlag eingeht[5]). Der Beweis, daß das neue Radioelement die Ordnungszahl 93 hat, ist also noch keineswegs geglückt, da *Fermi* ihn nur durch ein unvollkommen durchgeführtes Ausschlußverfahren versucht hat.

Man kann ebensogut annehmen, daß bei dieser neuartigen Kernzertrümmerung durch Neutronen erheblich andere „Kernreaktionen" stattfinden, als man sie bisher bei der Einwirkung von Protonen- und α-Strahlen auf Atomkerne beobachtet hat. Bei den letztgenannten Bestrahlungen findet man nur Kernumwandlungen unter Abgabe von Elektronen, Protonen und Heliumkernen, wodurch sich bei schweren Elementen die Masse der bestrahlten Atomkerne nur wenig ändert, da nahe benachbarte Elemente entstehen. Es wäre denkbar, daß bei der Beschießung schwerer Kerne mit Neutronen diese Kerne in mehrere größere Bruchstücke zerfallen, die zwar Isotope bekannter Elemente, aber nicht Nachbarn der bestrahlten Elemente sind.

Auch der Befund, daß das neue Radioelement in saurer Lösung bei Fällung von Rheniumsulfid in diesen Niederschlag geht, spricht nicht für 93; denn erstens absorbiert das Rheniumsulfid gern andere Stoffe, und zweitens läßt die Voraussage der vermutlichen Eigenschaften von 93 es noch keineswegs sicher erscheinen, daß dieses Element ein säurebeständiges Sulfid bilden würde.

Weiterhin würde sich aus den Versuchen von *Fermi*, wenn seine Deutung richtig wäre, die von ihm nicht erwähnte Folgerung ergeben, daß aus dem β-strahlenden Element 93 das Element 94 entstehen müßte. Dieses Element sollte man verhältnismäßig leicht chemisch von 93 trennen können.

Man muß noch weitere Untersuchungen abwarten, ehe man behaupten darf, daß hier das Element 93 wirklich gefunden ist. *Fermi* selbst ist in dieser Hinsicht, wie bereits erwähnt wurde, vorsichtig, nur in einem Referat[6]) über seine Versuche und in den Berichten der Tagespresse glaubt man schon des Resultates sicher zu sein.

Die **zweite Angabe** über die Auffindung des Elements 93 stammt von Odolen Koblic[7]). Er teilte mit, daß er aus dem Waschwasser der gerösteten Pechblende von Joachimsthal reine Salze des Elements 93 in erheblicher Menge (die Pechblende sollte etwa 1% dieses

1934: Erich Schumann (shaped charge expert) hired Kurt Diebner (nuclear physicist) for army weapons program

1934-1938: AEG, I.G. Farben, and Auergesellschaft patented high-voltage fusion neutron generators and tritium breeders

PATENT SPECIFICATION

Convention Date (Germany): Feb. 9, 1937.

Application Date (in United Kingdom): Feb. 7, 1938. No. 3845/38.

Complete Specification Accepted: June 28, 1939.

508,233

COMPLETE SPECIFICATION

Method for Carrying out Nuclear Reactions

We, Degea Aktiengesellschaft (Auergesellschaft), of 16—19, Rotherstrasse, Berlin, O.17, Germany, a German Company, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Artificial nuclear reactions are initiated by the bombardment of nuclei with light elementary particles. With the use of charged particles (protons, α particles) energies of 10^5 to 10^7 volts are necessary for overcoming the coulombic repulsion powers, in order to ensure a sufficient yield for the penetration of the particles into the bombarded nucleus.

Such a repulsion does not exist for neutrons, so that neutrons of small speed can penetrate into nuclei and produce reactions, as experiments actually show.

Unfortunately, there are no direct sources producing neutrons; they arise, if nuclei, for example, Be, are irradiated with α-particles of high energies (about 10^6 volts) or γ-rays very rich in energy (about 2.10^6 volts) or by bombardment of certain nuclei with fast particles of the heavy isotope of hydrogen. As sources of α-particles of sufficiently high energy, only the naturally radioactive elements have hitherto been available. In the two other cases, for accelerating elementary particles it is necessary to have recourse to the use of very considerable amounts of energy. With the remaining hitherto known methods for the production of elementary particles rich in energy, which have been used directly, or indirectly through the production of very hard Röntgen rays, for the production of neutrons and generally for the initiation of nuclear reactions, there came to be used an acceleration of the desired particles in high vacuum. This method indeed produces definite speeds, but only at the expense of very heavy outlay in the matter of electro-technical apparatus for building up an increase in the current density of the accelerated particles, and also gives a greater absolute yield from the nuclear reactions. The output attained in this way probably corresponds, at best, to that of a few grams of radium. The method of repeated secondary acceleration by means of high frequency alternating fields (Cyclotron) certainly produces greater absolute yields than those just stated, but necessitates however a great increase in the expense of apparatus (extremely large magnets).

The present invention therefore proposes to allow the nuclear reactions to take place under completely different conditions, namely, in the gas phase, under a mean numerical concentration of more than 10^{19} molecules of the gas per cubic centimetre, and preferably under a concentration corresponding to a pressure of one atmosphere at normal temperature of 18° C. Since in this case, a selective acceleration of elementary particles is not possible, the attainment of a thermal equilibrium with very high temperatures (greater than 10^7° C.) is the objective. For reasons of energy consumption such conditions can only be maintained by extraordinarily high momentary outputs and only for very short times. Accordingly, this invention contemplates the production of energies of 100 watt seconds and more during intervals of 10^{-6} second and less, corresponding to momentary outputs of 100,000 kilowatts and more.

Theoretical calculations based on experiments with exploding wires, and also observations made in connection with mercury discharges in which the number of glowing atoms could be determined with some degree of certainty, lead to the conclusion that high temperatures of the order specified occur with condenser discharges in the gaseous phase. Such operating conditions have in themselves the advantage that because of the practically complete ionisation in the discharge canal the braking action of the electron cloud falls away, and therefore still larger yields of the nuclear reactions are to be expected than have been observed hitherto with neutral atoms. It is therefore proposed for the realisation of the operating conditions set forth above, to utilise condenser discharges. For this it is necessary that

1) the gas concentration (number of molecules per cubic centimetre) be so great

UNITED STATES PATENT OFFICE

2,251,190

METHOD OF PRODUCING NEUTRONS

Hartmut Israel Kallmann, formerly known as Hartmut Kallmann, Berlin-Charlottenburg, and Ernst Kuhn, Berlin, Germany, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Germany, a corporation of Germany

Application March 10, 1939, Serial No. 261,156
In Germany March 16, 1938

16 Claims. (Cl. 250—84)

This invention relates to a method for the production of neutrons, particularly by the interaction of deuterons.

In order to obtain neutrons with the aid of ions with relatively slight acceleration (for instance 300 kv.) the nuclear reaction

$$D+D=He_3+n$$

is employed. The procedure in this connection is to bombard a layer containing heavy hydrogen nuclei with heavy hydrogen ions or deuterons. For the layer containing hydrogen, use is often made of ice, sal ammoniac, phosphoric acid and similar substances in which ordinary hydrogen is replaced by heavy hydrogen. These layers very rich in hydrogen have the disadvantage that they conduct heat and electricity poorly and are therefore easily destroyed by ionic bombardment. It would be better if more resistant layers were used, for instance, metallic layers. That is possible, however, only when metals that contain large amounts of dissolved or adsorbed hydrogen are employed. These are a few such metals, but they have the disadvantage that they gradually give off hydrogen in the vacuum. It would be still better therefore if substances could be used that contain hydrogen adsorbed only on the surface or in a surface layer but give it off to the outside less easily. These substances placed in the ion stream give only a small output of neutrons when impinged on vertically since the thickness of the adsorbed hydrogen layer is very small in comparison with the range of the ions projected into the metal. Nuclear processes can occur therefore only in a fractional portion of the path of the ions. In case, however, the path of the ions is maintained as nearly as possible entirely within the thin hydrogen layer, a large neutron output is obtained with the aid of these thin adsorbed hydrogen layers.

A principal purpose of the invention is the provision of a highly efficient method for the production of neutrons by the interaction of deuterons. According to the invention this is attained by allowing the stream of ions to impinge on the layer at an angle,—preferably in as grazing a manner as possible.

The adsorption layer containing hydrogen need not consist of pure hydrogen. It might under certain conditions be more advantageous if the adsorption layer consists of gases or vapors containing hydrogen, for instance, methane or water. This is particularly satisfactory when these substances are adsorbed especially strongly.

The body impinged on by the ions is preferably made of a substance that strongly adsorbs the molecules containing heavy hydrogen and at the same time possesses only a slight retarding capacity for the impinging ions. Carbon and beryllium have been found useful for these reasons. It is especially desirable to employ substances that adsorb the molecules containing hydrogen in as thick a layer as possible. This can be accomplished for instance by using, as adsorption body, a substance that is porous or roughened at least at the surface.

The surface of the adsorbing body is heated up by the energy of the impinging ions. In this way the giving off of the adsorbed substance is promoted. It is, therefore, advisable to cool the adsorbing body. This cooling has the advantage, moreover, that at low temperature the adsorbed layer adheres much more firmly. A reduction of the temperature of only 10° C., for instance from 20° C. room temperature to 10° C., can produce a considerable improvement. In many cases, it is advisable to use solid carbon dioxide or even liquid air for the cooling.

The adsorbed layer can be produced in the usual way, for instance by taking up heavy hydrogen or molecules containing heavy hydrogen from the surroundings, for instance from the gas chamber; but it may also be produced by bombarding the surface with heavy hydrogen ions. It is advisable to free the surface intended for the adsorption of heavy hydrogen as far as possible from other adsorbed molecules, such as ordinary hydrogen, for example, by heating in vacuum.

The replacement of the hydrogen given off during the ion bombardment can be accomplished, for instance, by simultaneous or subsequent bombardment with ions containing heavy hydrogen. This bombardment can be accomplished, for instance, with advantage from a different direction, for example, from the back or at a more acute angle from the front, than the bombardment for producing neutrons. The replacement of the heavy hydrogen may be accomplished, for example, by diffusion or by adsorption from the surroundings.

The principles of the invention are illustrated in the accompanying drawing in which:

Fig. 1 is a diagrammatic representation of apparatus embodying the principles of the invention; and

Fig. 2 is a partial diagrammatic representation of a modified embodiment of the invention.

1936: Rausch von Traubenberg began using surrounding neutron reflectors

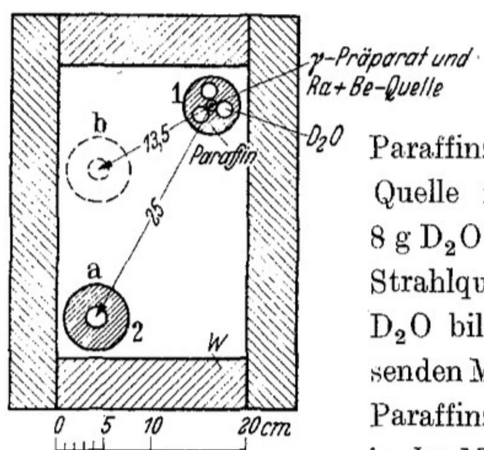


Fig. 3. Schema der Anordnung von Neutronenquelle und Detektor im Eisenhohlraum.

photoeffe
lium zur N
In dem
Paraffinzylinder 1
Quelle noch drei
8 g D_2O und zwe
Strahlquelle unterg
D_2O bildeten mit
senden Mantel von
Paraffinzylinder 2 v
in der Mitte den R
längere Meßreihe b
Aktivierung ohne

2. Origins of the German Nuclear Program

1920s: Georg Stetter, Fritz Houtermans, and others began working on nuclear energy release

1934: Ida Tacke Noddack published theoretical predictions of uranium fission and plutonium production

Uber das Element 93.

Von Dr.-Ing. Ida Noddack, Berlin. (Eingeg. 10. September 1934.)

Vor etwa vier Monaten wurde in dieser Zeitschrift über die Lücken des Periodischen Systems berichtet[1]). Am Schluß der Arbeit wurde auf die Möglichkeit der Entdeckung von Transuranen (d. h. Elementen, die im System auf das Uran folgen) eingegangen.

Wenige Wochen später erschienen zuerst in der Tagespresse, dann auch in der Fachliteratur Nachrichten, daß es zwei Forschern, Prof. *Fermi* in Rom und Ingenieur *Koblic* in Joachimsthal, unabhängig voneinander gelungen sei, das Element mit der Ordnungszahl 93 zu entdecken.

Wir wollen uns zunächst mit den Angaben von Fermi[2]) beschäftigen. *Fermi* hat die Frage untersucht, ob man die von *Curie* und *Joliot* entdeckte sogenannte induzierte Radioaktivität, die beim Beschießen von Atomkernen mit α-Strahlen entsteht, auch durch die Einwirkung von Neutronen hervorrufen kann.

Er brachte in ein Glasgefäß Berylliumpulver und Radiumemanation. Die Emanation emittiert α-Strahlen, diese treffen auf die Atomkerne des Berylliums und lösen in ihnen Neutronen aus. Die Neutronen durchdringen die Wände des Glasgefäßes und können auf in der Nähe befindliche Stoffe einwirken. *Fermi* brachte eine Reihe von Elementen in elementarer Form oder als Verbindungen in die Nähe seiner Strahlenquelle, ließ die Neutronen einwirken und setzte dann die bestrahlten Stoffe vor einen Geiger-Zähler. Zahlreiche Elemente sandten nach Bestrahlung mit Neutronen eine Zeitlang β-Strahlen aus, wiesen also in der Tat induzierte Radioaktivität auf[3]). Auf die Hypothesen, die *Fermi* zur Erklärung der zum Teil recht verwickelten Erscheinungen aufstellt[4]), soll hier nicht eingegangen werden, da uns nur ein Fall, die angebliche Entstehung des Elements 93, interessiert. Zum Studium der induzierten Radioaktivität des Urans brachte *Fermi* Uranylnitratlösung, die er von allen radioaktiven Zerfallsprodukten befreit hatte, in die Nähe seiner Neutronenquelle. Mit Hilfe des Geiger-Zählers konnte er zeigen, daß die Lösung durch die Bestrahlung radioaktiv geworden war und β-Strahlen aus-

[1]) *I. Noddack*, diese Ztschr. 47, 301 [1934].
[2]) *E. Fermi*, Nature 133, 898 [1934].
[3]) Natürlich wird nicht die Gesamtzahl der Atome des bestrahlten Stoffes radioaktiv, sondern nur eine unwägbare Menge, in diesem Fall einige hundert Atome.
[4]) *E. Fermi*, Nature 133, 757 [1934].

sandte. Die Auswertung der Abklingungskurve ergab, daß nicht nur ein, sondern mindestens fünf radioaktive Elemente von verschiedenen Halbwertszeiten entstanden waren, wobei es bisher, wie *Fermi* betont, noch unsicher ist, ob diese Elemente nacheinander oder nebeneinander entstehen.

Es gelang nun *Fermi*, eins dieser neu entstandenen Radioelemente, und zwar eins mit der Halbwertszeit 13 min, auf chemischem Wege abzutrennen. Er verfuhr dabei so, daß er die bestrahlte stark salpetersaure Uranylnitratlösung mit etwas Manganosalz versetzte, zum Kochen erhitzte, und dann Natriumchlorat zugab. In dem ausgeschiedenen Mangandioxyd war der größte Teil der β-Aktivität mit der Halbwertszeit von 13 min enthalten. *Fermi* versucht nun zu beweisen, daß das Radioelement, dem diese β-Aktivität zukommt, mit keinem bekannten Element in der Nähe des Urans isotop ist. Er setzt zu diesem Zweck zu der salpetersauren Lösung von bestrahltem Uranylnitrat nacheinander β-strahlende Isotope folgender Elemente: Protactinium (91), Thor (90), Actinium (89), Radium (88), Wismut (83) und Blei (82) und fällt dann Mangandioxyd mit Natriumchlorat. Alle die genannten β-strahlenden Elemente gehen nach *Fermi* nicht in den Niederschlag. Da das unbekannte Radioelement aber in die Manganfällung geht, und da es seinem Verhalten nach auch nicht mit Radon (86) und Ekacäsium (87) isotop sein kann, zieht *Fermi* den Schluß, daß es das unbekannte Element 93 (vielleicht auch 94 oder 95) sein könnte.

Diese Beweisführung ist nicht stichhaltig. Die Tatsache, daß *Fermi* nicht nur den bekannten unmittelbaren Nachbarn des Urans, das Protactinium, mit seinem neu entstandenen β-Strahler vergleicht, sondern mehrere Elemente bis herab zum Blei, beweist, daß er eine Reihe aufeinander folgender Abbauprozesse (unter Abgabe von Elektronen, Protonen und Heliumkernen) für möglich hält, die schließlich zur Bildung des Radioelements mit der Halbwertszeit 13 min führen. — Wenn er aber das tut, ist nicht einzusehen, warum er zwischen Uran (92) und Blei (82) das Element Polonium (84) nicht berücksichtigt, und warum er gerade beim Blei Halt macht; denn die alte Anschauung, daß die ununterbrochene Reihe radioaktiver Elemente beim Blei oder vielmehr beim Polonium ausgeführter Versuch zeigte, daß dieses Element nahezu quantitativ in den MnO_2-Niederschlag eingeht[5]). Der Beweis, daß das neue Radioelement die Ordnungszahl 93 hat, ist also noch keineswegs geglückt, da *Fermi* ihn nur durch ein unvollkommen durchgeführtes Ausschlußverfahren versucht hat.

Man kann ebensogut annehmen, daß bei dieser neuartigen Kernzertrümmerung durch Neutronen erheblich andere „Kernreaktionen" stattfinden, als man sie bisher bei der Einwirkung von Protonen- und α-Strahlen auf Atomkerne beobachtet hat. Bei den letztgenannten Bestrahlungen findet man nur Kernumwandlungen unter Abgabe von Elektronen, Protonen und Heliumkernen, wodurch sich bei schweren Elementen die Masse der bestrahlten Atomkerne nur wenig ändert, da nahe benachbarte Elemente entstehen. Es wäre denkbar, daß bei der Beschießung schwerer Kerne mit Neutronen diese Kerne in mehrere größere Bruchstücke zerfallen, die zwar Isotope bekannter Elemente, aber nicht Nachbarn der bestrahlten Elemente sind.

Auch der Befund, daß das neue Radioelement in saurer Lösung bei Fällung von Rheniumsulfid in diesen Niederschlag geht, spricht nicht für 93; denn erstens absorbiert das Rheniumsulfid gern andere Stoffe, und zweitens läßt die Voraussage der vermutlichen Eigenschaften von 93 es noch keineswegs sicher erscheinen, daß dieses Element ein säurebeständiges Sulfid bilden würde.

Weiterhin würde sich aus den Versuchen von *Fermi*, wenn seine Deutung richtig wäre, die von ihm nicht erwähnte Folgerung ergeben, daß aus dem β-strahlenden Element 93 das Element 94 entstehen müßte. Dieses Element sollte man verhältnismäßig leicht chemisch von 93 trennen können.

Man muß noch weitere Untersuchungen abwarten, ehe man behaupten darf, daß hier das Element 93 wirklich gefunden ist. *Fermi* selbst ist in dieser Hinsicht, wie bereits erwähnt wurde, vorsichtig, nur in einem Referat[6]) über seine Versuche und in den Berichten der Tagespresse glaubt man schon des Resultates sicher zu sein.

Die **zweite Angabe** über die Auffindung des Elements 93 stammt von Odolen Koblic[7]). Er teilte mit, daß er aus dem Waschwasser der gerösteten Pechblende von Joachimsthal reine Salze des Elements 93 in erheblicher Menge (die Pechblende sollte etwa 1% dieses

1934: Erich Schumann (shaped charge expert) hired Kurt Diebner (nuclear physicist) for army weapons program

1934-1938: AEG, I.G. Farben, and Auergesellschaft patented high-voltage fusion neutron generators and tritium breeders

PATENT SPECIFICATION

Convention Date (Germany): Feb. 9, 1937.

Application Date (in United Kingdom): Feb. 7, 1938. No. 3845/38.

Complete Specification Accepted: June 28, 1939.

508,233

COMPLETE SPECIFICATION

Method for Carrying out Nuclear Reactions

We, Degea Aktiengesellschaft (Auergesellschaft), of 16—19, Rotherstrasse, Berlin, O.17, Germany, a German Company, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Artificial nuclear reactions are initiated by the bombardment of nuclei with light elementary particles. With the use of charged particles (protons, α particles) energies of 10^5 to 10^7 volts are necessary for overcoming the coulombic repulsion powers, in order to ensure a sufficient yield for the penetration of the particles into the bombarded nucleus.

Such a repulsion does not exist for neutrons, so that neutrons of small speed can penetrate into nuclei and produce reactions, as experiments actually show.

Unfortunately, there are no direct sources producing neutrons; they arise, if nuclei, for example, Be, are irradiated with α-particles of high energies (about 10^6 volts) or γ-rays very rich in energy (about 2.10^6 volts) or by bombardment of certain nuclei with fast particles of the heavy isotope of hydrogen. As sources of α-particles of sufficiently high energy, only the naturally radioactive elements have hitherto been available. In the two other cases, for accelerating elementary particles it is necessary to have recourse to the use of very considerable amounts of energy. With the remaining hitherto known methods for the production of elementary particles rich in energy, which have been used directly, or indirectly through the production of very hard Röntgen rays, for the production of neutrons and generally for the initiation of nuclear reactions, there came to be used an acceleration of the desired particles in high vacuum. This method indeed produces definite speeds, but only at the expense of very heavy outlay in the matter of electro-technical apparatus for building up an increase in the current density of the accelerated particles, and also gives a greater absolute yield from the nuclear reactions. The output attained in this way probably corresponds, at best, to that of a few grams of radium. The method of repeated secondary acceleration by means of high frequency alternating fields (Cyclotron) certainly produces greater absolute yields than those just stated, but necessitates however a great increase in the expense of apparatus (extremely large magnets).

The present invention therefore proposes to allow the nuclear reactions to take place under completely different conditions, namely, in the gas phase, under a mean numerical concentration of more than 10^{19} molecules of the gas per cubic centimetre, and preferably under a concentration corresponding to a pressure of one atmosphere at normal temperature of 18° C. Since in this case, a selective acceleration of elementary particles is not possible, the attainment of a thermal equilibrium with very high temperatures (greater than 10^{7}° C.) is the objective. For reasons of energy consumption such conditions can only be maintained by extraordinarily high momentary outputs and only for very short times. Accordingly, this invention contemplates the production of energies of 100 watt seconds and more during intervals of 10^{-6} second and less, corresponding to momentary outputs of 100,000 kilowatts and more.

Theoretical calculations based on experiments with exploding wires, and also observations made in connection with mercury discharges in which the number of glowing atoms could be determined with some degree of certainty, lead to the conclusion that high temperatures of the order specified occur with condenser discharges in the gaseous phase. Such operating conditions have in themselves the advantage that because of the practically complete ionisation in the discharge canal the braking action of the electron cloud falls away, and therefore still larger yields of the nuclear reactions are to be expected than have been observed hitherto with neutral atoms. It is therefore proposed for the realisation of the operating conditions set forth above, to utilise condenser discharges. For this it is necessary that

1) the gas concentration (number of molecules per cubic centimetre) be so great

UNITED STATES PATENT OFFICE

2,251,190

METHOD OF PRODUCING NEUTRONS

Hartmut Israel Kallmann, formerly known as Hartmut Kallmann, Berlin-Charlottenburg, and Ernst Kuhn, Berlin, Germany, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Germany, a corporation of Germany

Application March 10, 1939, Serial No. 261,156
In Germany March 16, 1938

16 Claims. (Cl. 250—84)

This invention relates to a method for the production of neutrons, particularly by the interaction of deuterons.

In order to obtain neutrons with the aid of ions with relatively slight acceleration (for instance 300 kv.) the nuclear reaction

$$D+D=He_3+n$$

is employed. The procedure in this connection is to bombard a layer containing heavy hydrogen nuclei with heavy hydrogen ions or deuterons. For the layer containing hydrogen, use is often made of ice, sal ammoniac, phosphoric acid and similar substances in which ordinary hydrogen is replaced by heavy hydrogen. These layers very rich in hydrogen have the disadvantage that they conduct heat and electricity poorly and are therefore easily destroyed by ionic bombardment. It would be better if more resistant layers were used, for instance, metallic layers. That is possible, however, only when metals that contain large amounts of dissolved or adsorbed hydrogen are employed. These are a few such metals, but they have the disadvantage that they gradually give off hydrogen in the vacuum. It would be still better therefore if substances could be used that contain hydrogen adsorbed only on the surface or in a surface layer but give it off to the outside less easily. These substances placed in the ion stream give only a small output of neutrons when impinged on vertically since the thickness of the adsorbed hydrogen layer is very small in comparison with the range of the ions projected into the metal. Nuclear processes can occur therefore only in a fractional portion of the path of the ions. In case, however, the path of the ions is maintained as nearly as possible entirely within the thin hydrogen layer, a large neutron output is obtained with the aid of these thin adsorbed hydrogen layers.

A principal purpose of the invention is the provision of a highly efficient method for the production of neutrons by the interaction of deuterons. According to the invention this is attained by allowing the stream of ions to impinge on the layer at an angle,—preferably in as grazing a manner as possible.

The adsorption layer containing hydrogen need not consist of pure hydrogen. It might under certain conditions be more advantageous if the adsorption layer consists of gases or vapors containing hydrogen, for instance, methane or water. This is particularly satisfactory when these substances are adsorbed especially strongly.

The body impinged on by the ions is preferably made of a substance that strongly adsorbs the molecules containing heavy hydrogen and at the same time possesses only a slight retarding capacity for the impinging ions. Carbon and beryllium have been found useful for these reasons. It is especially desirable to employ substances that adsorb the molecules containing hydrogen in as thick a layer as possible. This can be accomplished for instance by using, as adsorption body, a substance that is porous or roughened at least at the surface.

The surface of the adsorbing body is heated up by the energy of the impinging ions. In this way the giving off of the adsorbed substance is promoted. It is, therefore, advisable to cool the adsorbing body. This cooling has the advantage, moreover, that at low temperature the adsorbed layer adheres much more firmly. A reduction of the temperature of only 10° C., for instance from 20° C. room temperature to 10° C., can produce a considerable improvement. In many cases, it is advisable to use solid carbon dioxide or even liquid air for the cooling.

The adsorbed layer can be produced in the usual way, for instance by taking up heavy hydrogen or molecules containing heavy hydrogen from the surroundings, for instance from the gas chamber; but it may also be produced by bombarding the surface with heavy hydrogen ions. It is advisable to free the surface intended for the adsorption of heavy hydrogen as far as possible from other adsorbed molecules, such as ordinary hydrogen, for example, by heating in vacuum.

The replacement of the hydrogen given off during the ion bombardment can be accomplished, for instance, by simultaneous or subsequent bombardment with ions containing heavy hydrogen. This bombardment can be accomplished, for instance, with advantage from a different direction, for example, from the back or at a more acute angle from the front, than the bombardment for producing neutrons. The replacement of the heavy hydrogen may be accomplished, for example, by diffusion or by adsorption from the surroundings.

The principles of the invention are illustrated in the accompanying drawing in which:

Fig. 1 is a diagrammatic representation of apparatus embodying the principles of the invention; and

Fig. 2 is a partial diagrammatic representation of a modified embodiment of the invention.

1936: Rausch von Traubenberg began using surrounding neutron reflectors

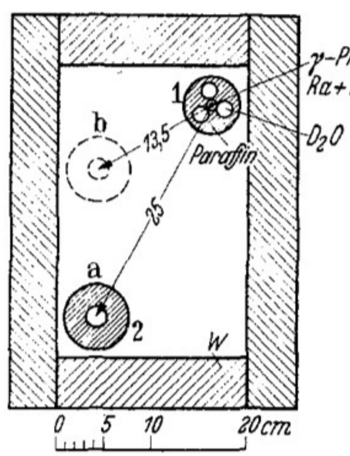


Fig. 3. Schema der Anordnung von Neutronenquelle und Detektor im Eisenhohlraum.

photoelel
lium zur N
In dem
Paraffinzylinder 1
Quelle noch drei
8 g D_2O und zwe
Strahlquelle unterg
D_2O bildeten mit
senden Mantel von
Paraffinzylinder 2 v
in der Mitte den R
längere Meßreihe b
Aktivierung ohne M

By January 1938, the highest levels of the German military were actively recruiting nuclear scientists (including Jewish ones) for a weapons program

(General Werner von Blomberg was Reichsminister of War May 1935–Jan. 1938)

SECRET No. 1 5 copies, Series a

ARMY SERVICE FORCES
MANHATTAN ENGINEER DISTRICT
INTELLIGENCE AND SECURITY DIVISION
BOSTON BRANCH OFFICE
P. O. BOX 2277
BOSTON, MASSACHUSETTS

IN REPLY REFER TO EIDM MI-16
DSM bl-36351

14 June 1945

Subject: Positive Intelligence

To: Major Francis J. Smith, Washington Liaison Office, Washington, D. C.

1. Inclosed is copy of the letter submitted by Confidential Informant No. 16 of the Boston Branch Office.

2. Siemens Halske and A. E. G. referred to are the German branches of Westinghouse and General Electric respectively.

3. According to informant Brasch was asked personally by Marshall Werner Von Blomberg, German Chief of Staff in 1938, to remain in Germany to do atomic research. Brasch is Jewish and believed it wiser to leave the country.

4. Confidential Informant No. 16 is identified as Richard S. Morse of the National Research Corporation.

5. For your information and any action which you may deem necessary.

James E. Nolan
JAMES E. NOLAN,
2nd Lt., Corps of Engineers,
Intelligence Officer.

Incl.:
Ltr (cy)

DECLASSIFIED
Authority NND 917017

June 2, 1945

NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3 GERMANY: US Wartime Positive Int. (Nov. 44-June 45)

Old Line Book Company
P. O. Box 1172
Boston 3, Massachusetts

Dear Mike:

In connection with investigational work now underway relative to the development of Manhattan District projects by the Germans, a certain amount of information probably can be obtained from Mr. A. Brasch of the Electronized Chemical Corporation at 122 East 42nd Street, New York City.

Mr. Brasch is a former German citizen, and I am sure he has been thoroughly investigated. As an atomist physicist in 1938 he was approached by members of the general German staff to initiate research along lines of interest to the Manhattan District. Because of his connections with Siemens Halske and A. E. G. and the University of Berlin some information might be forthcoming if required at this late date.

Sincerely yours,

/s/ R. S. Malton

Tom Malton

2. Origins of the German Nuclear Program

Die Naturwissenschaften 27:11-15 (January 1939)

Hahn and Strassmann

synthetischem Asbest[1], von künstlichem Glimmer[2], von künstlichem Kaolin[3] und Montmorillonit[4]. Bei allen diesen Versuchen hat man zwar bisher nur sehr kleine Kristalle erhalten, deren Identifizierung nur mittels Röntgenanalyse sichergestellt werden konnte. … fruchtbare … müssen.

Interes… Technik g… bei denen die einzelnen Glasfäden die bekannte …

Sprödigkeit des Glases vollkommen verloren haben, sowie ferner, daß die Beachtung des Isosterismus von Quarz und $AlPO_4$ zu technisch brauchbaren neuartigen Gläsern geführt hat.

Ich möchte schließen mit der Forderung, daß … …uchbaren … …cke mehr … …n Kennt- … …tzung des … …ngsgebiet … Bekannten und daß wir viel mehr als bisher unsere Kenntnisse über Kristallstruktur und Bindungsart der praktisch brauchbaren Stoffe vertiefen müssen, um in planmäßiger Weise diejenigen chemischen Elemente zur Verbindungsbildung beizuziehen, die aus den allgemeinen Erkenntnissen über Bau, Größe und Bindungsvermögen der Atome in Betracht kommen und in Deutschland als Rohstoffe vorhanden sind.

[1] K. H. SCHEUMANN, Fortschr. d. Min. Krist. Petrographie **17**, 69 (1937). — W. LÜTTGE, Fortschr. d. Min. Krist. Petrographie **18**, 29 (1933); **15**, 40 (1935). — Vgl. auch MACHATSCHKI, Naturwiss. **24**, 742 (1936).

[2] W. NOLL, Naturwiss. **20**, 283 (1932).

[3] W. NOLL, Naturwiss. **20**, 366 (1932).

[4] W. NOLL, Naturwiss. **23**, 197 (1935); vgl. auch W. NOLL, Ber. dtsch. keram. Ges. **19**, H. 5 (1938).

Über den Nachweis und das Verhalten der bei der Bestrahlung des Urans mittels Neutronen entstehenden Erdalkalimetalle[1].

Von O. HAHN und F. STRASSMANN, Berlin-Dahlem.

In einer vor kurzem an dieser Stelle erschienenen vorläufigen Mitteilung[2] wurde angegeben, daß bei der Bestrahlung des Urans mittels Neutronen außer den von MEITNER, HAHN und STRASSMANN im einzelnen beschriebenen Trans-Uranen — den Elementen 93 bis 96 — noch eine ganze Anzahl anderer Umwandlungsprodukte entstehen, die ihre Bildung offensichtlich einem sukzessiven zweimaligen α-Strahlenzerfall des vorübergehend entstandenen Urans 239 verdanken. Durch einen solchen Zerfall muß aus dem Element mit der Kernladung 92 ein solches mit der Kernladung 88 entstehen, also ein Radium. In der genannten Mitteilung wurden in einem noch als vorläufig bezeichneten Zerfallsschema 3 derartiger isomerer Radiumisotope mit ungefähr geschätzten Halbwertszeiten und ihren Umwandlungsprodukten, nämlich drei isomeren Actiniumisotopen, angegeben, die ihrerseits offensichtlich in Thorisotope übergehen.

Zugleich wurde auf die zunächst unerwartete Beobachtung hingewiesen, daß diese unter α-Strahlenabspaltung über ein Thorium sich bildenden Radiumisotope nicht nur mit schnellen, sondern auch mit verlangsamten Neutronen entstehen.

Der Schluß, daß es sich bei den Anfangsgliedern dieser drei neuen isomeren Reihen um Radiumisotope handelt, wurde darauf begründet, daß diese Substanzen sich mit Bariumsalzen abscheiden lassen und alle Reaktionen zeigen, die dem Element Barium eigen sind. Alle anderen bekannten Elemente, angefangen von den Trans-Uranen über das Uran, Protactinium, Thorium bis zum Actinium haben andere chemische Eigenschaften als das Barium und lassen sich leicht von ihm trennen. Dasselbe trifft zu für die Elemente unterhalb Radium, also etwa Wismut, Blei, Polonium, Ekacäsium.

Es bleibt also, wenn man das Barium selbst außer Betracht läßt, nur das Radium übrig.

Im folgenden soll kurz die Abscheidung des Isotopengemisches und die Gewinnung der einzelnen Glieder beschrieben werden. Aus dem Aktivitätsverlauf der einzelnen Isotope ergibt sich ihre Halbwertszeit und lassen sich die daraus entstehenden Folgeprodukte ermitteln. Die letzteren werden in dieser Mitteilung aber im einzelnen noch nicht beschrieben, weil wegen der sehr komplexen Vorgänge — es handelt sich um mindestens 3, wahrscheinlich 4 Reihen mit je 3 Substanzen — die Halbwertszeiten aller Folgeprodukte bisher noch nicht erschöpfend festgestellt werden konnten.

Als Trägersubstanz für die „Radiumisotope" diente naturgemäß immer das Barium. Am nächstliegenden war die Fällung des Bariums als Bariumsulfat, das neben dem Chromat schwerstlösliche Bariumsalz. Nach früheren Erfahrungen und einigen Vorversuchen wurde aber von der Abscheidung der „Radiumisotope" mit Bariumsulfat abgesehen; denn diese Niederschläge reißen neben geringen Mengen Uran nicht unbeträchtliche Mengen von Actinium- und Thoriumisotopen mit, also auch die mutmaßlichen Umwandlungsprodukte der Radiumisotope, und erlauben daher keine Reindarstellung der Ausgangsglieder. Statt der quantitativen, sehr oberflächenreichen Sulfatfällung wurde daher das in starker Salzsäure sehr schwer lösliche Ba-Chlorid als Fällungsmittel gewählt; eine Methode, die sich bestens bewährt hat.

Bei der energetisch nicht leicht zu verstehenden Bildung von Radiumisotopen aus Uran beim Beschießen mit langsamen Neutronen war eine besonders gründliche Bestimmung des chemischen Charakters der neu entstehenden künstlichen Radioelemente unerläßlich. Durch die Abtrennung einzelner analytischer Gruppen von Elementen aus der Lösung des bestrahlten Urans wurde außer der großen Gruppe der Transurane eine Aktivität stets bei den Erdalkalien (Trägersubstanz Ba), den seltenen Erden (Trägersubstanz La) und bei Elementen der vierten Gruppe des Periodischen Systems (Trägersubstanz Zr) gefunden. Eingehender untersucht wurden zunächst die Bariumfällungen, die offensichtlich die Anfangsglieder der beobachteten isomeren Reihen enthielten. Es soll gezeigt werden, daß Transurane, Uran, Protactinium, Thorium und Actinium

[1] Aus dem Kaiser Wilhelm-Institut für Chemie in Berlin-Dahlem. Eingegangen 22. Dezember 1938.

[2] O. HAHN u. F. STRASSMANN, Naturwiss. **26**, 756 (1938).

2. Origins of the German Nuclear Program

Die Naturwissenschaften 27:11-15 (January 1939)

Hahn and Strassmann

synthetischem Asbest[1], von künstlichem Glimmer[2], von künstlichem Kaolin[3] und Montmorillonit[4]. Bei allen diesen Versuchen hat man zwar bisher nur sehr kleine Kristalle erhalten, deren Identifizierung nur mittels Röntgenanalyse sichergestellt werden konnte. … fruchtbare … müssen.

Interes… Technik g… bei denen …

Sprödigkeit des Glases vollkommen verloren haben, sowie ferner, daß die Beachtung des Isosterismus von Quarz und $AlPO_4$ zu technisch brauchbaren neuartigen Gläsern geführt hat.

Ich möchte schließen mit der Forderung, daß … uchbaren … cke mehr … n Kennt… tzung des … ngsgebiet … unsere Kenntnisse über Kristallstruktur und Bindungsart der praktisch brauchbaren Stoffe vertiefen müssen, um in planmäßiger Weise diejenigen chemischen Elemente zur Verbindungsbildung beizuziehen, die aus den allgemeinen Erkenntnissen über Bau, Größe und Bindungsvermögen der Atome in Betracht kommen und in Deutschland als Rohstoffe vorhanden sind.

[1] K. H. SCHEUMANN, Fortschr. d. Min. Krist. Petrographie 17, 69 (1937). — W. LÜTTGE, Fortschr. d. Min. Krist. Petrographie 18, 29 (1933); 15, 40 (1935). — Vgl. auch MACHATSCHKI, Naturwiss. 24, 742 (1936).
[2] W. NOLL, Naturwiss. 20, 283 (1932).
[3] W. NOLL, Naturwiss. 20, 366 (1932).
[4] W. NOLL, Naturwiss. 23, 197 (1935); vgl. auch W. NOLL, Ber. dtsch. keram. Ges. 19, H. 5 (1938).

Über den Nachweis und das Verhalten der bei der Bestrahlung des Urans mittels Neutronen entstehenden Erdalkalimetalle[1].

Von O. HAHN und F. STRASSMANN, Berlin-Dahlem.

In einer vor kurzem an dieser Stelle erschienenen vorläufigen Mitteilung[2] wurde angegeben, daß bei der Bestrahlung des Urans mittels Neutronen außer den von MEITNER, HAHN und STRASSMANN im einzelnen beschriebenen Trans-Uranen — den Elementen 93 bis 96 — noch eine ganze Anzahl anderer Umwandlungsprodukte entstehen, die ihre Bildung offensichtlich einem sukzessiven zweimaligen α-Strahlenzerfall des vorübergehend entstandenen Urans 239 verdanken. Durch einen solchen Zerfall muß aus dem Element mit der Kernladung 92 ein solches mit der Kernladung 88 entstehen, also ein Radium. In der genannten Mitteilung wurden in einem noch als vorläufig bezeichneten Zerfallsschema 3 derartiger isomerer Radiumisotope mit ungefähr geschätzten Halbwertszeiten und ihren Umwandlungsprodukten, nämlich drei isomeren Actiniumisotopen, angegeben, die ihrerseits offensichtlich in Thorisotope übergehen.

Zugleich wurde auf die zunächst unerwartete Beobachtung hingewiesen, daß diese unter α-Strahlenabspaltung über ein Thorium sich bildenden Radiumisotope nicht nur mit schnellen, sondern auch mit verlangsamten Neutronen entstehen.

Der Schluß, daß es sich bei den Anfangsgliedern dieser drei neuen isomeren Reihen um Radiumisotope handelt, wurde darauf begründet, daß diese Substanzen sich mit Bariumsalzen abscheiden lassen und alle Reaktionen zeigen, die dem Element Barium eigen sind. Alle anderen bekannten Elemente, angefangen von den Trans-Uranen über das Uran, Protactinium, Thorium bis zum Actinium haben andere chemische Eigenschaften als das Barium und lassen sich leicht von ihm trennen. Dasselbe trifft zu für die Elemente unterhalb Radium, also etwa Wismut, Blei, Polonium, Ekacäsium.

Es bleibt also, wenn man das Barium selbst außer Betracht läßt, nur das Radium übrig.

Im folgenden soll kurz die Abscheidung des Isotopengemisches und die Gewinnung der einzelnen Glieder beschrieben werden. Aus dem Aktivitätsverlauf der einzelnen Isotope ergibt sich ihre Halbwertszeit und lassen sich die daraus entstehenden Folgeprodukte ermitteln. Die letzteren werden in dieser Mitteilung aber im einzelnen noch nicht beschrieben, weil wegen der sehr komplexen Vorgänge — es handelt sich um mindestens 3, wahrscheinlich 4 Reihen mit je 3 Substanzen — die Halbwertszeiten aller Folgeprodukte bisher noch nicht erschöpfend festgestellt werden konnten.

Als Trägersubstanz für die „Radiumisotope" diente naturgemäß immer das Barium. Am nächstliegenden war die Fällung des Bariums als Bariumsulfat, das neben dem Chromat schwerstlösliche Bariumsalz. Nach früheren Erfahrungen und einigen Vorversuchen wurde aber von der Abscheidung der „Radiumisotope" mit Bariumsulfat abgesehen; denn diese Niederschläge reißen neben geringen Mengen Uran nicht unbeträchtliche Mengen von Actinium- und Thoriumisotopen mit, also auch die mutmaßlichen Umwandlungsprodukte der Radiumisotope, und erlauben daher keine Reindarstellung der Ausgangsglieder. Statt der quantitativen, sehr oberflächenreichen Sulfatfällung wurde daher das in starker Salzsäure sehr schwer lösliche Ba-Chlorid als Fällungsmittel gewählt; eine Methode, die sich bestens bewährt hat.

Bei der energetisch nicht leicht zu verstehenden Bildung von Radiumisotopen aus Uran beim Beschießen mit langsamen Neutronen war eine besonders gründliche Bestimmung des chemischen Charakters der neu entstehenden künstlichen Radioelemente unerläßlich. Durch die Abtrennung einzelner analytischer Gruppen von Elementen aus der Lösung des bestrahlten Urans wurde außer der großen Gruppe der Transurane eine Aktivität stets bei den Erdalkalien (Trägersubstanz Ba), den seltenen Erden (Trägersubstanz La) und bei Elementen der vierten Gruppe des Periodischen Systems (Trägersubstanz Zr) gefunden. Eingehender untersucht wurden zunächst die Bariumfällungen, die offensichtlich die Anfangsglieder der beobachteten isomeren Reihen enthielten. Es soll gezeigt werden, daß Transurane, Uran, Protactinium, Thorium und Actinium

[1] Aus dem Kaiser Wilhelm-Institut für Chemie in Berlin-Dahlem. Eingegangen 22. Dezember 1938.
[2] O. HAHN u. F. STRASSMANN, Naturwiss. 26, 756 (1938).

Georg Stetter

ÖSTERREICHISCHES PATENTAMT **Kl. 21 i_4, 4/10**

PATENTSCHRIFT NR. 219170

Ausgegeben am 10. Jänner 1962

ALPENLÄNDISCHER ZENTRALVEREIN ZUR FÖRDERUNG SCHÖPFERISCHEN SCHAFFENS IN SALZBURG

Vorrichtung zur technischen Energiegewinnung mit Hilfe von Kernspaltungsreaktionen

Angemeldet am 30. Juni 1958 (A 4597/58); als Tag der Anmeldung gilt der 14. Juni 1939 (Tag der Hinterlegung beim Deutschen Reichspatentamt).
Beginn der Patentdauer: 15. Juni 1961.
Längste mögliche Dauer: 14. Juni 1971.
Als Erfinder wird genannt: Dr. Georg Stetter in Zell am See (Salzburg).

Die Erfindung bezieht sich auf eine Vorrichtung zur technischen Energiegewinnung mit Hilfe von Kernspaltungsreaktionen, wobei außer den eigentlichen Spaltsubstanzen (Brennstoff) neutronenstreuende Substanzen (Moderator) und gegebenenfalls neutronenabsorbierende Substanzen (Absorber) verwendet sind.

In derartigen Vorrichtungen (Spaltungsreaktoren) wird die Aufrechterhaltung der energieproduzierenden, mit Hilfe der bei der Kernspaltung entstehenden Spaltneutronen (Sekundärneutronen) als Kettenreaktion ablaufenden Kernspaltungen dadurch bewirkt, daß die schnellen Spaltneutronen in den neutronenstreuenden Substanzen (Moderator) auf langsame Geschwindigkeiten gebremst (moderiert) werden. Dieser Vorgang erhöht die Häufigkeit der Kernspaltungen und damit auch der Neutronenproduktion, da Kernspaltungen in überwiegendem Maße von langsamen Neutronen bewirkt werden. Die Neutronenbilanz wird gehoben, wodurch erhöhte Neutronenverluste, welche den Abbruch der Kettenreaktion zur Folge haben, kompensiert werden können.

Eine derartige Vorrichtung wurde von S. Flügge in der Zeitschrift Naturwissenschaften 27 [1939] im Heft 23/24 vom 9. 6. 1939, S. 402/410 beschrieben, wobei nach dem Vorschlag von S. Flügge die Spaltsubstanzen (Brennstoff) mit den neutronenstreuenden Substanzen (Moderator) homogen gemischt sind (homogener Spaltungsreaktor).

Die Neutronenökonomie ist jedoch infolge starken Neutroneneinfanges durch die Spaltsubstanzen bei einer homogenen Mischung von Spaltsubstanzen und neutronenstreuenden Substanzen nicht gut, so daß eine Kettenreaktion nur unter erschwerenden technischen Bedingungen in Gang gesetzt und aufrechterhalten werden kann.

Dieser Mangel wird durch die Erfindung dadurch behoben, daß die Spaltsubstanzen (Brennstoff) von den Neutronen streuenden Substanzen (Moderator) räumlich getrennt angeordnet sind (heterogener Spaltungsreaktor). Unter "räumlich getrennt" wird hier das Gegenteil einer homogenen Mischung verstanden, nämlich die "makroskopische" Eigenständlichkeit der Bereiche der Spaltsubstanzen (Brennstoffbereiche) und der Bereiche der neutronenstreuenden Substanzen (Moderatorbereiche).

Dadurch, daß auf diese Weise die Spaltneutronen in von der Spaltsubstanz hinreichend entfernten Bereichen auf thermische Geschwindigkeit abgebremst werden, entgehen sie leichter den Einfangprozessen, welche bei bestimmte … en in besonderem Maße auftreten. Der … se - bedingt auch durch die geometrisch … nzen - den kritischen Wert 1 für statio…

Vor dem Prioritäts… rdnungen die von einem Ra-Be-Präparat ausgesandten Primärneutronen in räumlich von der Spaltsubstanz getrennt angeordneten neutronenstreuenden Substanzen gebremst (vgl. Comptes Rendus 208, [1939], S. 898/900). Es ist jedoch vor dem Prioritätszeitpunkt der Erfindung nicht bekanntgeworden, eine derartige Anordnung auch zur Bremsung von in der Spaltsubstanz entstehenden Sekundärneutronen (Spaltneutronen) vorzusehen. Es

2. Origins of the German Nuclear Program

Hahn and Strassmann

Die Naturwissenschaften 27:11-15 (January 1939)

synthetischem Asbest[1], von künstlichem Glimmer[2], von künstlichem Kaolin[3] und Montmorillonit[4]. Bei allen diesen Versuchen hat man zwar bisher nur sehr kleine Kristalle erhalten, deren Identifizierung nur mittels Röntgenanalyse sichergestellt werden konnte.]
fruchtbare
müssen.
Interes
Technik ge
bei denen die einzelnen Glasladen die bekannte

Sprödigkeit des Glases vollkommen verloren haben, sowie ferner, daß die Beachtung des Isosterismus von Quarz und $AlPO_4$ zu technisch brauchbaren neuartigen Gläsern geführt hat.

Ich möchte schließen mit der Forderung, daß
uchbaren
cke mehr
n Kennt-
tzung des
ngsgebiet
bekannten und daß wir viel mehr als bisher unsere Kenntnisse über Kristallstruktur und Bindungsart der praktisch brauchbaren Stoffe vertiefen müssen, um in planmäßiger Weise diejenigen chemischen Elemente zur Verbindungsbildung beizuziehen, die aus den allgemeinen Erkenntnissen über Bau, Größe und Bindungsvermögen der Atome in Betracht kommen und in Deutschland als Rohstoffe vorhanden sind.

[1] K. H. SCHEUMANN, Fortschr. d. Min. Krist. Petrographie 17, 69 (1937). — W. LÜTTGE, Fortschr. d. Min. Krist. Petrographie 18, 29 (1933); 15, 40 (1935). — Vgl. auch MACHATSCHKI, Naturwiss. 24, 742 (1936).
[2] W. NOLL, Naturwiss. 20, 283 (1932).
[3] W. NOLL, Naturwiss. 20, 366 (1932).
[4] W. NOLL, Naturwiss. 23, 197 (1935); vgl. auch W. NOLL, Ber. dtsch. keram. Ges. 19, H. 5 (1938).

Über den Nachweis und das Verhalten der bei der Bestrahlung des Urans mittels Neutronen entstehenden Erdalkalimetalle[1].

Von O. HAHN und F. STRASSMANN, Berlin-Dahlem.

In einer vor kurzem an dieser Stelle erschienenen vorläufigen Mitteilung[2] wurde angegeben, daß bei der Bestrahlung des Urans mittels Neutronen außer den von MEITNER, HAHN und STRASSMANN im einzelnen beschriebenen Trans-Uranen — den Elementen 93 bis 96 — noch eine ganze Anzahl anderer Umwandlungsprodukte entstehen, die ihre Bildung offensichtlich einem sukzessiven zweimaligen α-Strahlenzerfall des vorübergehend entstandenen Urans 239 verdanken. Durch einen solchen Zerfall muß aus dem Element mit der Kernladung 92 ein solches mit der Kernladung 88 entstehen, also ein Radium. In der genannten Mitteilung wurden in einem noch als vorläufig bezeichneten Zerfallsschema 3 derartiger isomerer Radiumisotope mit ungefähr geschätzten Halbwertszeiten und ihren Umwandlungsprodukten, nämlich drei isomeren Actiniumisotopen, angegeben, die ihrerseits offensichtlich in Thorisotope übergehen.

Zugleich wurde auf die zunächst unerwartete Beobachtung hingewiesen, daß diese unter α-Strahlenabspaltung über ein Thorium sich bildenden Radiumisotope nicht nur mit schnellen, sondern auch mit verlangsamten Neutronen entstehen.

Der Schluß, daß es sich bei den Anfangsgliedern dieser drei neuen isomeren Reihen um Radiumisotope handelt, wurde darauf begründet, daß diese Substanzen sich mit Bariumsalzen abscheiden lassen und alle Reaktionen zeigen, die dem Element Barium eigen sind. Alle anderen bekannten Elemente, angefangen von den Trans-Uranen über das Uran, Protactinium, Thorium bis zum Actinium haben andere chemische Eigenschaften als das Barium und lassen sich leicht von ihm trennen. Dasselbe trifft zu für die Elemente unterhalb Radium, also etwa Wismut, Blei, Polonium, Ekacäsium.

Es bleibt also, wenn man das Barium selbst außer Betracht läßt, nur das Radium übrig.

Im folgenden soll kurz die Abscheidung des Isotopengemisches und die Gewinnung der einzelnen Glieder beschrieben werden. Aus dem Aktivitätsverlauf der einzelnen Isotope ergibt sich ihre Halbwertszeit und lassen sich die daraus entstehenden Folgeprodukte ermitteln. Die letzteren werden in dieser Mitteilung aber im einzelnen noch nicht beschrieben, weil wegen der sehr komplexen Vorgänge — es handelt sich um mindestens 3, wahrscheinlich 4 Reihen mit je 3 Substanzen — die Halbwertszeiten aller Folgeprodukte bisher noch nicht erschöpfend festgestellt werden konnten.

Als Trägersubstanz für die „Radiumisotope" diente naturgemäß immer das Barium. Am nächstliegenden war die Fällung des Bariums als Bariumsulfat, das neben dem Chromat schwerstlösliche Bariumsalz. Nach früheren Erfahrungen und einigen Vorversuchen wurde aber von der Abscheidung der „Radiumisotope" mit Bariumsulfat abgesehen; denn diese Niederschläge reißen neben geringen Mengen Uran nicht unbeträchtliche Mengen von Actinium- und Thoriumisotopen mit, also auch die mutmaßlichen Umwandlungsprodukte der Radiumisotope, und erlauben daher keine Reindarstellung der Ausgangsglieder. Statt der quantitativen, sehr oberflächenreichen Sulfatfällung wurde daher das in starker Salzsäure sehr schwer lösliche Ba-Chlorid als Fällungsmittel gewählt; eine Methode, die sich bestens bewährt hat.

Bei der energetisch nicht leicht zu verstehenden Bildung von Radiumisotopen aus Uran beim Beschießen mit langsamen Neutronen war eine besonders gründliche Bestimmung des chemischen Charakters der neu entstehenden künstlichen Radioelemente unerläßlich. Durch die Abtrennung einzelner analytischer Gruppen von Elementen aus der Lösung des bestrahlten Urans wurde außer der großen Gruppe der Transurane eine Aktivität stets bei den Erdalkalien (Trägersubstanz Ba), den seltenen Erden (Trägersubstanz La) und bei Elementen der vierten Gruppe des Periodischen Systems (Trägersubstanz Zr) gefunden. Eingehender untersucht wurden zunächst die Bariumfällungen, die offensichtlich die Anfangsglieder der beobachteten isomeren Reihen enthielten. Es soll gezeigt werden, daß Transurane, Uran, Protactinium, Thorium und Actinium

[1] Aus dem Kaiser Wilhelm-Institut für Chemie in Berlin-Dahlem. Eingegangen 22. Dezember 1938.
[2] O. HAHN u. F. STRASSMANN, Naturwiss. 26, 756 (1938).

Georg Stetter

ÖSTERREICHISCHES PATENTAMT

PATENTSCHRIFT NR. 219170

Kl. 21 i_4, 4/10

Ausgegeben am 10. Jänner 1962

ALPENLÄNDISCHER ZENTRALVEREIN
ZUR FÖRDERUNG SCHÖPFERISCHEN SCHAFFENS
IN SALZBURG

Vorrichtung zur technischen Energiegewinnung mit Hilfe von Kernspaltungsreaktionen

Angemeldet am 30. Juni 1958 (A 4597/58); als Tag der Anmeldung gilt der 14. Juni 1939 (Tag der Hinterlegung beim Deutschen Reichspatentamt).
Beginn der Patentdauer: 15. Juni 1961.
Längste mögliche Dauer: 14. Juni 1971.
Als Erfinder wird genannt: Dr. Georg Stetter in Zell am See (Salzburg).

Die Erfindung bezieht sich auf eine Vorrichtung zur technischen Energiegewinnung mit Hilfe von Kernspaltungsreaktionen, wobei außer den eigentlichen Spaltsubstanzen (Brennstoff) neutronenstreuende Substanzen (Moderator) und gegebenenfalls neutronenabsorbierende Substanzen (Absorber) verwendet sind.

In derartigen Vorrichtungen (Spaltungsreaktoren) wird die Aufrechterhaltung der energieproduzierenden, mit Hilfe der bei der Kernspaltung entstehenden Spaltneutronen (Sekundärneutronen) als Kettenreaktion ablaufenden Kernspaltungen dadurch bewirkt, daß die schnellen Spaltneutronen in den neutronenstreuenden Substanzen (Moderator) auf langsame Geschwindigkeiten gebremst (moderiert) werden. Dieser Vorgang erhöht die Häufigkeit der Kernspaltungen und damit auch der Neutronenproduktion, da Kernspaltungen in überwiegendem Maße von langsamen Neutronen bewirkt werden. Die Neutronenbilanz wird gehoben, wodurch erhöhte Neutronenverluste, welche den Abbruch der Kettenreaktion zur Folge haben, kompensiert werden können.

Eine derartige Vorrichtung wurde von S. Flügge in der Zeitschrift Naturwissenschaften 27 [1939] im Heft 23/24 vom 9. 6. 1939, S. 402/410 beschrieben, wobei nach dem Vorschlag von S. Flügge die Spaltsubstanzen (Brennstoff) mit den neutronenstreuenden Substanzen (Moderator) homogen gemischt sind (homogener Spaltungsreaktor).

Die Neutronenökonomie ist jedoch infolge starken Neutroneneinfanges durch die Spaltsubstanzen bei einer homogenen Mischung von Spaltsubstanzen und neutronenstreuenden Substanzen nicht gut, so daß eine Kettenreaktion nur unter erschwerenden technischen Bedingungen in Gang gesetzt und aufrechterhalten werden kann.

Dieser Mangel wird durch die Erfindung dadurch behoben, daß die Spaltsubstanzen (Brennstoff) von den Neutronen streuenden Substanzen (Moderator) räumlich getrennt angeordnet sind (heterogener Spaltungsreaktor). Unter "räumlich getrennt" wird hier das Gegenteil einer homogenen Mischung verstanden, nämlich die "makroskopische" Eigenständlichkeit der Bereiche der Spaltsubstanzen (Brennstoffbereiche) und der Bereiche der neutronenstreuenden Substanzen (Moderatorbereiche).

Dadurch, daß auf diese Weise die Spaltneutronen in von der Spaltsubstanz hinreichend entfernten Bereichen auf thermische Geschwindigkeit abgebremst werden, entgehen sie leichter den Einfangprozessen, welche bei bestimmte
en in besonderem
Maße auftreten. Der
se - bedingt auch
durch die geometrisch
nzen - den kriti-
schen Wert 1 für statio

Vor dem Prioritäts
rdnungen die von
einem Ra-Be-Präparat ausgesandten Primärneutronen in räumlich von der Spaltsubstanz getrennt angeordneten neutronenstreuenden Substanzen gebremst (vgl. Comptes Rendus 208, [1939], S. 898/900). Es ist jedoch vor dem Prioritätszeitpunkt der Erfindung nicht bekanntgeworden, eine derartige Anordnung auch zur Bremsung von in der Spaltsubstanz entstehenden Sekundärneutronen (Spaltneutronen) vorzusehen. Es

von Ardenne and Ohnesorge

Philip Morrison to Samuel K. Allison. 20 December 1943. Report on Enemy Physics Literature: Survey Report P. NARA RG 77, Entry UD-22A, Box 170, Folder 32.60-1 GERMANY: Summary Reports (1944)

DECLASSIFIED
Authority NND 917017

SECRET

S. K. Allison - 6 - December 20, 1943

2) At Berlin-Lichterfelde, in the private laboratory of the radio engineer, M. von Ardenne. At this laboratory some neutron work is being done, and at least one well-known neutron physicist (Houtermans) is employed.(20) It is interesting that an electronic research laboratory should extend into nuclear physics in war-time. Ardenne mentions that he was urged to do nuclear physics in 1939 by the Reichspostminester Ohnesorge.

3) A serviceable machine in Heidelberg, under Bothe.

(Can the presence and scale of secret work of these laboratories be determined?)

B. The principal laboratories which have published in this field are given after the text of the report with the names of the best-known workers, and with some statement of the nature of the work of each laboratory.

C. General personnel situation

The years 1940-1941 saw a dislocation of German nuclear physics similar to that in America. Heisenberg went from Leipzig to the K.W.I. at Berlin; men like Pose and Funfer, early workers in the field, came from small universities to Berlin-Dahlem or Heidelberg. The British concluded(21) that in Berlin-Dahlem was situated the main government team. This conclusion still seems sound. Much work was farmed out, as can be seen above, especially to Bothe's gro
that the mean
who came to Da
itely not on
secret work.
munication(22)--
that from late
have not
been involved
ument against
a parallel Ger
east justified
by Heisenberg'
n bombs and/or
poison has bee

A number of young German physicists have not published at all since their first 1939 work on fission. They may form the junior staff of the project. It is again true that mention of their presence has come largely from Hahn's group.

D. The University of Strasbourg

A possible opportunity to learn more is provided by the new Nazi university at Strasbourg, in Alsace. Apparently for purposes of propaganda, they have sent there in late 1942-early 1943 a rather strong faculty. Included are Heisenberg's closest co-worker at Berlin, K. F. v. Weiszacker, Fleishmann, a well-known colleague of Bothe's, and Noddack, a man with experience in radio- and rare-element chemistry. These men will know a great deal. It is certainly true that Allied connections in Alsace are much better than those in Germany.

(Can this be employed to learn something about the German work through these men and their talk or activities?)

SECRET

This document contains information affecting the national defense of the United States within the meaning of the Espionage Act

2. Origins of the German Nuclear Program

Die Naturwissenschaften 27:11-15 (January 1939)

synthetischem Asbest[1], von künstlichem Glimmer[2], von künstlichem Kaolin[3] und Montmorillonit[4]. Bei allen diesen Versuchen hat man zwar bisher nur sehr kleine Kristalle erhalten, deren Identifizierung nur mittels Röntgenanalyse sichergestellt werden konnte.] fruchtbare müssen.

Interes Technik ge bei denen die einzelnen Glasfäden die bekannte

Sprödigkeit des Glases vollkommen verloren haben, sowie ferner, daß die Beachtung des Isosterismus von Quarz und $AlPO_4$ zu technisch brauchbaren neuartigen Gläsern geführt hat.

Ich möchte schließen mit der Forderung, daß uchbaren cke mehr n Kennt- tzung des ngsgebiet Bekannten und daß wir viel mehr als bisher unsere Kenntnisse über Kristallstruktur und Bindungsart der praktisch brauchbaren Stoffe vertiefen müssen, um in planmäßiger Weise diejenigen chemischen Elemente zur Verbindungsbildung beizuziehen, die aus den allgemeinen Erkenntnissen über Bau, Größe und Bindungsvermögen der Atome in Betracht kommen und in Deutschland als Rohstoffe vorhanden sind.

[1] K. H. SCHEUMANN, Fortschr. d. Min. Krist. Petrographie 17, 69 (1937). — W. LÜTTGE, Fortschr. d. Min. Krist. Petrographie 18, 29 (1933); 15, 40 (1935). — Vgl. auch MACHATSCHKI, Naturwiss. 24, 742 (1936).
[2] W. NOLL, Naturwiss. 20, 283 (1932).
[3] W. NOLL, Naturwiss. 20, 366 (1932).
[4] W. NOLL, Naturwiss. 23, 197 (1935); vgl. auch W. NOLL, Ber. dtsch. keram. Ges. 19, H. 5 (1938).

Über den Nachweis und das Verhalten der bei der Bestrahlung des Urans mittels Neutronen entstehenden Erdalkalimetalle[1].

Von O. HAHN und F. STRASSMANN, Berlin-Dahlem.

In einer vor kurzem an dieser Stelle erschienenen vorläufigen Mitteilung[2] wurde angegeben, daß bei der Bestrahlung des Urans mittels Neutronen außer den von MEITNER, HAHN und STRASSMANN im einzelnen beschriebenen Trans-Uranen — den Elementen 93 bis 96 — noch eine ganze Anzahl anderer Umwandlungsprodukte entstehen, die ihre Bildung offensichtlich einem sukzessiven zweimaligen α-Strahlenzerfall des vorübergehend entstandenen Urans 239 verdanken. Durch einen solchen Zerfall muß aus dem Element mit der Kernladung 92 ein solches mit der Kernladung 88 entstehen, also ein Radium. In der genannten Mitteilung wurden in einem noch als vorläufig bezeichneten Zerfallsschema 3 derartiger isomerer Radiumisotope mit ungefähr geschätzten Halbwertszeiten und ihren Umwandlungsprodukten, nämlich drei isomeren Actiniumisotopen, angegeben, die ihrerseits offensichtlich in Thorisotope übergehen.

Zugleich wurde auf die zunächst unerwartete Beobachtung hingewiesen, daß diese unter α-Strahlenabspaltung über ein Thorium sich bildenden Radiumisotope nicht nur mit schnellen, sondern auch mit verlangsamten Neutronen entstehen.

Der Schluß, daß es sich bei den Anfangsgliedern dieser drei neuen isomeren Reihen um Radiumisotope handelt, wurde darauf begründet, daß diese Substanzen sich mit Bariumsalzen abscheiden lassen und alle Reaktionen zeigen, die dem Element Barium eigen sind. Alle anderen bekannten Elemente, angefangen von den Trans-Uranen über das Uran, Protactinium, Thorium bis zum Actinium haben andere chemische Eigenschaften als das Barium und lassen sich leicht von ihm trennen. Dasselbe trifft zu für die Elemente unterhalb Radium, also etwa Wismut, Blei, Polonium, Ekacäsium.

Es bleibt also, wenn man das Barium selbst außer Betracht läßt, nur das Radium übrig.

Im folgenden soll kurz die Abscheidung des Isotopengemisches und die Gewinnung der einzelnen Glieder beschrieben werden. Aus dem Aktivitätsverlauf der einzelnen Isotope ergibt sich ihre Halbwertszeit und lassen sich die daraus entstehenden Folgeprodukte ermitteln. Die letzteren werden in dieser Mitteilung aber im einzelnen noch nicht beschrieben, weil wegen der sehr komplexen Vorgänge — es handelt sich um mindestens 3, wahrscheinlich 4 Reihen mit je 3 Substanzen — die Halbwertszeiten aller Folgeprodukte bisher noch nicht erschöpfend festgestellt werden konnten.

Als Trägersubstanz für die „Radiumisotope" diente naturgemäß immer das Barium. Am nächstliegenden war die Fällung des Bariums als Bariumsulfat, das neben dem Chromat schwerstlösliche Bariumsalz. Nach früheren Erfahrungen und einigen Vorversuchen wurde aber von der Abscheidung der „Radiumisotope" mit Bariumsulfat abgesehen; denn diese Niederschläge reißen neben geringen Mengen Uran nicht unbeträchtliche Mengen von Actinium- und Thoriumisotopen mit, also auch die mutmaßlichen Umwandlungsprodukte der Radiumisotope, und erlauben daher keine Reindarstellung der Ausgangsglieder. Statt der quantitativen, sehr oberflächenreichen Sulfatfällung wurde daher das in starker Salzsäure sehr schwer lösliche Ba-Chlorid als Fällungsmittel gewählt; eine Methode, die sich bestens bewährt hat.

Bei der energetisch nicht leicht zu verstehenden Bildung von Radiumisotopen aus Uran beim Beschießen mit langsamen Neutronen war eine besonders gründliche Bestimmung des chemischen Charakters der neu entstehenden künstlichen Radioelemente unerläßlich. Durch die Abtrennung einzelner analytischer Gruppen von Elementen aus der Lösung des bestrahlten Urans wurde außer der großen Gruppe der Transurane eine Aktivität stets bei den Erdalkalien (Trägersubstanz Ba), den seltenen Erden (Trägersubstanz La) und bei Elementen der vierten Gruppe des Periodischen Systems (Trägersubstanz Zr) gefunden. Eingehender untersucht wurden zunächst die Bariumfällungen, die offensichtlich die Anfangsglieder der beobachteten isomeren Reihen enthielten. Es soll gezeigt werden, daß Transurane, Uran, Protactinium, Thorium und Actinium

[1] Aus dem Kaiser Wilhelm-Institut für Chemie in Berlin-Dahlem. Eingegangen 22. Dezember 1938.
[2] O. HAHN u. F. STRASSMANN, Naturwiss. 26, 756 (1938).

Hahn and Strassmann

ÖSTERREICHISCHES PATENTAMT **Kl. 21 g, 4/10**

PATENTSCHRIFT NR. 219170

Ausgegeben am 10. Jänner 1962

ALPENLÄNDISCHER ZENTRALVEREIN ZUR FÖRDERUNG SCHÖPFERISCHEN SCHAFFENS IN SALZBURG

Vorrichtung zur technischen Energiegewinnung mit Hilfe von Kernspaltungsreaktionen

Angemeldet am 30. Juni 1958 (A 4597/58); als Tag der Anmeldung gilt der 14. Juni 1939 (Tag der Hinterlegung beim Deutschen Reichspatentamt).
Beginn der Patentdauer: 15. Juni 1961.
Längste mögliche Dauer: 14. Juni 1971.
Als Erfinder wird genannt: Dr. Georg Stetter in Zell am See (Salzburg).

Die Erfindung bezieht sich auf eine Vorrichtung zur technischen Energiegewinnung mit Hilfe von Kernspaltungsreaktionen, wobei außer den eigentlichen Spaltsubstanzen (Brennstoff) neutronenstreuende Substanzen (Moderator) und gegebenenfalls neutronenabsorbierende Substanzen (Absorber) verwendet sind.

In derartigen Vorrichtungen (Spaltungsreaktoren) wird die Aufrechterhaltung der energieproduzierenden, mit Hilfe der bei der Kernspaltung entstehenden Spaltneutronen (Sekundärneutronen) als Kettenreaktion ablaufenden Kernspaltungen dadurch bewirkt, daß die schnellen Spaltneutronen in den neutronenstreuenden Substanzen (Moderator) auf langsame Geschwindigkeiten gebremst (moderiert) werden. Dieser Vorgang erhöht die Häufigkeit der Kernspaltungen und damit auch der Neutronenproduktion, da Kernspaltungen in überwiegendem Maße von langsamen Neutronen bewirkt werden. Die Neutronenbilanz wird gehoben, wodurch erhöhte Neutronenverluste, welche den Abbruch der Kettenreaktion zur Folge haben, kompensiert werden können.

Eine derartige Vorrichtung wurde von S. Flügge in der Zeitschrift Naturwissenschaften 27 [1939] im Heft 23/24 vom 9. 6. 1939, S. 402/410 beschrieben, wobei nach dem Vorschlag von S. Flügge die Spaltsubstanzen (Brennstoff) mit den neutronenstreuenden Substanzen (Moderator) homogen gemischt sind (homogener Spaltungsreaktor).

Die Neutronenökonomie ist jedoch infolge starken Neutroneneinfanges durch die Spaltsubstanzen bei einer homogenen Mischung von Spaltsubstanzen und neutronenstreuenden Substanzen nicht gut, so daß eine Kettenreaktion nur unter erschwerenden technischen Bedingungen in Gang gesetzt und aufrechterhalten werden kann.

Dieser Mangel wird durch die Erfindung dadurch behoben, daß die Spaltsubstanzen (Brennstoff) von den Neutronen streuenden Substanzen (Moderator) räumlich getrennt angeordnet sind (heterogener Spaltungsreaktor). Unter "räumlich getrennt" wird hier das Gegenteil einer homogenen Mischung verstanden, nämlich die "makroskopische" Eigenständlichkeit der Bereiche der Spaltsubstanzen (Brennstoffbereiche) und der Bereiche der neutronenstreuenden Substanzen (Moderatorbereiche).

Dadurch, daß auf diese Weise die Spaltneutronen in von der Spaltsubstanz hinreichend entfernten Bereichen auf thermische Geschwindigkeit abgebremst werden, entgehen sie leichter den Einfangprozessen, welche bei bestimmte … en in besonderem Maße auftreten. Der … se - bedingt auch durch die geometrisch … nzen - den kritischen Wert 1 für statio…

Vor dem Prioritäts … rdnungen die von einem Ra-Be-Präparat ausgesandten Primärneutronen in räumlich von der Spaltsubstanz getrennt angeordneten neutronenstreuenden Substanzen gebremst (vgl. Comptes Rendus 208, [1939], S. 898/900). Es ist jedoch vor dem Prioritätszeitpunkt der Erfindung nicht bekanntgeworden, eine derartige Anordnung auch zur Bremsung von in der Spaltsubstanz entstehenden Sekundärneutronen (Spaltneutronen) vorzusehen. Es

Georg Stetter

Philip Morrison to Samuel K. Allison. 20 December 1943. Report on Enemy Physics Literature: Survey Report P. NARA RG 77, Entry UD-22A, Box 170, Folder 32.60-1 GERMANY: Summary Reports (1944)

DECLASSIFIED
Authority NND 917017

SECRET

S. K. Allison - 6 - December 20, 1943

2) At Berlin-Lichterfelde, in the private laboratory of the radio engineer, M. von Ardenne. At this laboratory some neutron work is being done, and at least one well-known neutron physicist (Houtermans) is employed.(20) It is interesting that an electronic research laboratory should extend into nuclear physics in war-time. Ardenne mentions that he was urged to do nuclear physics in 1939 by the Reichspostminester Ohnesorge.

3) A serviceable machine in Heidelberg, under Bothe.

(Can the presence and scale of secret work of these laboratories be determined?)

B. The principal laboratories which have published in this field are given after the text of the report with the names of the best-known workers, and with some statement of the nature of the work of each laboratory.

C. General personnel situation

The years 1940-1941 saw a dislocation of German nuclear physics similar to that in America. Heisenberg went from Leipzig to the K.W.I. at Berlin; men like Pose and Funfer, early workers in the field, came from small universities to Berlin-Dahlem or Heidelberg. The British concluded(21) that in Berlin-Dahlem was situated the main government team. This conclusion still seems sound. Much work was farmed out, as can be seen above, especially to Bothe's gr… that the mean who came to Da… itely not on secret work. … munication(22)-- that from late… have not been involved … ument against a parallel Ger… east justified by Heisenberg'… n bombs and/or poison has bee…

A number of young German physicists have not published at all since their first 1939 work on fission. They may form the junior staff of the project. It is again true that mention of their presence has come largely from Hahn's group.

D. The University of Strasbourg

A possible opportunity to learn more is provided by the new Nazi university at Strasbourg, in Alsace. Apparently for purposes of propaganda, they have sent there in late 1942-early 1943 a rather strong faculty. Included are Heisenberg's closest co-worker at Berlin, K. F. v. Weiszacker, Fleishmann, a well-known colleague of Bothe's, and Noddack, a man with experience in radio- and rare-element chemistry. These men will know a great deal. It is certainly true that Allied connections in Alsace are much better than those in Germany.

(Can this be employed to learn something about the German work through these men and their talk or activities?)

SECRET

This document contains information affecting the national defense of the United States within the meaning of the Espionage Act, U. S. C. … 31 and 32. Its transmission

von Ardenne and Ohnesorge

NARA RG GOUDS, Entry UD-7420, Box 6, Folder ALSOS—Reports and Operations

DECLASSIFIED
Authority NND 933079

File #28

Harteck

S E C R E T

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY
ALSOS MISSION
APO 887

25 May 1945

TO: Major R. R. Furman

FROM: Dr. S. A. Goudsmit

1. The Harteck file of correspondence with the RFR contains one very interesting document at the end. It is a proposal which was sent by Harteck and Groth to the War Ministry on 24 April 1939. In this letter, they write roughly:

"We take the liberty of calling to your attention the newest developments in nuclear physics which, in our opinion, will perhaps make it possible to produce an explosive which is many orders of magnitude more effective than the present one."

2. They then give a short popular account of the discovery of Hahn and the work of Joliot and mention that, in America and in England, great emphasis is placed on research in nuclear physics, whereas the same subject has been neglected in Germany.

3. They finish the letter with the following paragraph:

"It is obvious that, if the possibility of energy production outlined above can be realized, which certainly is within the realm of possibilities, that country which first makes use of it has an unsurpassable advantage over the others."

S. A. GOUDSMIT
Scientific Chief

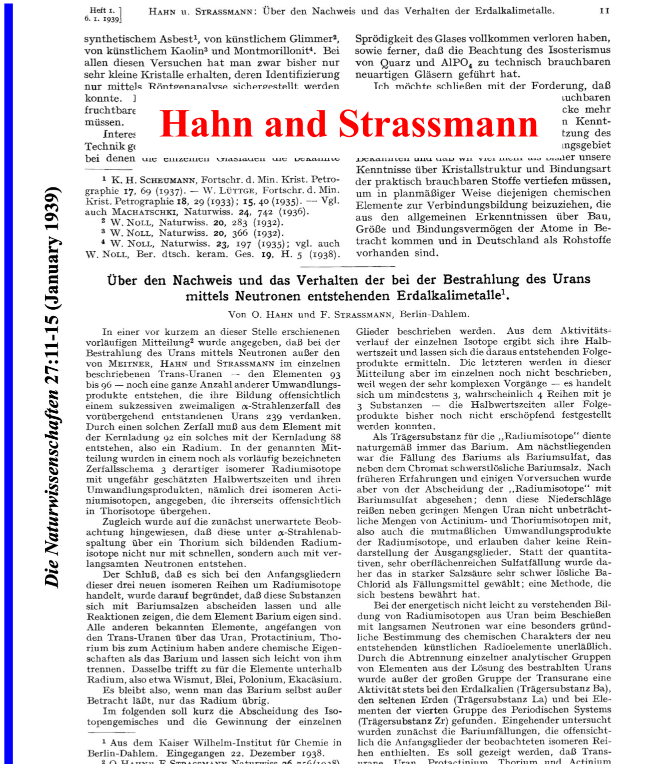
NO DEPT. OF ENERGY CLASSIFIED INFORMATION (NO RD/FRD/~~DOE-NSI~~) COORDINATE W… BEFORE DECLA… AUTHO… BY R. … HKS

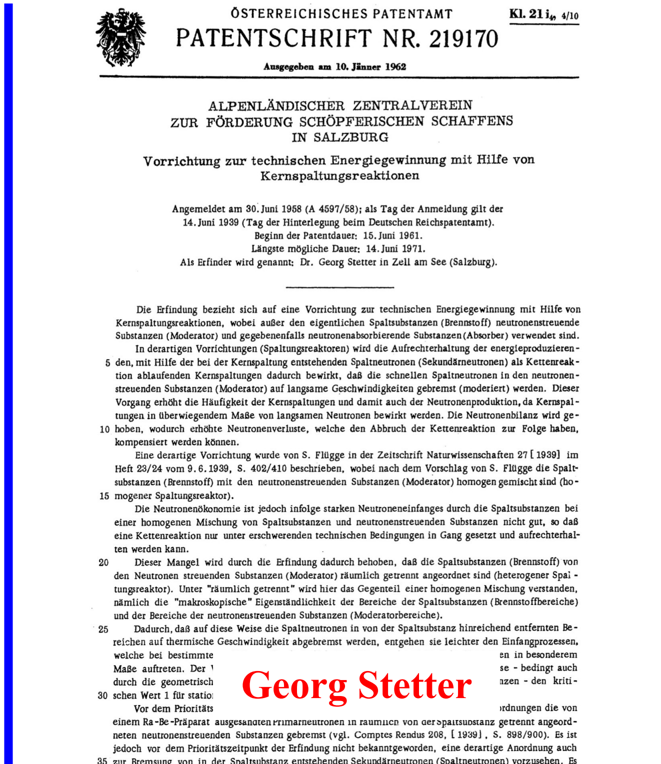
S E C R E T

Harteck and Groth

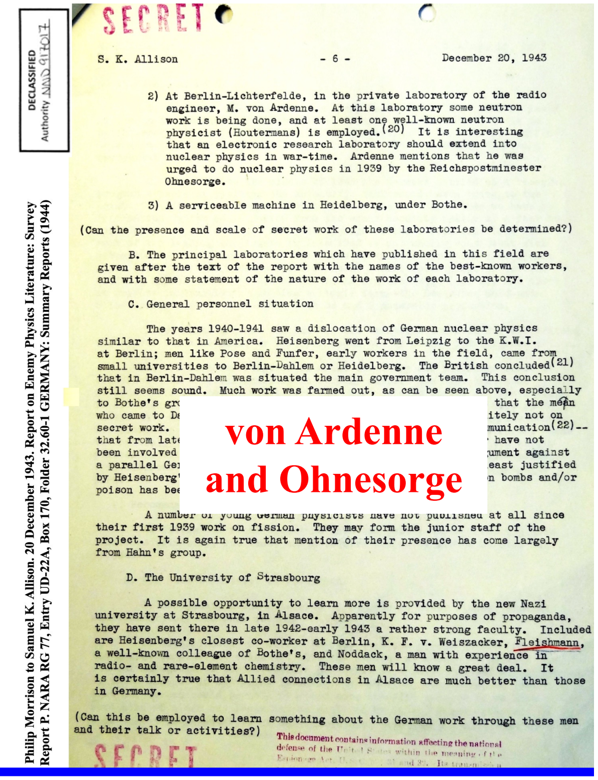
2. Origins of the German Nuclear Program

Die Naturwissenschaften 27:11-15 (January 1939)

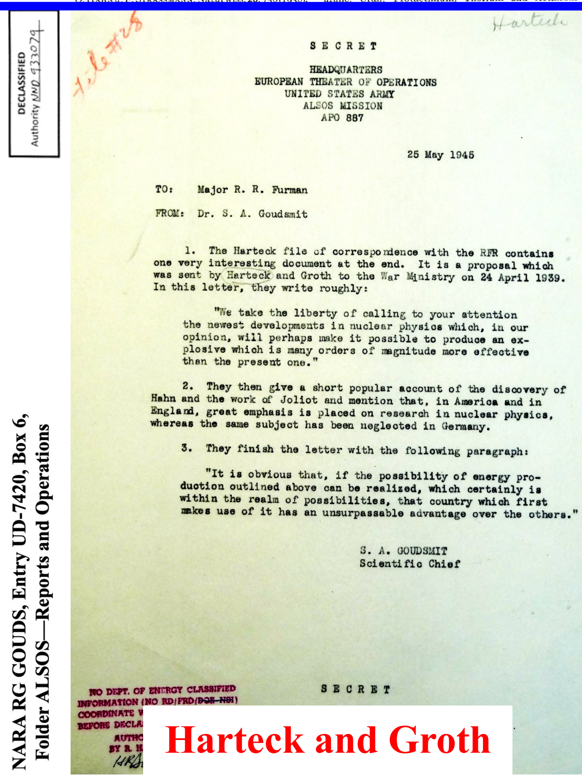




Philip Morrison to Samuel K. Allison, 20 December 1943, Report on Enemy Physics Literature: Survey Report P. NARA RG 77, Entry UD-22A, Box 170, Folder 32.60-1 GERMANY: Summary Reports (1944)

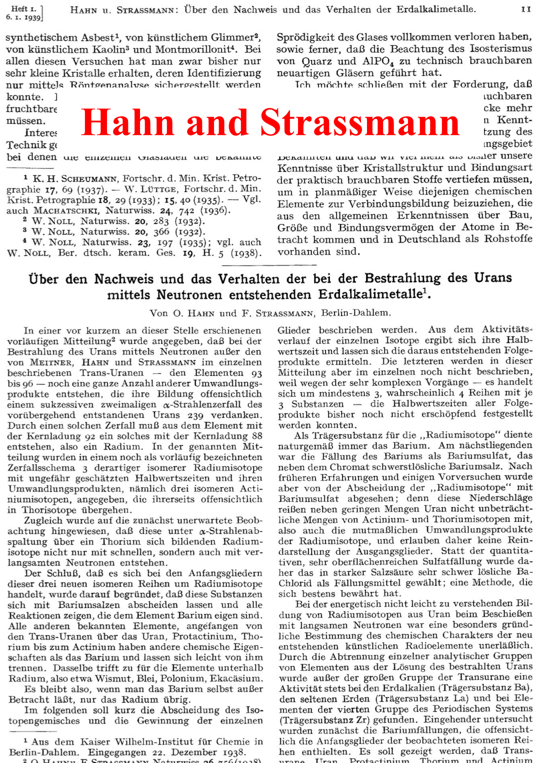


NARA RG GOUDS, Entry UD-7420, Box 6, Folder ALSOS—Reports and Operations

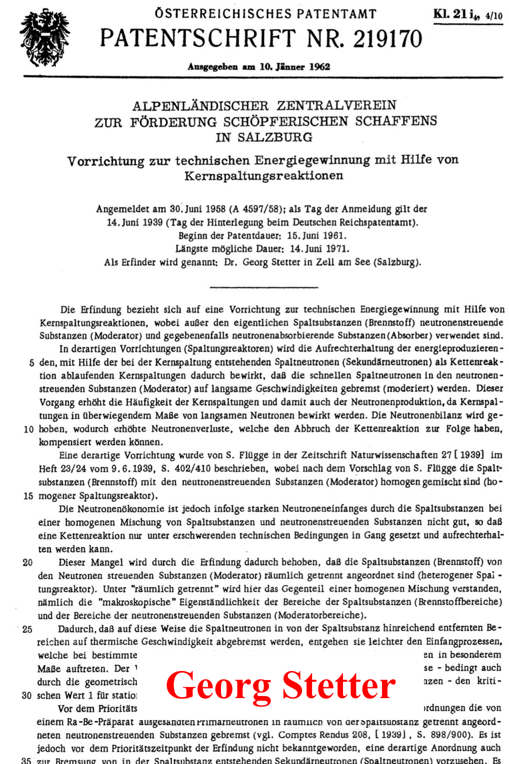


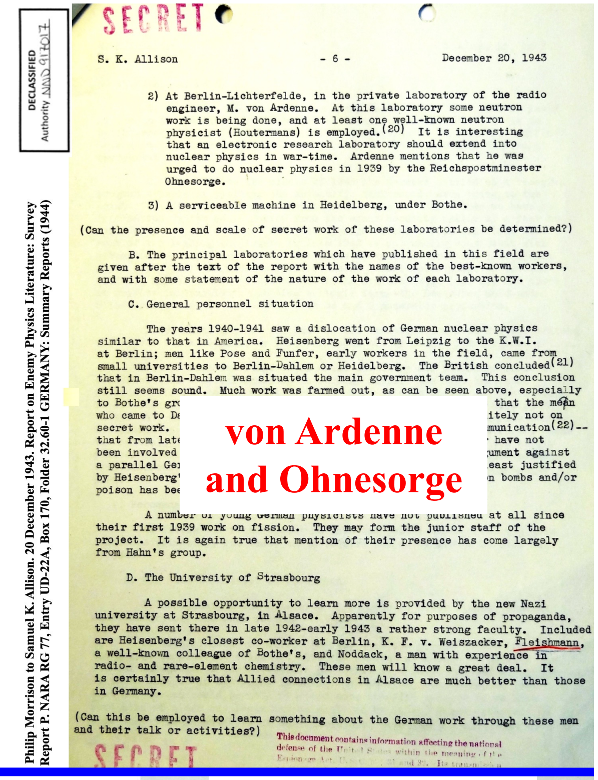
Die Naturwissenschaften 27:402-410 (June 1939)

2. Origins of the German Nuclear Program

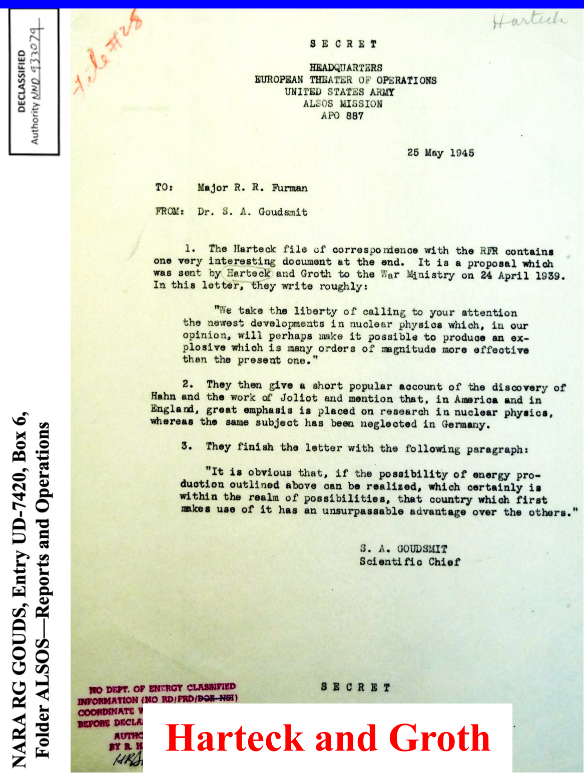


Die Naturwissenschaften 27:11-15 (January 1939)



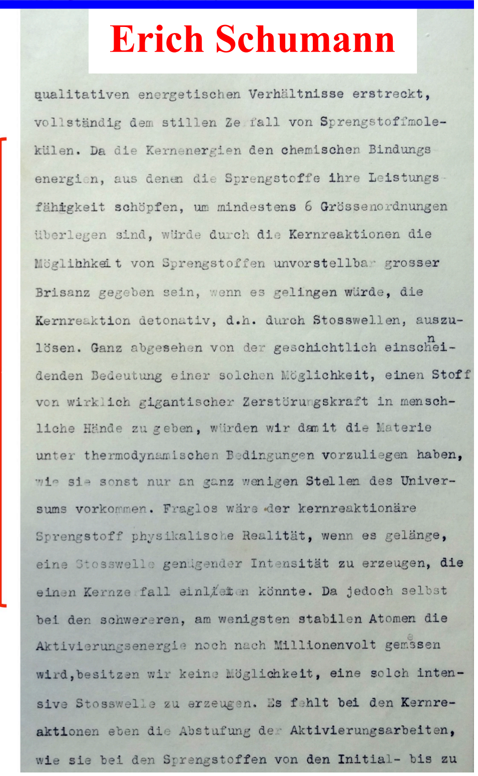


Philip Morrison to Samuel K. Allison. 20 December 1943. Report on Enemy Physics Literature: Survey Report P. NARA RG 77, Entry UD-22A, Box 170, Folder 32.60-1 GERMANY: Summary Reports (1944)



NARA RG GOUDS, Entry UD-7420, Box 6, Folder ALSOS—Reports and Operations

Die Naturwissenschaften 27:402–410 (June 1939)



Bundesarchiv Militärarchiv Freiburg N822/17. Erich Schumann. 2 October 1940. Unclassified draft article on explosives research for popular publication.

2. SS Coordination of the Nuclear Program

2. SS Coordination of the Nuclear Program

NARA RG 238, Microfilm M1270, Interrogation Records
Prepared for War Crimes Proceedings at Nuernberg, Roll 24

~~CONFIDENTIAL~~

analysed B

Ref No SAIC/FIR/15
27 Jul 45

SEVENTH ARMY INTERROGATION CENTER
APO 758

NOTES ON HIMMLER AND HIS STAFF
BY WILHELM FUEHRER, ADJ TO HIMMLER
Final Interrogation Report

4. PERSONALITIES

a. HIMMLER's Field Hq

GROTHMANN,	SS-OSTUBAF (Lt Col)	Adj to HIMMLER from 1941 to the last; supervised military matters of WAFFEN-SS. Born HAMBURG; 29 years old; blue eyes, 1,75 m tall.

c. Scientific Personalities

SCHUMANN, Prof	nuclear	Director, First Physics Institute, University of BERLIN, and of HEERESWAFFENAMT (Army Ord Dept).
GERTHSEN, Prof	nuclear	Director, Second Physics Institute University of BERLIN; atom research.
GEIGER, Prof	nuclear	Director, Physics Institute, TECHNISCHE HOCHSCHULE (Technical College), BERLIN; atom research.
GERLACH, Prof	nuclear	Physics Institute, University of MUNICH.
TOMASCHEK, Prof	nuclear	Physics Institute, TECHNISCHE HOCHSCHULE, MUNICH.
VON UND ZUR MUEHLEN, Prof		Geological Institute, TECHNISCHE HOCHSCHULE, MUNICH. Expert on Geology of Russia.
SCHMAUSS, Prof		Meteorological Institute, MUNICH.
VON FICKER, Prof		Meteorological Institute, VIENNA.
GUTHNICK, Prof		Observatory, BERLIN-BABELSBERG.
HECKMANN, Prof		Director, Observatory, HAMBURG-BERGEDORF.
KIRCHNER, Prof	nuclear	Director, Physics Institute, University of COLOGNE. Expert on atom physics.

2. SS Coordination of the Nuclear Program

NARA RG 238, Microfilm M1270, Interrogation Records
Prepared for War Crimes Proceedings at Nuernberg, Roll 24

~~CONFIDENTIAL~~

analysed B

Ref No SAIC/FIR/15
27 Jul 45

SEVENTH ARMY INTERROGATION CENTER
APO 758

NOTES ON HIMMLER AND HIS STAFF
BY WILHELM FUEHRER, ADJ TO HIMMLER
Final Interrogation Report

4. PERSONALITIES

a. HIMMLER's Field Hq

GROTHMANN	SS-OSTUBAF (Lt Col)	Adj to HIMMLER from 1941 to the last; supervised military matters of WAFFEN-SS. Born HAMBURG; 29 years old; blue eyes,1,75 m tall.

c. Scientific Personalities

SCHUMANN, Prof	nuclear	Director, First Physics Institute, University of BERLIN, and of HEERESWAFFENAMT (Army Ord Dept).
GERTHSEN, Prof	nuclear	Director, Second Physics Institute University of BERLIN; atom research.
GEIGER, Prof	nuclear	Director, Physics Institute, TECHNISCHE HOCHSCHULE (Technical College), BERLIN;atom research.
GERLACH, Prof	nuclear	Physics Institute, University of MUNICH.
TOMASCHEK, Prof	nuclear	Physics Institute,TECHNISCHE HOCHSCHULE, MUNICH.
VON UND ZUR MUEHLEN, Prof		Geological Institute, TECHNISCHE HOCHSCHULE, MUNICH. Expert on Geology of Russia.
SCHMAUSS, Prof		Meteorological Institute, MUNICH.
VON FICKER, Prof		Meteorological Institute, VIENNA.
GUTHNICK, Prof		Observatory, BERLIN-BABELSBERG.
HECKMANN, Prof		Director, Observatory, HAMBURG-BERGEDORF.
KIRCHNER, Prof	nuclear	Director, Physics Institute, University of COLOGNE. Expert on atom physics.

Bundesarchiv Lichterfelde, NS 19-2012

XIa/165 22

DER REICHSFÜHRER-SS
CHEF DES SS-HAUPTAMTES
CdSSHA/Be/Vo. VS-Tgb.Nr.313/42 g.Kdos.

Berlin W 35, den 8. Sept. 1942
Lützowstraße 48/49
Postschließfach 48

2 Ausfertigungen
Prüf.Nr. 1

2

Betr.: Reichspostminister Dr. Ohnesorge.

An den
Reichsführer-SS
und Chef der Deutschen Polizei,
Feld-Kommandostelle.

Reichsführer !

Reichspostminister Dr. Ohnesorge ist sehr aktiv und sehr beweglich aus seinem Urlaub zurückgekehrt. Drängt gewaltig, zum Führer zu kommen aus folgenden Gründen:

a) Nach seinen Beobachtungen fasst im Augenblick Amerika die gesamten Professoren der Physik und der Chemie zusammen, um besondere Leistungen hervorzubringen. Er möchte hierüber kurz dem Führer Vortrag halten.

b) Dr. Ohnesorge möchte sein nun ausprobiertes Gerät, aufgebaut auf einem Panzerjäger, dem Führer vorführen, um überhaupt die Möglichkeit zu erhalten, es für die Waffen-SS in genügender Menge herstellen lassen zu können. Die Konstrukteure würden selbst in das Führerhauptquartier fahren, das Gerät an einem vorhandenen Fahrzeug, bezw. Geschütz aufbauen, sodass es kurz dem Führer gezeigt werden könnte.

c) Dr. Ohnesorge möchte dem Reichsführer-SS für seinen Kulturfonds einen Scheck über 5 Mill. Mark persönlich übergeben.

Ich wäre in besonderem Masse dankbar, wenn der Besuch von Dr. Ohnesorge im Führerhauptquartier bald ermöglicht werden könnte, jedenfalls vor dem Mitte September beginnenden Europäischen Kongress.

SS-Gruppenführer

2. SS Coordination of the Nuclear Program

NARA RG 238, Microfilm M1270, Interrogation Records Prepared for War Crimes Proceedings at Nuernberg, Roll 24

~~CONFIDENTIAL~~ analysed B

Ref No SAIC/FIR/15
27 Jul 45

SEVENTH ARMY INTERROGATION CENTER
APO 758

NOTES ON HIMMLER AND HIS STAFF
BY WILHELM FUEHRER, ADJ TO HIMMLER
Final Interrogation Report

4. PERSONALITIES

a. HIMMLER's Field Hq

GROTHMANN,	SS-OSTUBAF (Lt Col)	Adj to HIMMLER from 1941 to the last; supervised military matters of WAFFEN-SS. Born HAMBURG; 29 years old; blue eyes, 1,75 m tall.

c. Scientific Personalities

SCHUMANN, Prof	nuclear	Director, First Physics Institute, University of BERLIN, and of HEERESWAFFENAMT (Army Ord Dept).
GERTHSEN, Prof	nuclear	Director, Second Physics Institute University of BERLIN; atom research.
GEIGER, Prof	nuclear	Director, Physics Institute, TECHNISCHE HOCHSCHULE (Technical College), BERLIN; atom research.
GERLACH, Prof	nuclear	Physics Institute, University of MUNICH.
TOMASCHEK, Prof	nuclear	Physics Institute, TECHNISCHE HOCHSCHULE, MUNICH.
VON UND ZUR MUEHLEN, Prof		Geological Institute, TECHNISCHE HOCHSCHULE, MUNICH. Expert on Geology of Russia.
SCHMAUSS, Prof		Meteorological Institute, MUNICH.
VON FICKER, Prof		Meteorological Institute, VIENNA.
GUTHNICK, Prof		Observatory, BERLIN-BABELSBERG.
HECKMANN, Prof		Director, Observatory, HAMBURG-BERGEDORF.
KIRCHNER, Prof	nuclear	Director, Physics Institute, University of COLOGNE. Expert on atom physics.

Bundesarchiv Lichterfelde, NS 19-2012

XIa/165 22

DER REICHSFÜHRER-SS
CHEF DES SS-HAUPTAMTES
Cd/HA/Be/Vo. VS-Tgb.Nr. 313/42 g.Kdos.

Berlin W 35, den 8. Sept. 1942
Lützowstraße 48/49
Postschließfach 48

2

Geheime Reichssache!
2 Ausfertigungen
Prüf.Nr. 1

Betr.: Reichspostminister Dr. Ohnesorge.

An den
Reichsführer-SS
und Chef der Deutschen Polizei,
Feld-Kommandostelle.

Reichsführer !

Reichspostminister Dr. Ohnesorge ist sehr aktiv und sehr beweglich aus seinem Urlaub zurückgekehrt. Drängt gewaltig, zum Führer zu kommen aus folgenden Gründen:

a) Nach seinen Beobachtungen fasst im Augenblick Amerika die gesamten Professoren der Physik und der Chemie zusammen, um besondere Leistungen hervorzubringen. Er möchte hierüber kurz dem Führer Vortrag halten.

b) Dr. Ohnesorge möchte sein nun ausprobiertes Gerät, aufgebaut auf einem Panzerjäger, dem Führer vorführen, um überhaupt die Möglichkeit zu erhalten, es für die Waffen-SS in genügender Menge herstellen lassen zu können. Die Konstrukteure würden selbst in das Führerhauptquartier fahren, das Gerät an einem vorhandenen Fahrzeug, bezw. Geschütz aufbauen, sodass es kurz dem Führer gezeigt werden könnte.

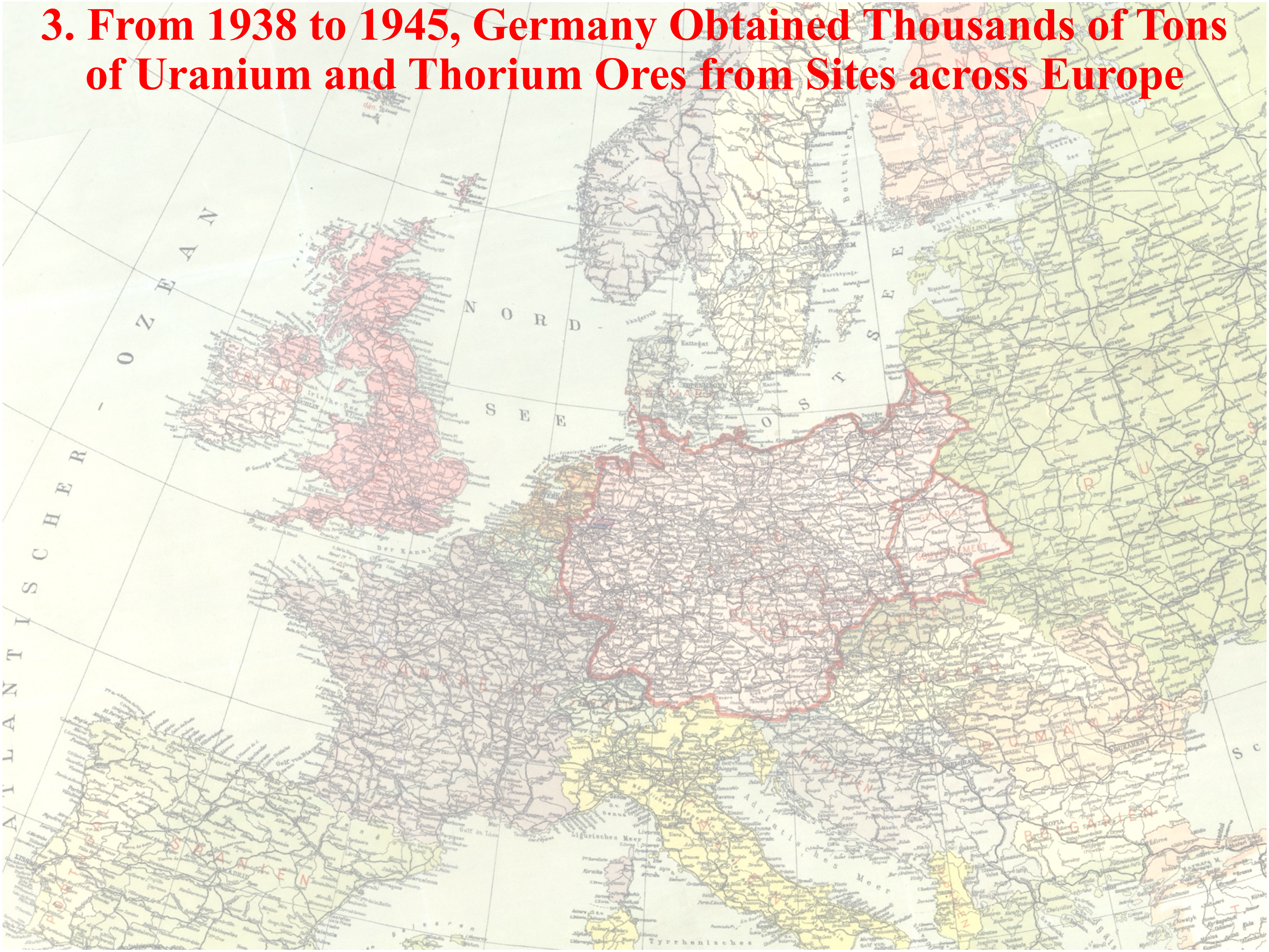
c) Dr. Ohnesorge möchte dem Reichsführer-SS für seinen Kulturfonds einen Scheck über 5 Mill. Mark persönlich übergeben.

Ich wäre in besonderem Masse dankbar, wenn der Besuch von Dr. Ohnesorge im Führerhauptquartier bald ermöglicht werden könnte, jedenfalls vor dem Mitte September beginnenden Europäischen Kongress.

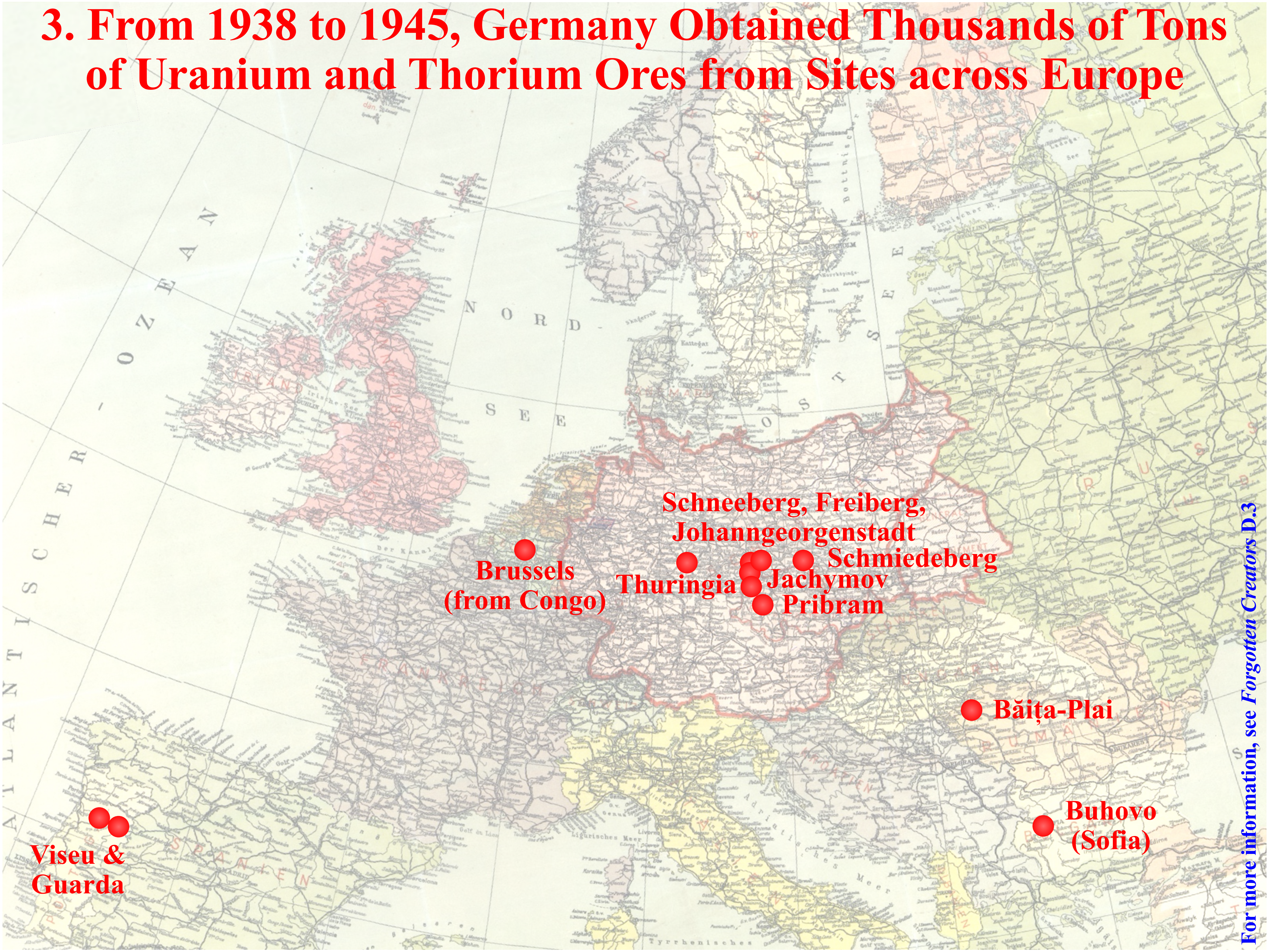
Berger
SS-Gruppenführer

According to his [Ohnesorge's] observations, at the moment America is gathering all the professors of physics and chemistry to produce special achievements. He would like to give a short lecture about this to the Führer.

3. From 1938 to 1945, Germany Obtained Thousands of Tons of Uranium and Thorium Ores from Sites across Europe



3. From 1938 to 1945, Germany Obtained Thousands of Tons of Uranium and Thorium Ores from Sites across Europe



For more information, see *Forgotten Creators* D.3

3. From 1938 to 1945, Germany Obtained Thousands of Tons of Uranium and Thorium Ores from Sites across Europe

William Casey. 1988. *The Secret War Against Hitler.* p. 49.
When the British government learned that the Germans, on occupying Norway and Belgium, were increasing Norwegian heavy water production and had seized 3500 tons of uranium from Union Minière in Belgium, the Ministry of Supply was directed to study what would happen if an atom bomb was detonated in the center of a large British city.
[Nikolaus Riehl also reported the amount as 3500 tons instead of the usually given 1200 tons; see David Irving, 1967, *The Virus House,* pp. 65, 90--91.]

Vladimir Rychly, NARA RG 38, Entry 98C, Box 9, Folder TSC #2601-2700, 11 Feb. 1946.
The Germans put [uranium] mining on a high priority and only mining was done throughout the 6 years occupation. The ore was delivered by special planes to Germany and Austria.
Box 12, Folder TSC #3301-3400, 5 December 1946.
During the German occupation of Czechoslovakia, the Germans continued operations in this mine to the very last moment.

https://www.cia.gov/readingroom/docs/DOC_0000198124.pdf
Kowary area (the old Schmiedeberg area exploited by the Germans) where uranium was produced before the war…

Manhattan District History, Book I, Volume 14, Foreign Intelligence Supplement No. 1.
11 tons of uranium products, 1/2 ton of Schmiedeberg ore and a few drums of monazite sand were on hand… The shortage of radium in Germany made it worth while to exploit the Schmiedeberg deposits.

Peter Hayes. 2004. *From Cooperation to Complicity: Degussa in the Third Reich.* p. 235.
Radium-Bergbau GmbH of Berlin, which in 1941-43, further developed mines in Portugal…

H. S. Lowenhaupt. 5 December 1946. Russian Mining Operations in the German-Czech Border Region. NARA RG 77, Entry UD-22A, Box 163, Folder Czechoslovakia.
Uranium is known to occur... in a number of silver-bismuth-cobalt veins 10 to 20 cm. in thickness cutting the slates within a 2 1/2 km. radius to the northwest, west, and southwest of Johanngeorgenstadt... [T]he strongest pitchblende vein is in the Vereinigt Mine. From 1870 to 1913, 12.2 tons U_3O_8 were produced with a maximum yield of 2.7 tons in 1905… Schneeberg mines are in a 10 km^2 mineralized area between Schneeberg and Neustadtel to the south. Production in the thirty-seven year interval between 1870 and 1907 was 80 metric tons [U_3O_8]. Union Mines lists uranium at Schneeberg, Neustadtel, Burckhardt Grauen, Rohna, and Pfannenstiel.

Jonathan E. Helmreich. 1986. *Gathering Rare Ores: The Diplomacy of Uranium Acquisition, 1943-1954.* p. 70.
The CDT [Combined Development Trust] did not know of the valuable deposits in Saxony, just north of the East German border with Czechoslovakia and the Joachimstal mines. Discovered by the Germans in 1943…

Report on Treibacher Chemical Works AG. 10 October 1945. CIOS Evaluation Report 343, AFHRA A1008 frames 0794-0797.
During the war they used Pitchblende from Joachimstahl in Czechoslovakia (where it was first discovered) and from Erzgebirge.

Schneeberg, Freiberg, Johanngeorgenstadt

Schmiedeberg

Brussels (from Congo)

Thuringia

Jachymov

Pribram

http://taifasuri.ro/index.php/taifasuri/mozaic/17838-bomba-atomica-ruso-americana-hranita-din-uraniul-romanesc-nr748-sapt19-25-sept-2019
And those mines were in the Apuseni Mountains, in Biharia, at Stei-Baita. It seems that the uranium deposits here were discovered by German aviators who, around 1938-1939, flying over the perimeter, noticed a drop in pressure and a bizarre development of the films, which led the Germans to carry out a geological survey of the area with modern equipment, so they installed 40 probes in the area… The uranium that was obtained from those mines was… picked up by the SS service and shipped to laboratories in Germany. To facilitate transport on an industrial scale, the Germans built new sections of the Avram Iancu-Bulzeçti-Baia de Cris road and completed part of the Brad-Deva railway, a megastructure with viaducts and impeccable tunnels.

Băița-Plai

https://www.cia.gov/readingroom/docs/DOC_0000198124.pdf
The most important uranium deposit in Bulgaria is located in the old lead mining area of Goten Peak, near the monastery of Buhovo, northeast of Sofia. In late 1945, the Soviets continued the former German exploitation of this area.

Viseu & Guarda

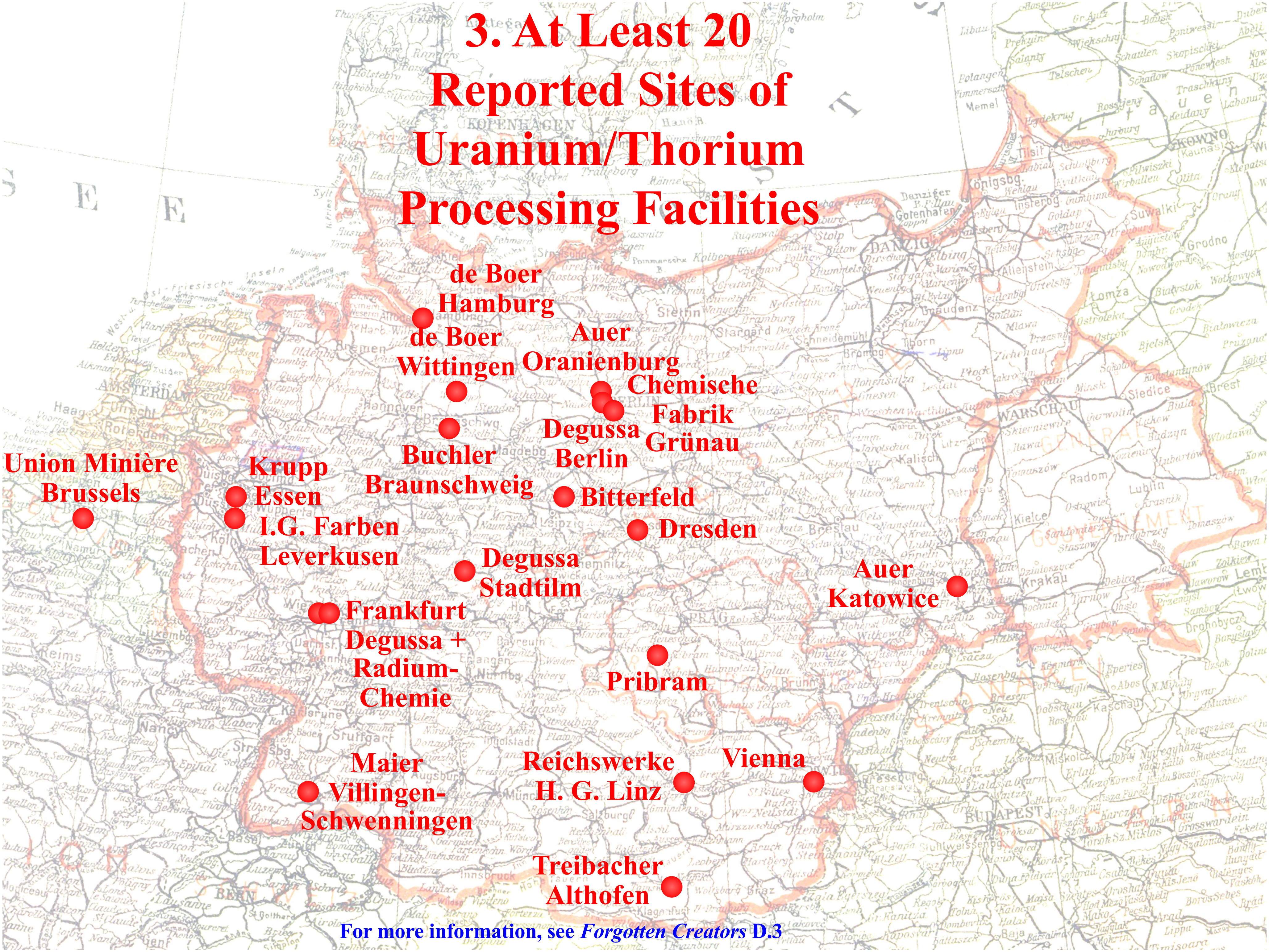
Buhovo (Sofia)

U.S. Embassy, Istanbul, 18 December 1943, AFHRA A1261 p. 27.
In the course of a violent argument with a Bulgarian officer, an engineer of the Todt organization revealed in Sofia that the Germans now possess a new type of incendiary far surpassing anything yet used in warfare. The engineer intimated that London would suffer a fate worse than that of Berlin or Hamburg in the near future.

For more information, see *Forgotten Creators* D.3

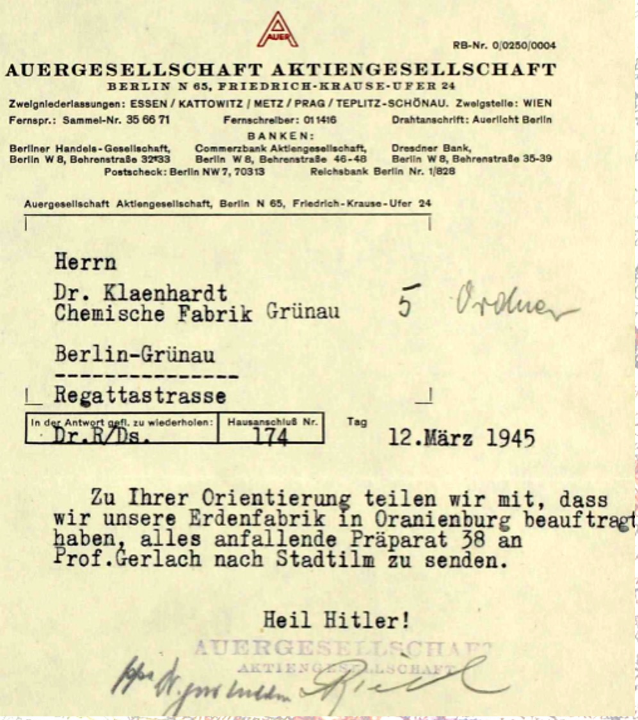
3. At Least 20 Reported Sites of Uranium/Thorium Processing Facilities

3. At Least 20 Reported Sites of Uranium/Thorium Processing Facilities



For more information, see *Forgotten Creators* D.3

3. At Least 20 Reported Sites of Uranium/Thorium Processing Facilities



RB-Nr. 0/0250/0004

AUERGESELLSCHAFT AKTIENGESELLSCHAFT
BERLIN N 65, FRIEDRICH-KRAUSE-UFER 24
Zweigniederlassungen: ESSEN / KATTOWITZ / METZ / PRAG / TEPLITZ-SCHÖNAU. Zweigstelle: WIEN
Fernspr.: Sammel-Nr. 35 66 71 Fernschreiber: 01 1416 Drahtanschrift: Auerlicht Berlin
BANKEN:
Berliner Handels-Gesellschaft, Berlin W 8, Behrenstraße 32/33
Commerzbank Aktiengesellschaft, Berlin W 8, Behrenstraße 46-48
Dresdner Bank, Berlin W 8, Behrenstraße 35-39
Postscheck: Berlin NW 7, 70313 Reichsbank Berlin Nr. 1/828

Auergesellschaft Aktiengesellschaft, Berlin N 65, Friedrich-Krause-Ufer 24

Herrn
Dr. Klaenhardt
Chemische Fabrik Grünau 5 Ordner
Berlin-Grünau
Regattastrasse

In der Antwort gefl. zu wiederholen: Dr.R/Ds. Hausanschluß Nr.: 174 Tag 12.März 1945

Zu Ihrer Orientierung teilen wir mit, dass wir unsere Erdenfabrik in Oranienburg beauftragt haben, alles anfallende Präparat 38 an Prof.Gerlach nach Stadtilm zu senden.

Heil Hitler!
AUERGESELLSCHAFT AKTIENGESELLSCHAFT

https://www.cia.gov/readingroom/document/cia-rdp83-00415r003900020006-0

[Chemische Fabrik Grünau:] Production was increased during World War II and the manufacture of uranium metal from pitchblende was started on a large scale. At that time the factory employed over 1,000 workers. About 60 per cent of the factory was damaged by air attacks in spring 1945, and... all the uranium installations, as well as the company's own power plant, were fully dismantled after the Red Army occupied Berlin.

For more information, see *Forgotten Creators* D.3

David Gattiker and George C. Davis. 16 May 1945. Report on visit to Joachimsthal. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45--Dec. '45.

I and Davis entered Czechoslovakian target yesterday morning and spent three hours with Dr. Patzochke, German director of the mines. […] These concentrates contain 60 per cent U_3O_8 and were sent to Germany and Austria for radium extraction, and were divided equally between Auer, Buchler at Brunswick, and Goldschmidt at Treibach in Austria.

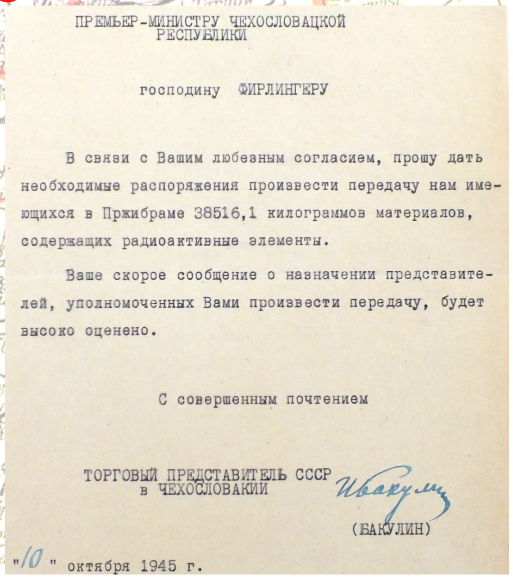
G-157. I.G. Farben Leverkusen. 11 June 1942.

Kwasnik developed process whereby uranium oxide is carried through a rotating inclined nickel tube heated to 650°C through which a stream of fluorine gas is passed. The UF_6 thus formed is frozen by CO_2 in containers. About 500 grams UF_6 thus produced per hour. The UF_6 to be frozen in large crystalline block to reduce amount of adsorption of other gases.

Robert E. Work. 18 September 1945. Preliminary Interrogation Report. Prof. Dr. Ulrich Hoffmann. AFHRA A5183 frame 0609.

PhD in chemistry from University of Berlin in 1926. Instructor at University of Berlin until 1936. Called to University of Rostock in 1936 where he became full professor in 1937. In April 1942 he was called to University of Vienna as Director of the Institute for Inorganic and Analytic Chemistry... Dr. Hoffmann's research in the field of air interest was only in the development of the atomic bomb. Claims to have improved method of obtaining FLUOR, which is necessary to obtain UF6, one of the basic ingredients of the atomic bomb.

Ivan Bakulin to Zdeněk Fierlinger, 10 October 1945 Národní archiv, Ústřední výbor KSČ, Klement Gottwald, sv. 81, aj. 1031



ПРЕМЬЕР-МИНИСТРУ ЧЕХОСЛОВАЦКОЙ РЕСПУБЛИКИ

господину ФИРЛИНГЕРУ

В связи с Вашим любезным согласием, прошу дать необходимые распоряжения произвести передачу нам имеющихся в Пржибраме 38516,1 килограммов материалов, содержащих радиоактивные элементы.

Ваше скорое сообщение о назначении представителей, уполномоченных Вами произвести передачу, будет высоко оценено.

С совершенным почтением

ТОРГОВЫЙ ПРЕДСТАВИТЕЛЬ СССР
в ЧЕХОСЛОВАКИИ

(БАКУЛИН)

"10" октября 1945 г.

4. ^{235}U Enrichment: Centrifuges

Zeitschrift für Physikalische Chemie A 17:459 (1895)

Gas centrifuges were invented in Germany by 1895.

Ueber den Einfluss der Zentrifugalkraft auf chemische Systeme.

Von

G. Bredig.

(Mit 3 Figuren im Text.)

Einleitung.

Die Frage, ob durch den Einfluss äusserer Kräfte, wie z. B. durch die Gravitation, sich in einem ursprünglich homogenen Gemenge Konzentrationsverschiedenheiten in der Richtung dieser Kräfte ausbilden, ist bereits im Anfange dieses Jahrhunderts diskutiert worden. So stellte bereits Gay-Lussac[1]) in den Kellern der Pariser Sternwarte Versuche darüber an, ob eine Salzlösung in einer vertikalen 2 m langen Säule unter dem Einfluss der Schwerkraft am unteren Ende der Säule eine andere Konzentration annehme, als am oberen Ende. Er erhielt ein negatives Resultat, was nach den neueren Berechnungen von Gouy und Chaperon[2]) auch verständlich wird, da diese Autoren thermodynamisch den Einfluss der Gravitation auf die Konzentration aus der Änderung der Dichte mit der Konzentration zu berechnen vermögen und denselben so klein finden, dass seine experimentelle Feststellung schwerlich ausführbar ist.

Die Theorie solcher Systeme ist bereits mehrfach, von J. W. Gibbs[3]), Gouy und Chaperon[4]), P. Duhem[5]), van der Waals[6]) und anderen gegeben worden.

Nun hat aber unlängst Herr Th. des Coudres in einer interessanten Abhandlung[7]) beiläufig darauf hingewiesen, dass man die Betrachtungen über den Einfluss der Schwere auf die Konzentration der Lö-

[1]) Ann. chim. phys. **11,** 306 (1819). — Vergl. auch Ostwald, Lehrbuch der allg. Chemie (2. Aufl.) I, 700. — Beudant, Ann. chim. phys. **8,** 15. — **Bischof,** Lehrbuch der ch. und ph. Geol. II, 1712. — Lieben, Lieb. Ann. **101, 77** (**1857**).

[2]) Ann. chim. phys. (6) **12,** 384 (1887).

[3]) Thermodynam. Studien S. 171 ff. Deutsch von Ostwald.

[4]) Siehe oben und Compt. rend. **105,** 117.

[5]) Journ. de phys. (2) **8,** 391 (1888).

[6]) Diese Zeitschr. **5,** 157.

[7]) Wied. Ann. **46,** 296; **49,** 284; Diese Zeitschr. **12, 143.**

4. ^{235}U Enrichment: Centrifuges

Zeitschrift für Physikalische Chemie A 17:459 (1895)

Ueber den Einfluss der Zentrifugalkraft auf chemische Systeme.

Von

G. Bredig.

(Mit 3 Figuren im Text.)

Einleitung.

Die Frage, ob durch den Einfluss äusserer Kräfte, wie z. B. durch die Gravitation, sich in einem ursprünglich homogenen Gemenge Konzentrationsverschiedenheiten in der Richtung dieser Kräfte ausbilden, ist bereits im Anfange dieses Jahrhunderts diskutiert worden. So stellte bereits Gay-Lussac[1]) in den Kellern der Pariser Sternwarte Versuche darüber an, ob eine Salzlösung in einer vertikalen 2 m langen Säule unter dem Einfluss der Schwerkraft am unteren Ende der Säule eine andere Konzentration annehme, als am oberen Ende. Er erhielt ein negatives Resultat, was nach den neueren Berechnungen von Gouy und Chaperon[2]) auch verständlich wird, da diese Autoren thermodynamisch den Einfluss der Gravitation auf die Konzentration aus der Änderung der Dichte mit der Konzentration zu berechnen vermögen und denselben so klein finden, dass seine experimentelle Feststellung schwerlich ausführbar ist.

Die Theorie solcher Systeme ist bereits mehrfach, von J. W. Gibbs[3]), Gouy und Chaperon[4]), P. Duhem[5]), van der Waals[6]) und anderen gegeben worden.

Nun hat aber unlängst Herr Th. des Coudres in einer interessanten Abhandlung[7]) beiläufig darauf hingewiesen, dass man die Betrachtungen über den Einfluss der Schwere auf die Konzentration der Lö-

1) Ann. chim. phys. **11**, 306 (1819). — Vergl. auch Ostwald, Lehrbuch der allg. Chemie 2. Aufl. I, 700. — Beudant, Ann. chim. phys. **8**, 15. — Bischof, Lehrbuch der ch. und ph. Geol. II, 1712. — Lieben, Lieb. Ann. **101**, 77 (1857).
2) Ann. chim. phys. (6) **12**, 384 (1887).
3) Thermodynam. Studien S. 171 ff. Deutsch von Ostwald.
4) Siehe oben und Compt. rend. **105**, 117.
5) Journ. de phys. (2) **8**, 391 (1888).
6) Diese Zeitschr. **5**, 157.
7) Wied. Ann. **46**, 296; **49**, 284; Diese Zeitschr. **12**, 143.

PATENTSCHRIFT

№ 833 487

KLASSE 12e GRUPPE 3 05

G 414 IVb/12e

Dr.-Ing. Helmuth Hausen, München-Solln
ist als Erfinder genannt worden

Gesellschaft für Linde's Eismaschinen A. G., Höllriegelskreuth bei München

Verfahren und Vorrichtung zur Zerlegung von Gas- und Flüssigkeitsgemischen in Zentrifugen

Patentiert im Gebiet der Bundesrepublik Deutschland vom 18. Juni 1939 an
Der Zeitraum vom 8. Mai 1945 bis einschließlich 7. Mai 1950 wird auf die Patentdauer nicht angerechnet
(Ges. v. 15. 7. 51)
Patentanmeldung bekanntgemacht am 26. Juli 1951
Patenterteilung bekanntgemacht am 7. Februar 1952

Es hat bisher nicht an Versuchen gefehlt, Gasgemische durch Zentrifugieren zu zerlegen. Ein brauchbares Ergebnis konnte jedoch mit diesen Verfahren nicht erzielt werden, weil die Trennwirkung der bekannten Zentrifugierverfahren verhältnismäßig gering ist. Auch theoretisch läßt sich nachweisen, daß die Zerlegungswirkung einer nach den bekannten Verfahren betriebenen Zentrifuge selbst bei den höchsten heute möglichen Umfangsgeschwindigkeiten und bei Gemischen mit großen Unterschieden im Molekulargewicht nur sehr gering ist.

Nach der vorliegenden Erfindung läßt sich aber der an sich kleine, durch Zentrifugalwirkung erzielbare Trenneffekt dadurch zu größerer Wirkung bringen, daß man ihn durch Gegenstromführung der Gase verstärkt. Eine solche Verstärkung durch Gegenstrom ist z. B. bei der Rektifikation bekannt. Die nur geringe Zerlegungswirkung eines einzelnen Rektifikationsbodens wird dadurch vervielfacht, daß man eine große Zahl von solchen Böden übereinander anordnet und Flüssigkeit und Dampf im Gegenstrom führt. Ebenso läßt sich grundsätzlich die Trennwirkung einer Zentrifuge dadurch ver-

PATENTSCHRIFT

№ 906 094

KLASSE 12e GRUPPE 3 05

M 4147 IVb/12e

Dr. Werner Kuhn, Basel (Schweiz) und Dr. Hans Martin, Kiel
sind als Erfinder genannt worden

Dr. Hans Martin, Kiel

Vorrichtung und Verfahren zur Trennung von Gasgemischen durch Anwendung von künstlich erzeugten Schwerefeldern

Patentiert im Gebiet der Bundesrepublik Deutschland vom 12. Juli 1938 an
Der Zeitraum vom 8. Mai 1945 bis einschließlich 7. Mai 1950 wird auf die Patentdauer nicht angerechnet
(Ges. v. 15. 7. 51)
Patentanmeldung bekanntgemacht am 12. März 1953
Patenterteilung bekanntgemacht am 28. Januar 1954

Es ist bekannt, daß man eine teilweise Trennung von Gas- oder Dampfgemischen, welche sich aus verschieden schweren Bestandteilen zusammensetzen, dadurch erreichen kann, daß man das Gasgemisch in einen Hohlkörper bringt und denselben mit hoher Umlaufzahl um eine Achse rotieren läßt. Durch das bei der hohen Umlaufzahl auftretende Schwerefeld wird eine Anreicherung der schwereren Bestandteile in den peripheren Teilen, eine verhältnismäßige Anreicherung der leichteren Bestandteile in den der Achse benachbarten Teilen des Hohlkörpers hervorgebracht. Es ist indessen bekannt, daß eine solche Trennung nur in recht geringem Ausmaße erfolgt und daß sie nur dann merkliche Beträge annimmt, wenn das Molekulargewicht der in dem Gemische vorliegenden Bestandteile große Unterschiede aufweist.

Um auch bei kleinen Unterschieden im Molekulargewicht, wie sie z. B. bei Luft oder bei Isotopengemischen vorliegen, eine weitgehende Trennung herbeizuführen, ist es notwendig, die bei der Zentrifugierung anfallenden Gasfraktionen wiederholt zu zentrifugieren. Es ist dabei naheliegend, anstatt einer einzigen eine Reihe von Zentrifugen vorzusehen und diese durch Rohrleitungen derart zu verbinden, daß die zweite Zentrifuge mit der in der ersten anfallenden schweren Fraktion gespeist wird, die dritte Zentrifuge mit der in der zweiten anfallenden noch schwereren Fraktion usf. Auf diese Weise können Fraktionen er-

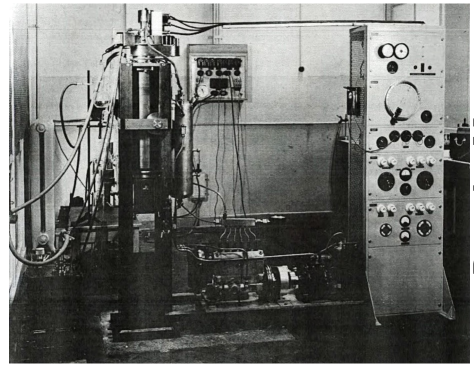
Gas centrifuges were invented in Germany by 1895. By WWII, uranium gas centrifuges were produced in:

- **Kiel (2 groups)**
- **Munich**
- **Freiburg**
- **Göttingen**
- **Thuringia**
- **Breslau/Wrocław**
- **Swiss factories (!)**
- **+ more locations?**

How many uranium gas centrifuges did Germany produce and use?

irp.fas.org/cia/product/zippe.pdf
In November 1946, [redacted] turned to centrifuge development… It must be noted that a centrifuge for isotope separation had been Steenbeck's <u>idée fixe</u> ever since he came to Sinop. Even before he came to Sinop, he seems to have suggested to the Soviet a centrifuge with extremely long rotors…

Werner Schwietzke. 1947. National Archives of Australia. Series MT105/8, ctrl 1/6/3094, code 934755.
Since the theoretical calculations of the stress distribution of the rotor rotating at high speed can only be carried out with a certain approximation, it was recommended that the precisely balanced rotor be subjected to a test run below the maximum rotational speed of 65,000 rpm, which was calculated as critical, and that any changes in the rotor be precisely determined by precision measurements after the run. After a considerable number of test series over several hours at 60,000 rpm a deformation of the rotor never could be detected, so that a constant operating speed of 56,000 rpm could be selected for the intended tests without danger. This ultracentrifuge, which requires little space and effort, has proven itself extraordinarily good in practice. ***[Forgotten Creators* D.4.2]**



Marshal Georgy Zhukov. 2 October 1945. Report to Joseph Stalin. Archive of the President of the Russian Federation, Fund 93, Division 77 (45), List 4-11.

The main specialists in the field of isotope separation in Germany were Professor Harteck, Dr. Groth, who, together with the chief designer of the Anschütz company (Kiel, English zone), Dr. Beyerle, invented an ultra-centrifuge built by the above company, as well as by the Hellige company (Breslau, USSR zone).

NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1
GERMANY—Research—TA—(1943–June 1946)

DECLASSIFIED
Authority NND 917017

D M A

C 50 28596 Card & File

CONFIDENTIAL

C.I.C. 75/295

10 September 1945

COPY NO. 66

Germ.

COMBINED INTELLIGENCE COMMITTEE

COMBINED INTELLIGENCE OBJECTIVES SUBCOMMITTEE
EVALUATION REPORT 318 (13th August 1945)

FRITZ HELLIGE & CO.
FREIBURG - BREISGAU
MANUFACTURERS OF ULTRAZENTRIFUGE

Source: JOLLES, Friedrich Wolfgang (44, non Aryan, never in Party)
Stecklenbergerstr. 34
Thals/Harz
Source was drafted for service with the Wirtschaftsgruppe Feinmechanik & Optik, working for the civilian sector of the Group.

1. Fritz Hellige & Co., were the makers of an ULTRAZENTRIFUGE (ultra-centrifuge) which was designed to be used in the manufacture of a new explosive ten million times more destructive and powerful than any heretofore known.

2. The raw material used was pitchblende. The end product was a liquid which had to be charged in order to become an explosive.

3. Only a few grams of the liquid had been produced by the spring of this year, which explains why the new explosive was never used against the Allies.

4. In November 1944, the plant, originally located in a suburb of Freiburg/Breisgau, was completely bombed out. According to a Pruefungsbericht which Jolles saw, the plant was evacuated to Kandern, south of Freiburg, where the Ultracentrifuge was set up in a little house about 300 meters from the main factory building.

5. Betriebsleiter FRITZENSCHAFT, who may be located in the suburb of Freiburg where the plant was originally located, or at Kandern, knows everything about the Ultracentrifuge and the new product.

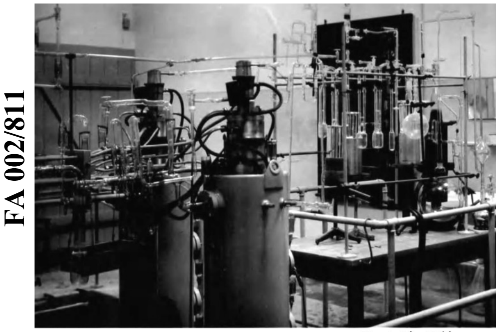
6. Sourve also stated that the new explosive had important peacetime uses, since a quantity about the size of a match box contained enough energy to drive a motor car for twenty years.

7. Source believed that the new explosive was in some way related to the splitting of the atom.

CARDED

E.L. Deuss H.R. Habicht
CIOS Team VII
9th U.S. Army

Deutsches Museum FA 002/811



NARA RG 227, Microfilm M1392, Bush-Conant File Relating to the Development of the Atomic Bomb

March 14, 1944

MEMORANDUM

TO: Major R. R. Furman

FROM: H. T. Wensel

DECLASSIFIED
812018
By MHC NARS Date 2/6/89

This memorandum will put on record the information which I gave you orally yesterday.

Dr. H. C. Urey of Columbia University was approached through a Professor Perrin, who was then an exchange Professor in the Chemistry Department at Columbia University, on behalf of one <u>Constantin Chilowsky</u>. Chilowsky was desirous of selling an invention, the exact method never disclosed to us, for accomplishing the same purpose which the Manhattan District is seeking to. Professor Urey indicated that he was not interested in the matter but passed the information on to the OSRD, and I was asked to interview Chilowsky by Dr. Conant to see what I could find out. I used my credentials as a member of the National Bureau of Standards and indicated to Chilowsky and Professor Perrin that I had no other government connection.

Chilowsky was a Swiss and refused to divulge even the approximate nature of his method but, inasmuch as I indicated that the government would be apathetic to the idea until shown that something practical was involved, in order to "sell" me on the importance of the job, he indicated to me that the Germans were actively engaged on the same objective. In particular, he told me he had personally seen in a factory in Switzerland centrifuges which were being produced to be sent to Germany for the Germans' work on this field.

Chilowsky also told me that he had a moral and financial obligation to offer first crack at his invention to the British group of Halban. It seems that Halban and his group had some part in developing the invention in question. Halban is at present with the British team in Montreal, and it may be that Chilowsky's whereabouts can be traced through Halban if no other means of approach is available.

ANSCHÜTZ & CO. G.M.B.H.
KREISELGERÄTE
KIEL-NEUMÜHLEN
BRIEFANSCHRIFT: KIEL, POSTSCHLIESSFACH
TELEGRAMMADRESSE: ANSCHÜTZCO-KIEL · FERNRUF: 4000 · POSTSCHECKKONTO: HAMBURG 5854
BANKEN: REICHSBANK-GIROKONTO 811, VEREINSBANK KIEL, WILH. AHLMANN, KIEL

An das
Institut für Physikalische Chemie
der Hansischen Universität
z.Hd. Herrn Dozent Dr.W.Groth,
Jungiusstr. 9,
<u>H a m b u r g 36.</u>

IHRE ZEICHEN	IHRE NACHRICHT VOM	UNSERE ZEICHEN	TAG
	9.12.41.	E.A.Dr.Bey/Rw.	11.12.1941.

BETREFF

<u>Herstellung einer Ultrazentrifuge, Oelkreislauf.</u>

Für Ihr Schreiben vom 9.12.41 danken wir Ihnen bestens.

Die Firma Bosch G.m.b.H. teilt uns soeben mit, dass der in unserem Schema 03 21 02 - 1 /<u>Schem.1</u> bei 3) vorgesehene Einzylinder-Luftpresser nicht geliefert werden kann, dass aber Verdichter der Type SV/DRB 160 R 12 4 Wochen nach Auftragseingang erhältlich seien.

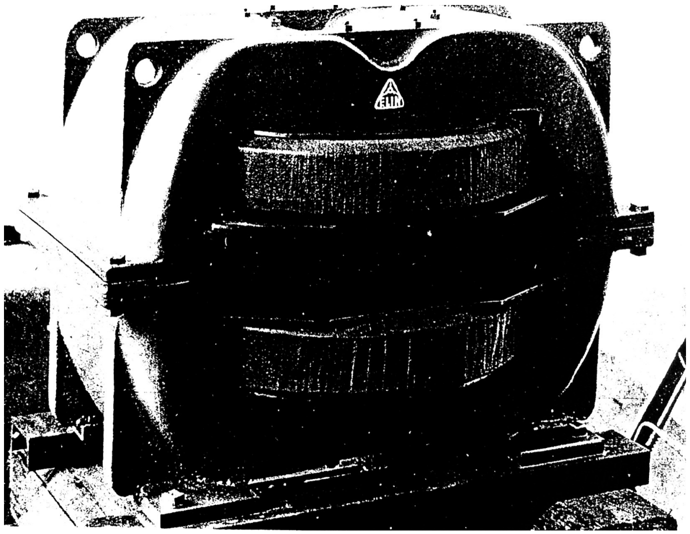
Wir haben unsere frühere Bestellung Nr. 82 11 vom 23.11.41 zurückgezogen und anstelle dessen 2 Stück Verdichter der letztgenannten Type soeben mit der Bitte in Auftrag gegeben, die angegebene Lieferzeit von 4 Wochen einzuhalten. Gleichzeitig haben wir darauf hingewiesen, dass es sich dabei um ein Bauteil handelt, für dessen schnelle Lieferung Sie sich bereits an die Firma Bosch gewandt hatten.

Heil Hitler !
ANSCHÜTZ u. CO. G.m.b.H.
Entwicklungs-Abteilung

i.A. Beyerle

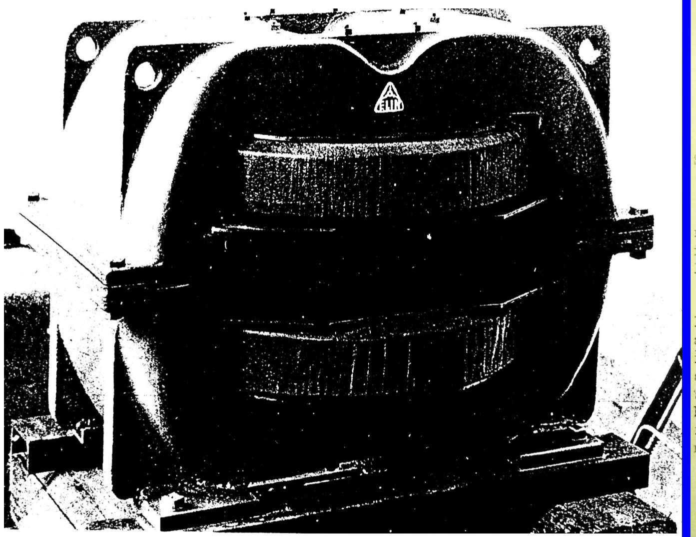
4. ^{235}U Enrichment: Electromagnetic Separators/Calutrons

Prototype calutron built and demonstrated by 1941 by Manfred von Ardenne and ELIN company [Russian archive/Rainer Karlsch].



4. ^{235}U Enrichment: Electromagnetic Separators/Calutrons

Prototype calutron built and demonstrated by 1941 by Manfred von Ardenne and ELIN company [Russian archive/Rainer Karlsch].



Samuel Goudsmit found 1942 reports on von Ardenne's calutrons. They are still withheld.

SECRET

Copy No. 1 of 4 Copies

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY
ALSOS MISSION
APO 887

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1
GERMANY—Research—TA—(1943--June 1946)

16 June 1945

SUBJECT: Baron von Ardenne's Isotope Separation

1. Among the Reichsforschungsrat papers, we have found the research report of the work which ~~von Ardenne~~ did for the Reichspost. The report is dated April 1942 and describes a magnetic isotope separator in detail. It was sent to the RFR by ~~Esau~~.

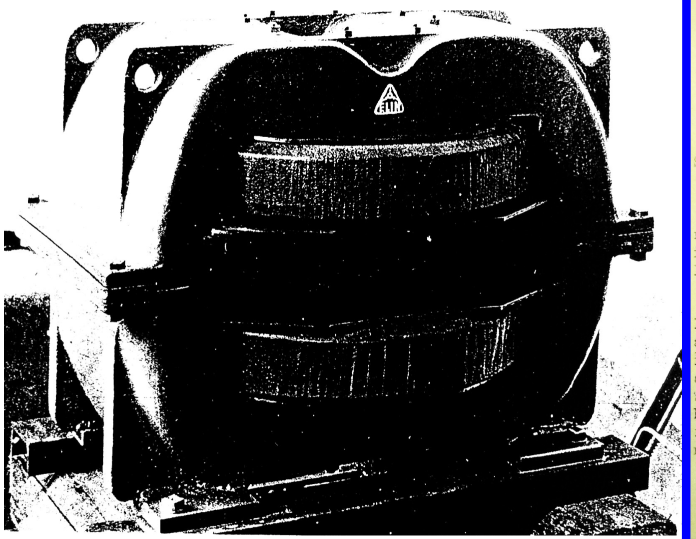
2. Attached is also an interesting commentary by von Ardenne himself. In this, he states that isotope separation is essential to decrease the amount of uranium necessary for the uranium machine. He claims that indications regarding developments, especially in the U.S.A., which aim at a decrease of the uranium quantity in the U-machine, have recently seeped through. Further down, he claims that the method invented by him is new and that, by keeping the development work very secret, an important advantage can be gained over the high level of experimental nuclear physics in the U.S.A.

S. A. Goudsmit

S. A. GOUDSMIT
Scientific Chief

4. ^{235}U Enrichment: Electromagnetic Separators/Calutrons

Prototype calutron built and demonstrated by 1941 by Manfred von Ardenne and ELIN company [Russian archive/Rainer Karlsch].



Samuel Goudsmit found 1942 reports on von Ardenne's calutrons. They are still withheld.

SECRET

Copy No. 1 of 4 Copies

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY
ALSOS MISSION
APO 887

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1 GERMANY—Research—TA—(1943--June 1946)

16 June 1945

SUBJECT: Baron von Ardenne's Isotope Separation

1. Among the Reichsforschungsrat papers, we have found the research report of the work which von Ardenne did for the Reichspost. The report is dated April 1942 and describes a magnetic isotope separator in detail. It was sent to the RFR by Esau.

2. Attached is also an interesting commentary by von Ardenne himself. In this, he states that isotope separation is essential to decrease the amount of uranium necessary for the uranium machine. He claims that indications regarding developments, especially in the U.S.A., which aim at a decrease of the uranium quantity in the U-machine, have recently seeped through. Further down, he claims that the method invented by him is new and that, by keeping the development work very secret, an important advantage can be gained over the high level of experimental nuclear physics in the U.S.A.

S. A. Goudsmit
S. A. GOUDSMIT
Scientific Chief

Heinz Ewald's March 1942 final report on calculations for the optimal performance of calutrons [Deutsches Museum G-139].

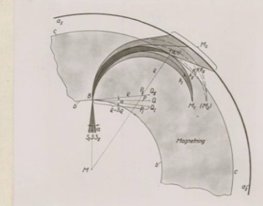


Fig. 5. Zum Auflösungsvermögen der Anordnung mit Innenionenquelle.

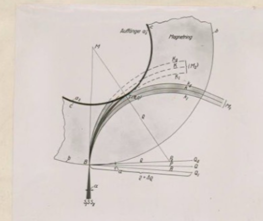


Fig. 6. Zum Auflösungsvermögen der Anordnung mit Aussenionenquelle.

Punkte T, so dass der Kreis k_{II} den Kreis c in T berührt. Die Radien der Kreise k und K seien ρ und $\rho+\Delta\rho$. Wenn wir für eine bestimmte Anordnung – gegeben seien die Radien r_b und r_c und die Winkeldivergenz 2α – das Auflösungsvermögen angeben wollen, dann genügt es, das Verhältnis $\rho/\Delta\rho$ für die beiden Kreise k_{II} und K_I zu bestimmen. Denn aus der Beziehung

$$\rho = \frac{const.\sqrt{M \cdot U}}{H}$$

für den Krümmungsradius von Ionen der Voltenergie U im Magnetfeld H folgt für das Auflösungsvermögen

$$\frac{M}{\Delta M} = \frac{1}{\alpha} \cdot \frac{\rho}{\Delta\rho}$$

Wenn wir den Ursprung des Koordinatensystemes in den Mittelpunkt M der ganzen Anordnung verlegen (Fig. 7), haben die drei Kreise k_{II}, K_I und c die Gleichungen (unter Vernachlässigung höherer Potenzen von α):

$$(x-\rho)^2 + (y - r_b - \rho\cdot\alpha)^2 = \rho^2$$
$$(x-(\rho+\Delta\rho))^2 + (y - r_b + (\rho+\Delta\rho))^2 = (\rho+\Delta\rho)^2$$
$$x^2 + y^2 = r_c^2$$

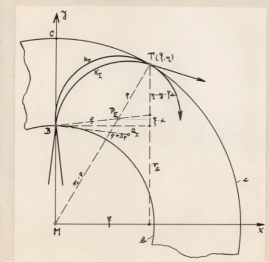
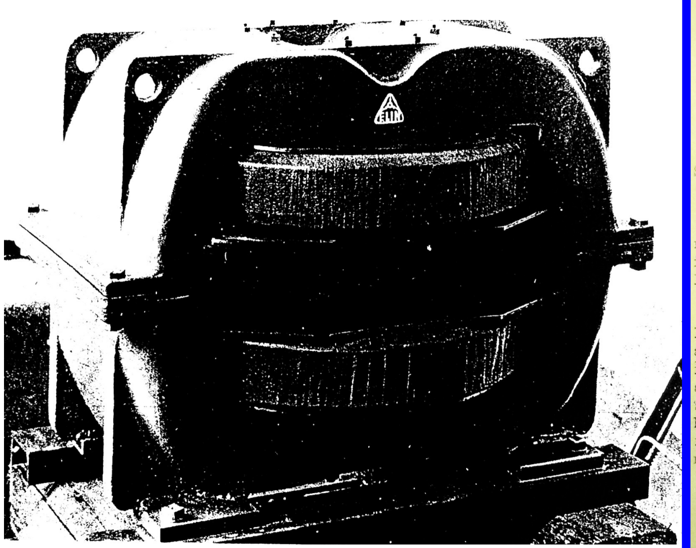


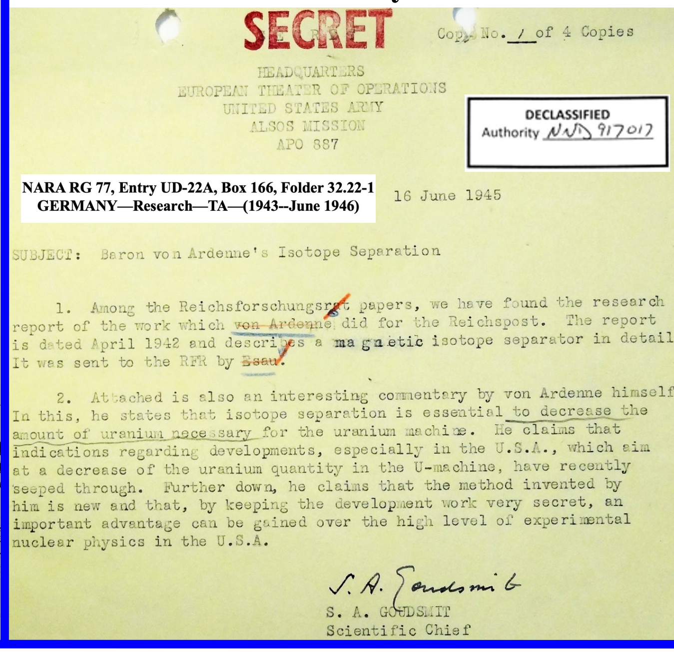
Fig. 7 Ableitung des Auflösungsvermögens.

4. ^{235}U Enrichment: Electromagnetic Separators/Calutrons

Prototype calutron built and demonstrated by 1941 by Manfred von Ardenne and ELIN company [Russian archive/Rainer Karlsch].



Samuel Goudsmit found 1942 reports on von Ardenne's calutrons. They are still withheld.



SECRET

Copy No. 1 of 4 Copies

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY
ALSOS MISSION
APO 887

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1
GERMANY—Research—TA—(1943--June 1946)

16 June 1945

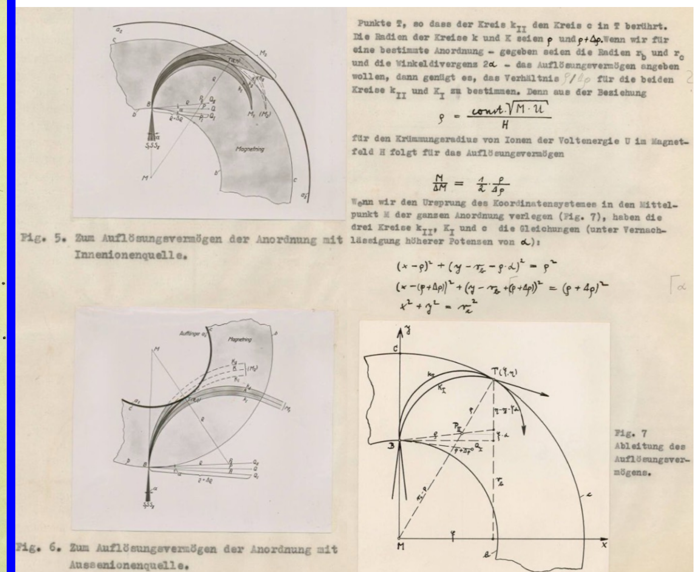
SUBJECT: Baron von Ardenne's Isotope Separation

1. Among the Reichsforschungsrat papers, we have found the research report of the work which ~~von Ardenne~~ did for the Reichspost. The report is dated April 1942 and describes a magnetic isotope separator in detail. It was sent to the RFR by ~~Esau~~.

2. Attached is also an interesting commentary by von Ardenne himself. In this, he states that isotope separation is essential to decrease the amount of uranium necessary for the uranium machine. He claims that indications regarding developments, especially in the U.S.A., which aim at a decrease of the uranium quantity in the U-machine, have recently seeped through. Further down, he claims that the method invented by him is new and that, by keeping the development work very secret, an important advantage can be gained over the high level of experimental nuclear physics in the U.S.A.

S. A. Goudsmit
S. A. GOUDSMIT
Scientific Chief

Heinz Ewald's March 1942 final report on calculations for the optimal performance of calutrons [Deutsches Museum G-139].

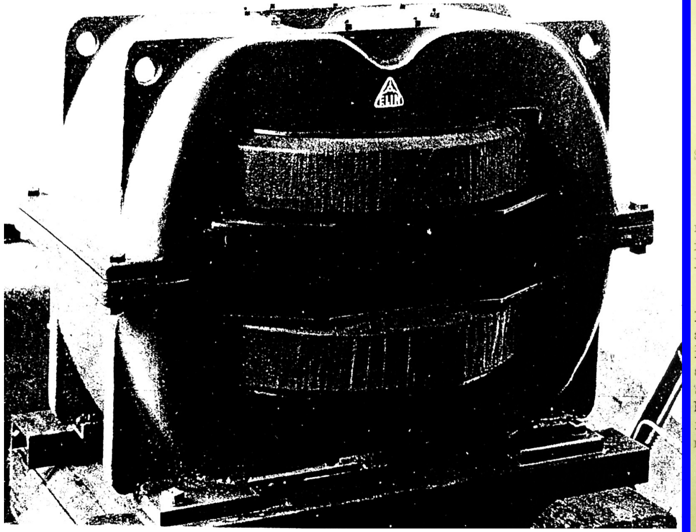


Manfred von Ardenne. 1990. *Die Erinnerungen.* 10th ed. Munich: Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms." In this absolutely confidential conversation, I expressed the opinion that it was technically quite possible to obtain uranium-235 in quantities of a few kilograms with the help of highly sophisticated magnetic mass separators (which we had previously designed and experimentally developed), if large electrical corporations were used for this purpose.

4. ^{235}U Enrichment: Electromagnetic Separators/Calutrons

Prototype calutron built and demonstrated by 1941 by Manfred von Ardenne and ELIN company [Russian archive/Rainer Karlsch].



Samuel Goudsmit found 1942 reports on von Ardenne's calutrons. They are still withheld.

SECRET

Copy No. 1 of 4 Copies

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY
ALSOS MISSION
APO 887

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1 GERMANY—Research—TA—(1943--June 1946)

16 June 1945

SUBJECT: Baron von Ardenne's Isotope Separation

1. Among the Reichsforschungsrat papers, we have found the research report of the work which von Ardenne did for the Reichspost. The report is dated April 1942 and describes a magnetic isotope separator in detail. It was sent to the RFR by Esau.

2. Attached is also an interesting commentary by von Ardenne himself. In this, he states that isotope separation is essential to decrease the amount of uranium necessary for the uranium machine. He claims that indications regarding developments, especially in the U.S.A., which aim at a decrease of the uranium quantity in the U-machine, have recently seeped through. Further down, he claims that the method invented by him is new and that, by keeping the development work very secret, an important advantage can be gained over the high level of experimental nuclear physics in the U.S.A.

S. A. Goudsmit
S. A. GOUDSMIT
Scientific Chief

Heinz Ewald's March 1942 final report on calculations for the optimal performance of calutrons [Deutsches Museum G-139].

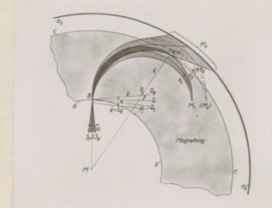


Fig. 5. Zum Auflösungsvermögen der Anordnung mit Innenionenquelle.

Punkte T, so dass der Kreis k_{II} den Kreis c in T berührt. Die Radien der Kreise k und K seien ρ und $\rho+\Delta\rho$. Wenn wir für eine bestimmte Anordnung – gegeben seien die Radien r_b und r_c und die Winkeldivergenz 2α – das Auflösungsvermögen angeben wollen, dann genügt es, das Verhältnis $\rho/\Delta\rho$ für die beiden Kreise k_{II} und K_I zu bestimmen. Denn aus der Beziehung

$$\rho = \frac{const.\sqrt{M \cdot U}}{H}$$

für den Krümmungsradius von Ionen der Voltenergie U im Magnetfeld H folgt für das Auflösungsvermögen

$$\frac{M}{\Delta M} = \frac{1}{\alpha} \cdot \frac{\rho}{\Delta\rho}$$

Wenn wir den Ursprung des Koordinatensystemes in den Mittelpunkt M der ganzen Anordnung verlegen (Fig. 7), haben die drei Kreise k_{II}, K_I und c die Gleichungen (unter Vernachlässigung höherer Potenzen von α):

$$(x-\rho)^2 + (y - r_b - \rho\cdot\alpha)^2 = \rho^2$$
$$(x-(\rho+\Delta\rho))^2 + (y - r_b + (\rho+\Delta\rho))^2 = (\rho+\Delta\rho)^2$$
$$x^2 + y^2 = r_c^2$$

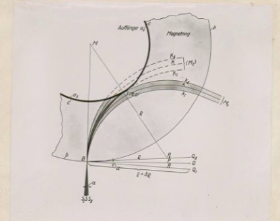


Fig. 6. Zum Auflösungsvermögen der Anordnung mit Aussenionenquelle.

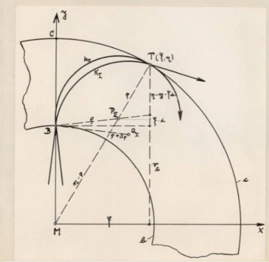


Fig. 7 Ableitung des Auflösungsvermögens.

Manfred von Ardenne. 1990. *Die Erinnerungen.* 10th ed. Munich: Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms." In this absolutely confidential conversation, I expressed the opinion that it was technically quite possible to obtain uranium-235 in quantities of a few kilograms with the help of highly sophisticated magnetic mass separators (which we had previously designed and experimentally developed), if large electrical corporations were used for this purpose.

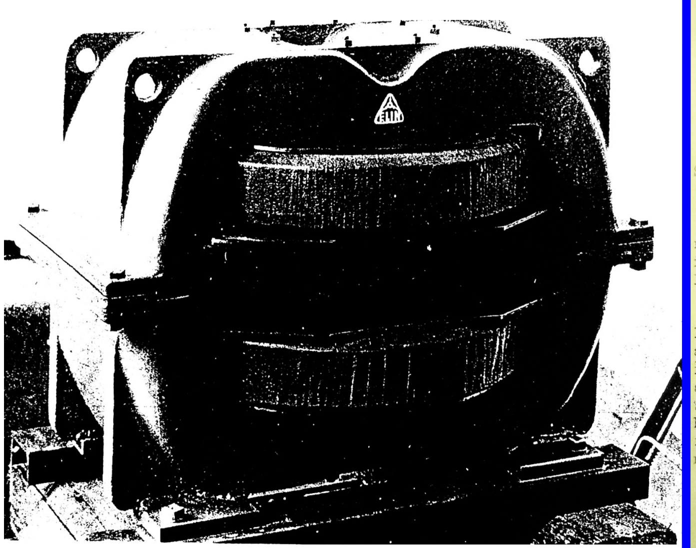
OSS. 9 June 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-1 GERMANY: US Wartime Positive Int. (July 42–June 44).

The Reichs Postal Administration under the direction of Pose have installed three new high tension laboratories of which the location is not known. Professors Fluegge and von Ardenn are in charge.

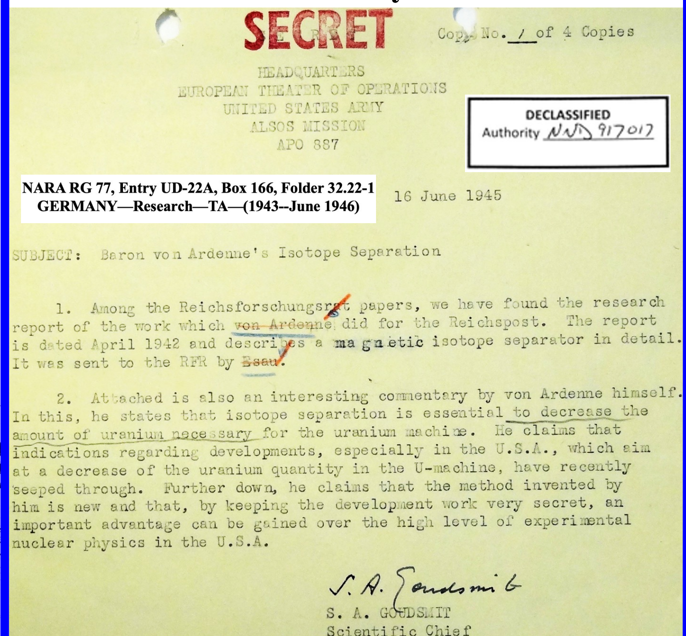
DECLASSIFIED
Authority NND 917017

4. ^{235}U Enrichment: Electromagnetic Separators/Calutrons

Prototype calutron built and demonstrated by 1941 by Manfred von Ardenne and ELIN company [Russian archive/Rainer Karlsch].



Samuel Goudsmit found 1942 reports on von Ardenne's calutrons. They are still withheld.



SECRET

Copy No. 1 of 4 Copies

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY
ALSOS MISSION
APO 887

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1
GERMANY—Research—TA—(1943--June 1946)

16 June 1945

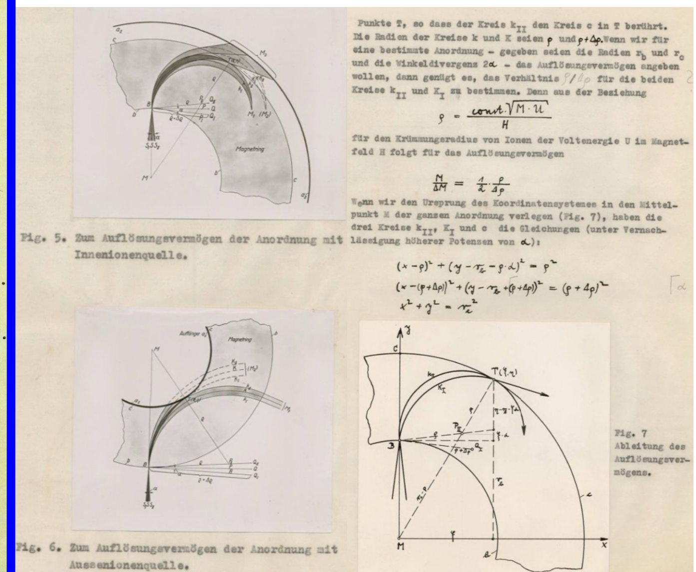
SUBJECT: Baron von Ardenne's Isotope Separation

1. Among the Reichsforschungsrat papers, we have found the research report of the work which ~~von Ardenne~~ did for the Reichspost. The report is dated April 1942 and describes a magnetic isotope separator in detail. It was sent to the RFR by ~~Esau~~.

2. Attached is also an interesting commentary by von Ardenne himself. In this, he states that isotope separation is essential to decrease the amount of uranium necessary for the uranium machine. He claims that indications regarding developments, especially in the U.S.A., which aim at a decrease of the uranium quantity in the U-machine, have recently seeped through. Further down, he claims that the method invented by him is new and that, by keeping the development work very secret, an important advantage can be gained over the high level of experimental nuclear physics in the U.S.A.

S. A. Goudsmit
S. A. GOUDSMIT
Scientific Chief

Heinz Ewald's March 1942 final report on calculations for the optimal performance of calutrons [Deutsches Museum G-139].



Punkte T, so dass der Kreis k_{II} den Kreis c in T berührt. Die Radien der Kreise k und K seien ρ und $\rho+\Delta\rho$. Wenn wir für eine bestimmte Anordnung – gegeben seien die Radien r_b und r_c und die Winkeldivergenz 2α – das Auflösungsvermögen angeben wollen, dann genügt es, das Verhältnis $\rho/\Delta\rho$ für die beiden Kreise k_{II} und K_I zu bestimmen. Denn aus der Beziehung

$$\rho = \frac{const.\sqrt{M \cdot U}}{H}$$

für den Krümmungsradius von Ionen der Voltenergie U im Magnetfeld H folgt für das Auflösungsvermögen

$$\frac{M}{\Delta M} = \frac{1}{2} \cdot \frac{\rho}{\Delta\rho}$$

Wenn wir den Ursprung des Koordinatensystemes in den Mittelpunkt M der ganzen Anordnung verlegen (Fig. 7), haben die drei Kreise k_{II}, K_I und c die Gleichungen (unter Vernachlässigung höherer Potenzen von α):

$$(x-\rho)^2 + (y - r_b - \rho\cdot\alpha)^2 = \rho^2$$
$$(x-(\rho+\Delta\rho))^2 + (y - r_b + (\rho+\Delta\rho))^2 = (\rho+\Delta\rho)^2$$
$$x^2 + y^2 = r_c^2$$

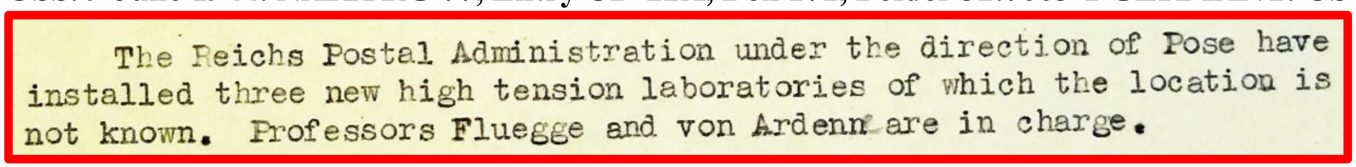
Fig. 5. Zum Auflösungsvermögen der Anordnung mit Innenionenquelle.

Fig. 6. Zum Auflösungsvermögen der Anordnung mit Aussenionenquelle.

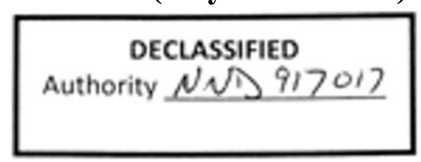
Fig. 7 Ableitung des Auflösungsvermögens.

Manfred von Ardenne. 1990. *Die Erinnerungen.* 10th ed. Munich: Herbig. p. 159.
During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms." In this absolutely confidential conversation, I expressed the opinion that it was technically quite possible to obtain uranium-235 in quantities of a few kilograms with the help of highly sophisticated magnetic mass separators (which we had previously designed and experimentally developed), if large electrical corporations were used for this purpose.

OSS. 9 June 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-1 GERMANY: US Wartime Positive Int. (July 42–June 44).



The Reichs Postal Administration under the direction of Pose have installed three new high tension laboratories of which the location is not known. Professors Fluegge and von Ardenne are in charge.

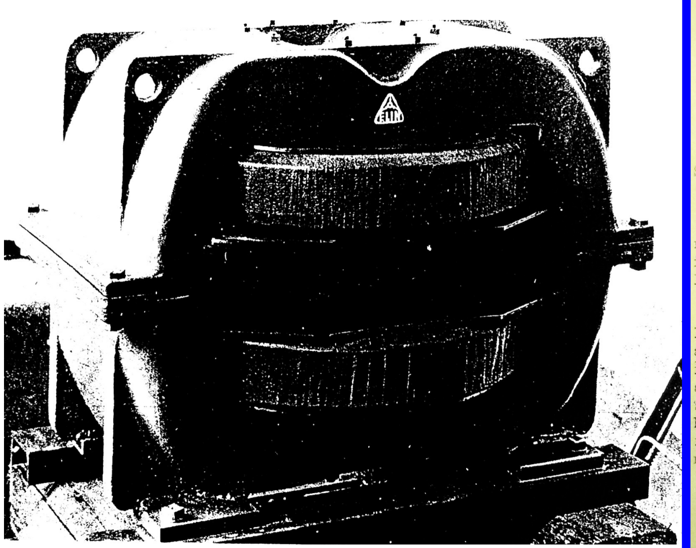


DECLASSIFIED
Authority NND 917017

General Henry H. Arnold. 1949. *Global Mission*. New York: Harper. p. 491.
The Germans were supposed to have perfected an electric machine which would make it possible to complete the development of the atomic bomb. I was then asked to have our bombers in England make special missions against the various branches of the Kaiser Wilhelm Institute in Berlin.

4. ^{235}U Enrichment: Electromagnetic Separators/Calutrons

Prototype calutron built and demonstrated by 1941 by Manfred von Ardenne and ELIN company [Russian archive/Rainer Karlsch].



Samuel Goudsmit found 1942 reports on von Ardenne's calutrons. They are still withheld.

SECRET

Copy No. 1 of 4 Copies

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY
ALSOS MISSION
APO 887

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1 GERMANY—Research—TA—(1943--June 1946)

16 June 1945

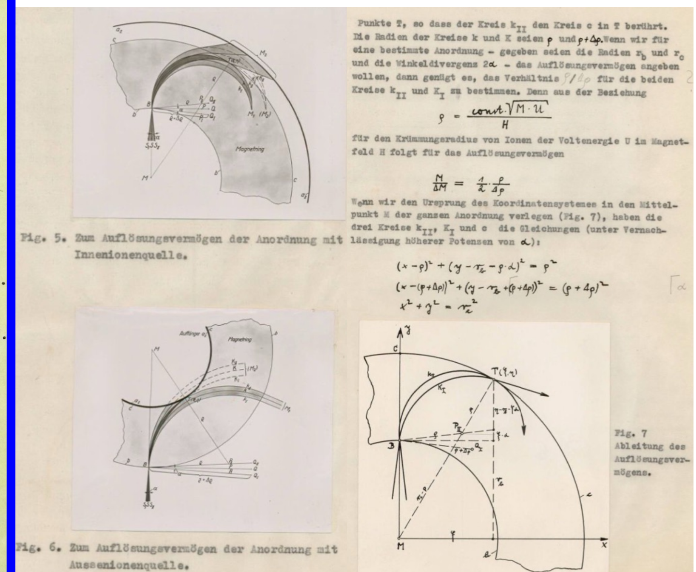
SUBJECT: Baron von Ardenne's Isotope Separation

1. Among the Reichsforschungsrat papers, we have found the research report of the work which ~~von Ardenne~~ did for the Reichspost. The report is dated April 1942 and describes a magnetic isotope separator in detail. It was sent to the RFR by ~~Esau~~.

2. Attached is also an interesting commentary by von Ardenne himself. In this, he states that isotope separation is essential to decrease the amount of uranium necessary for the uranium machine. He claims that indications regarding developments, especially in the U.S.A., which aim at a decrease of the uranium quantity in the U-machine, have recently seeped through. Further down, he claims that the method invented by him is new and that, by keeping the development work very secret, an important advantage can be gained over the high level of experimental nuclear physics in the U.S.A.

S. A. Goudsmit
S. A. GOUDSMIT
Scientific Chief

Heinz Ewald's March 1942 final report on calculations for the optimal performance of calutrons [Deutsches Museum G-139].



Punkte T, so dass der Kreis k_{II} den Kreis c in T berührt. Die Radien der Kreise k und K seien ρ und $\rho+\Delta\rho$. Wenn wir für eine bestimmte Anordnung – gegeben seien die Radien r_b und r_c und die Winkeldivergenz 2α – das Auflösungsvermögen angeben wollen, dann genügt es, das Verhältnis $\rho/\Delta\rho$ für die beiden Kreise k_{II} und K_I zu bestimmen. Denn aus der Beziehung

$$\rho = \frac{const.\sqrt{M \cdot U}}{H}$$

für den Krümmungsradius von Ionen der Voltenergie U im Magnetfeld H folgt für das Auflösungsvermögen

$$\frac{M}{\Delta M} = \frac{1}{2} \cdot \frac{\rho}{\Delta\rho}$$

Wenn wir den Ursprung des Koordinatensystemes in den Mittelpunkt M der ganzen Anordnung verlegen (Fig. 7), haben die drei Kreise k_{II}, K_I und c die Gleichungen (unter Vernachlässigung höherer Potenzen von α):

$$(x-\rho)^2 + (y - r_b - \rho\cdot\alpha)^2 = \rho^2$$
$$(x-(\rho+\Delta\rho))^2 + (y - r_b + (\rho+\Delta\rho))^2 = (\rho+\Delta\rho)^2$$
$$x^2 + y^2 = r_c^2$$

Fig. 5. Zum Auflösungsvermögen der Anordnung mit Innenionenquelle.

Fig. 6. Zum Auflösungsvermögen der Anordnung mit Aussenionenquelle.

Fig. 7 Ableitung des Auflösungsvermögens.

Manfred von Ardenne. 1990. *Die Erinnerungen.* 10th ed. Munich: Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms." In this absolutely confidential conversation, I expressed the opinion that it was technically quite possible to obtain uranium-235 in quantities of a few kilograms with the help of highly sophisticated magnetic mass separators (which we had previously designed and experimentally developed), if large electrical corporations were used for this purpose.

OSS. 9 June 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-1 GERMANY: US Wartime Positive Int. (July 42–June 44).

The Reichs Postal Administration under the direction of Pose have installed three new high tension laboratories of which the location is not known. Professors Fluegge and von Ardenne are in charge.

DECLASSIFIED
Authority NND 917017

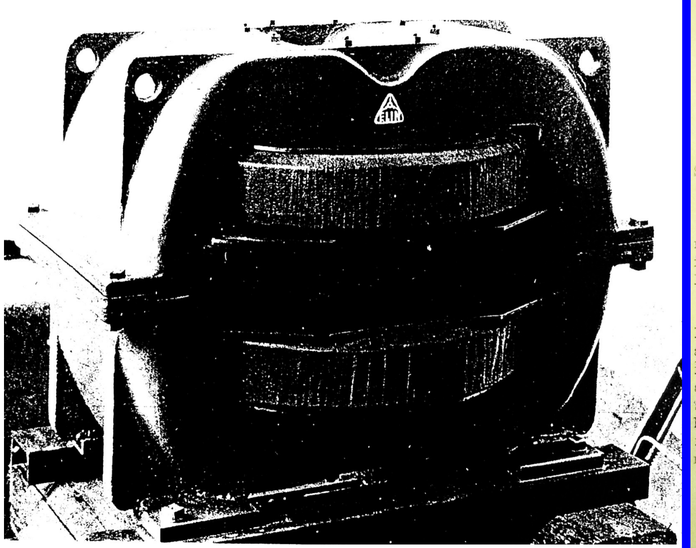
General Henry H. Arnold. 1949. *Global Mission*. New York: Harper. p. 491.

The Germans were supposed to have perfected an electric machine which would make it possible to complete the development of the atomic bomb. I was then asked to have our bombers in England make special missions against the various branches of the Kaiser Wilhelm Institute in Berlin.

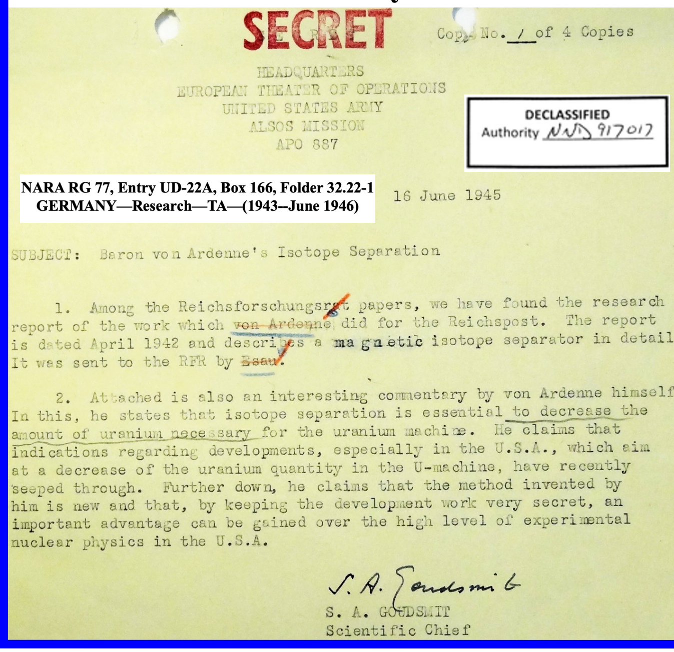
See also work on electromagnetic isotope separation by Richard Herzog, Hans Kopfermann, Wolfgang Paul, Wilhelm Walcher, etc.

4. ^{235}U Enrichment: Electromagnetic Separators/Calutrons

Prototype calutron built and demonstrated by 1941 by Manfred von Ardenne and ELIN company [Russian archive/Rainer Karlsch].



Samuel Goudsmit found 1942 reports on von Ardenne's calutrons. They are still withheld.



SECRET

Copy No. 1 of 4 Copies

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY
ALSOS MISSION
APO 887

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1 GERMANY—Research—TA—(1943--June 1946)

16 June 1945

SUBJECT: Baron von Ardenne's Isotope Separation

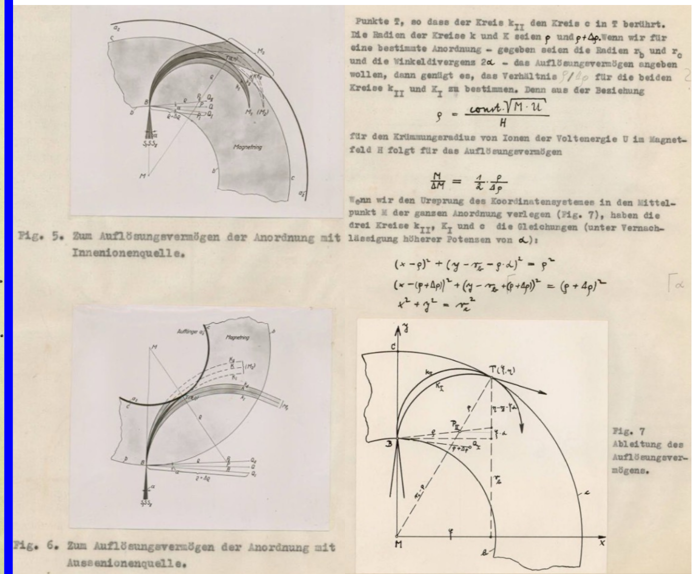
1. Among the Reichsforschungsrat papers, we have found the research report of the work which ~~von Ardenne~~ did for the Reichspost. The report is dated April 1942 and describes a magnetic isotope separator in detail. It was sent to the RFR by ~~Esau~~.

2. Attached is also an interesting commentary by von Ardenne himself. In this, he states that isotope separation is essential to decrease the amount of uranium necessary for the uranium machine. He claims that indications regarding developments, especially in the U.S.A., which aim at a decrease of the uranium quantity in the U-machine, have recently seeped through. Further down, he claims that the method invented by him is new and that, by keeping the development work very secret, an important advantage can be gained over the high level of experimental nuclear physics in the U.S.A.

S. A. Goudsmit

S. A. GOUDSMIT
Scientific Chief

Heinz Ewald's March 1942 final report on calculations for the optimal performance of calutrons [Deutsches Museum G-139].



Punkte T, so dass der Kreis k_{II} den Kreis c in T berührt. Die Radien der Kreise k und K seien ρ und $\rho+\Delta\rho$. Wenn wir für eine bestimmte Anordnung - gegeben seien die Radien r_b und r_c und die Winkeldivergenz 2α - das Auflösungsvermögen angeben wollen, dann genügt es, das Verhältnis $\rho/\Delta\rho$ für die beiden Kreise k_{II} und K_I zu bestimmen. Denn aus der Beziehung

$$\rho = \frac{\text{const.}\sqrt{M \cdot U}}{H}$$

für den Krümmungsradius von Ionen der Voltenergie U im Magnetfeld H folgt für das Auflösungsvermögen

$$\frac{M}{\Delta M} = \frac{1}{2} \cdot \frac{\rho}{\Delta\rho}$$

Wenn wir den Ursprung des Koordinatensystemes in den Mittelpunkt M der ganzen Anordnung verlegen (Fig. 7), haben die drei Kreise k_{II}, K_I und c die Gleichungen (unter Vernachlässigung höherer Potenzen von α):

$$(x-\rho)^2 + (y - r_b - \rho\cdot\alpha)^2 = \rho^2$$
$$(x-(\rho+\Delta\rho))^2 + (y - r_b + (\rho+\Delta\rho))^2 = (\rho+\Delta\rho)^2$$
$$x^2 + y^2 = r_c^2$$

Fig. 5. Zum Auflösungsvermögen der Anordnung mit Innenionenquelle.

Fig. 6. Zum Auflösungsvermögen der Anordnung mit Aussenionenquelle.

Fig. 7 Ableitung des Auflösungsvermögens.

Manfred von Ardenne. 1990. *Die Erinnerungen.* 10th ed. Munich: Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms." In this absolutely confidential conversation, I expressed the opinion that it was technically quite possible to obtain uranium-235 in quantities of a few kilograms with the help of highly sophisticated magnetic mass separators (which we had previously designed and experimentally developed), if large electrical corporations were used for this purpose.

OSS. 9 June 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-1 GERMANY: US Wartime Positive Int. (July 42–June 44).

The Reichs Postal Administration under the direction of Pose have installed three new high tension laboratories of which the location is not known. Professors Fluegge and von Ardenn are in charge.

DECLASSIFIED
Authority NND 917017

General Henry H. Arnold. 1949. *Global Mission*. New York: Harper. p. 491.

The Germans were supposed to have perfected an electric machine which would make it possible to complete the development of the atomic bomb. I was then asked to have our bombers in England make special missions against the various branches of the Kaiser Wilhelm Institute in Berlin.

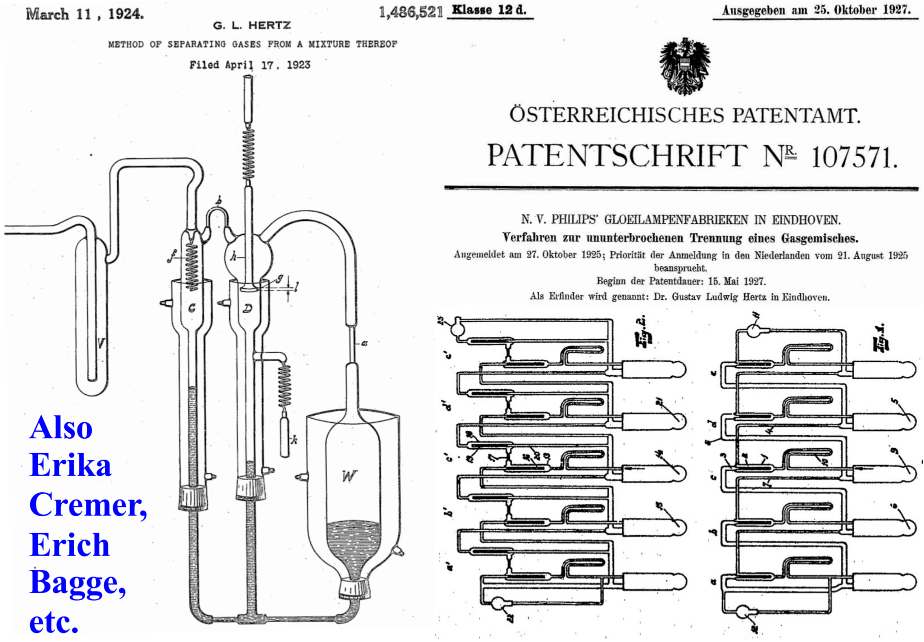
See also work on electromagnetic isotope separation by Richard Herzog, Hans Kopfermann, Wolfgang Paul, Wilhelm Walcher, etc.

How many calutrons did Germany produce and use during the war?

For more information, see *Forgotten Creators* D.4.3.

4. ^{235}U Enrichment: Gaseous Diffusion

Gustav Hertz patented gaseous diffusion in 1923, worked throughout the war despite his Jewish ancestry, then helped the Soviet Union build gaseous diffusion enrichment plants.



Also Erika Cremer, Erich Bagge, etc.

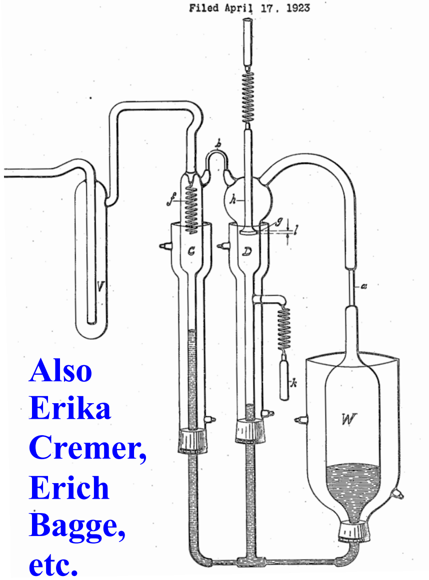
4. 235U Enrichment: Gaseous Diffusion

Gustav Hertz patented gaseous diffusion in 1923, worked throughout the war despite his Jewish ancestry, then helped the Soviet Union build gaseous diffusion enrichment plants.

March 11, 1924. G. L. HERTZ 1,486,521

METHOD OF SEPARATING GASES FROM A MIXTURE THEREOF

Filed April 17, 1923



Also Erika Cremer, Erich Bagge, etc.

Klasse 12 d. Ausgegeben am 25. Oktober 1927.

ÖSTERREICHISCHES PATENTAMT.

PATENTSCHRIFT Nr. 107571.

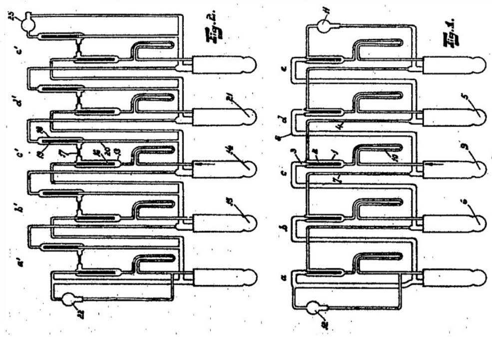
N. V. PHILIPS' GLOEILAMPENFABRIEKEN IN EINDHOVEN.

Verfahren zur ununterbrochenen Trennung eines Gasgemisches.

Angemeldet am 27. Oktober 1925; Priorität der Anmeldung in den Niederlanden vom 21. August 1925 beansprucht.

Beginn der Patentdauer: 15. Mai 1927.

Als Erfinder wird genannt: Dr. Gustav Ludwig Hertz in Eindhoven.



Auergesellschaft patented improved diffusion enrichment methods in 1940 and worked throughout the war. Then Nikolaus Riehl and other Auer personnel helped the Soviets.

ÉTAT FRANÇAIS.

MINISTÈRE DE LA PRODUCTION INDUSTRIELLE ET DES COMMUNICATIONS.

SERVICE DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION.

Gr. 14. — Cl. 6. N° 881.316

Procédé de séparation, par diffusion, de substances difficilement séparables.

Société dite : AUERGESELLSCHAFT AKTIENGESELLSCHAFT résidant en Allemagne.

Demandé le 16 avril 1942, à $16^h 40^m$, à Paris.

Délivré le 22 janvier 1943. — Publié le 21 avril 1943.

(Demande de brevet déposée en Allemagne le 21 septembre 1940. — Déclaration du déposant.)

On sait que les éléments chimiques ne sont pas à considérer comme des matières complètement uniformes, mais au contraire que la plupart des éléments se composent de plusieurs espèces d'atomes différentes, les espèces d'atomes appartenant à un élément se distinguant par leur poids atomique et non par leurs propriétés chimiques. On appelle isotopes les espèces d'atomes qui appartiennent au même élément, mais ont des poids atomiques différents. La séparation des isotopes les uns des autres pose un problème particulièrement difficile, parce qu'il n'y a pas de différences chimiques entre les isotopes à séparer et que, par suite, toutes les méthodes chimiques de séparation échouent. On a donc tenté de recourir à des méthodes physiques de séparation, dans lesquelles le poids atomique se manifeste de telle manière que l'on puisse escompter la différenciation des atomes de poids différents. Mais parmi tous les essais entrepris dans ce sens, la très grande majorité ont manqué leur but, une des premières raisons de ces échecs étant due au fait que les différences de poids atomiques des corps isotopes sont pour la plupart très faibles.

A maintes reprises, on a essayé de mettre à profit le fait qu'un atome plus léger doit posséder une vitesse de diffusion plus grande qu'un atome moins léger. On a donc fait diffuser à travers des membranes poreuses les espèces d'atomes étudiées en essayant de réaliser leur séparation par ce moyen. La majorité de ces essais n'ont toutefois pas réussi. Il a été trouvé, ces dernières années, un procédé par lequel on peut, dans de nombreux cas, exécuter une séparation d'isotopes avec une pleine réussite tout au moins pour des isotopes gazeux. Il s'agit du procédé par « thermo-diffusion » indiqué par Clusius. Mais le procédé en question, aussi bien que tous les autres procédés qui produisent pour le moins une certaine ségrégation des isotopes, se limitent généralement à des corps gazeux. Un inconvénient plus grave encore des procédés indiqués jusqu'à présent réside dans la grande complexité, le prix élevé et le manque de robustesse des appareils que nécessite leur mise en œuvre. A cela s'ajoute la très grande dépense d'énergie nécessaire pour la séparation d'une certaine quantité de matière, dans tous ces procédés. Dans quelques cas particuliers, on réussit à séparer jusqu'à un certain degré des paires d'isotopes déterminées, sans franchir le cadre d'un procédé de laboratoire, mais les

[881.316] — 2 —

procédés employés jusqu'à présent n'ont aucune chance d'être appliqués à l'échelle industrielle.

La présente invention concerne un procédé de séparation d'isotopes, exempt de tous les inconvénients caractéristiques des méthodes employées jusqu'à ce jour et qui, pour la première fois, permet de réaliser une séparation d'isotopes sur le plan industriel. Comme il s'agit ici d'un nouveau procédé physico-chimique de séparation, il est également applicable à la ségrégation d'autres substances difficilement séparables telles que, par exemple, les paires d'éléments formant des mélanges azéotropiques. En outre, le procédé n'est pas applicable uniquement aux gaz, mais encore particulièrement à des substances en solution. C'est là précisément qu'il convient d'apprécier l'importance particulière du nouveau procédé, car la séparation de substances dissoutes a une importance industrielle beaucoup plus grande que la séparation des seuls corps gazeux. En effet, les métaux notamment ne se trouvent pas en général normalement à l'état gazeux, tout au moins aux températures utilisables au laboratoire et en exploitation.

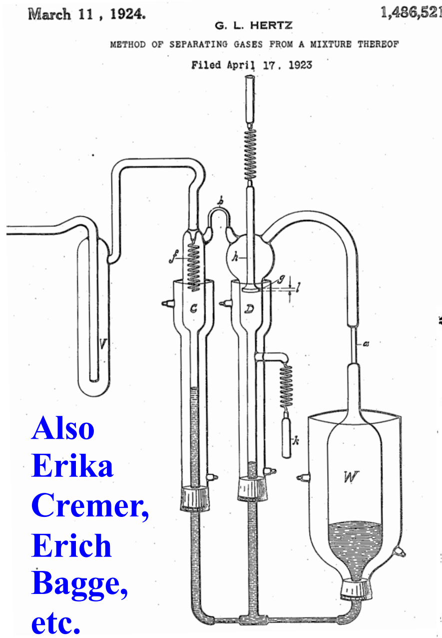
La description qui va suivre, en regard du dessin annexé, donné à titre d'exemple non limitatif, fera bien comprendre comment l'invention peut être réalisée, les particularités qui ressortent tant du dessin que du texte faisant, bien entendu, partie de celle-ci.

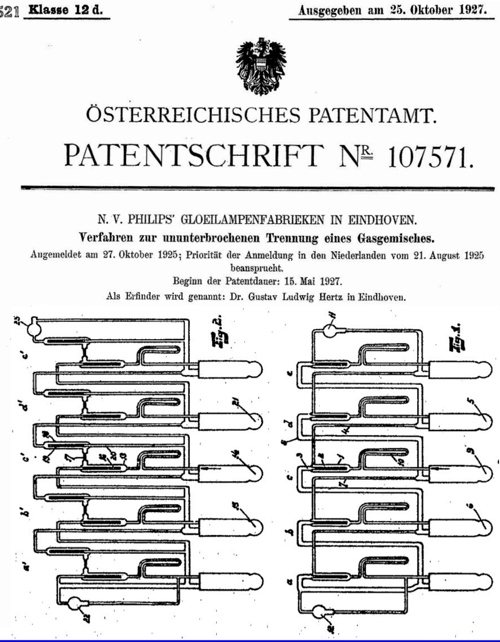
On décrira tout d'abord la forme de réalisation du procédé objet de l'invention qui est destinée à la séparation de substances à l'état dissous.

La fig. 1 sert à expliquer le procédé. Un cylindre 1, par exemple en tôle, est rempli d'une masse poreuse 2, telle que du sable, de la terre d'infusoires ou une masse céramique cohérente. La masse poreuse (telle que le sable) est noyée dans la solution des isotopes à séparer. A l'extrémité inférieure du cylindre, on évapore le solvant par la chaleur par ventilation ou par le vide, en prenant soin que l'évaporation soit suffisamment lente pour que le sel dissous ne risque pas de cristalliser. Par le haut, on verse du solvant frais goutte à goutte, en quantité égale à ce qui s'en évapore dans le bas. Il se passe alors le phénomène suivant : la solution se concentre au voisinage de la surface inférieure dans la mesure même où le solvant est évaporé à l'extrémité inférieure. Il se produit, par suite, une baisse de concentration de bas en haut et la matière dissoute commence à se diffuser de bas en haut. On a donc affaire ici à deux courants de sens contraires, L'un de ces courants est constitué par l'écoulement du solvant à travers la masse en direction descendante, l'autre est un courant de diffusion, en sens contraire, de la matière dissoute. Les atomes ou les ions ou molécules en solution, diffusent donc d'une manière ininterrompue de bas en haut, mais sans changer de place, car leur diffusion est continuellement compensée par le courant liquide s'écoulant à sa rencontre. (On pourrait illustrer les conditions régnant ici par l'exemple de l'écureuil dans sa cage rotative ; on sait que l'écureuil court continuellement sans changer de place, car la cage tourne en sens contraire). Grâce à la disposition adoptée, une diffusion ininterrompue et durable des isotopes s'établit de bas en haut et, par ce moyen, il se produit automatiquement une ségrégation, du fait que la partie basse de la solution s'enrichit peu à peu en isotope le plus lourd, la partie haute devenant plus riche en isotope le plus léger. Si l'on voulait entreprendre un fonctionnement de cette nature selon les méthodes usuelles de séparation, par exemple dans le genre de la cristallisation fractionnée, on serait conduit à employer des quantités de liquide exagérées et à surveiller et à préparer un très grand nombre de charges individuelles. Rien de tout cela n'est nécessaire pour le présent procédé. Tout le travail consiste à faire évaporer le solvant à l'extrémité inférieure de la colonne et à le faire retomber goutte à goutte à l'extrémité supérieure. Bien entendu, le dispositif doit comporter des appareils d'extraction, par exemple des tubulures d'aspiration qui permettent de prélever la solution de la colonne. Une telle colonne peut rester en service des mois, voire des années, sans nécessiter de frais importants en personnel de surveillance.

4. 235U Enrichment: Gaseous Diffusion

Gustav Hertz patented gaseous diffusion in 1923, worked throughout the war despite his Jewish ancestry, then helped the Soviet Union build gaseous diffusion enrichment plants.



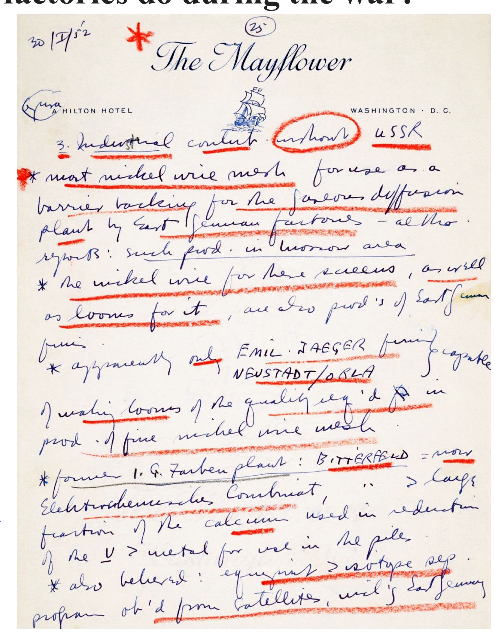


Also Erika Cremer, Erich Bagge, etc.

Auergesellschaft patented improved diffusion enrichment methods in 1940 and worked throughout the war. Then Nikolaus Riehl and other Auer personnel helped the Soviets.

Soviets found Neustadt an der Orla factories that were uniquely skilled at producing nickel membrane filters for gaseous diffusion. What did those factories do during the war?

***Forgotten Creators* D.4.4, D.4.6, D.14**



Princeton University Library, Moe Berg Papers (C1413), Box 20, Folder 3--Loose Notes: Central Intelligence Agency.

How many gaseous diffusion cells did Germany produce and use during the war?

4. 235U Enrichment: Gaseous Diffusion

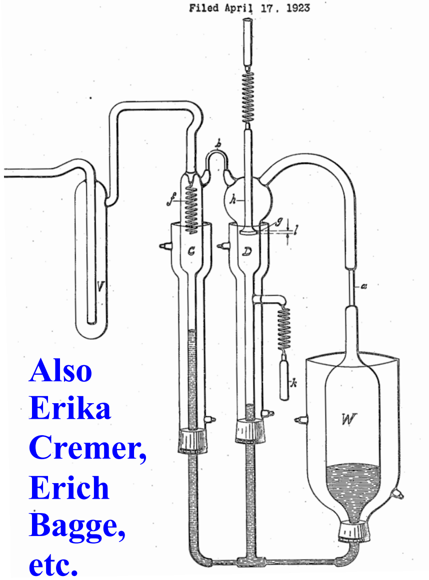
Gustav Hertz patented gaseous diffusion in 1923, worked throughout the war despite his Jewish ancestry, then helped the Soviet Union build gaseous diffusion enrichment plants.

March 11, 1924. 1,486,521

G. L. HERTZ

METHOD OF SEPARATING GASES FROM A MIXTURE THEREOF

Filed April 17, 1923



Also Erika Cremer, Erich Bagge, etc.

Klasse 12 d. Ausgegeben am 25. Oktober 1927.

ÖSTERREICHISCHES PATENTAMT.

PATENTSCHRIFT Nr. 107571.

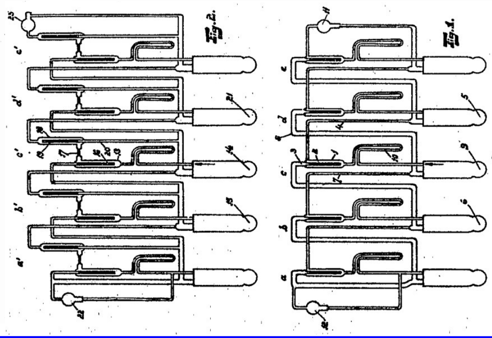
N. V. PHILIPS' GLOEILAMPENFABRIEKEN IN EINDHOVEN.

Verfahren zur ununterbrochenen Trennung eines Gasgemisches.

Angemeldet am 27. Oktober 1925; Priorität der Anmeldung in den Niederlanden vom 21. August 1925 beansprucht.

Beginn der Patentdauer: 15. Mai 1927.

Als Erfinder wird genannt: Dr. Gustav Ludwig Hertz in Eindhoven.



Auergesellschaft patented improved diffusion enrichment methods in 1940 and worked throughout the war. Then Nikolaus Riehl and other Auer personnel helped the Soviets.

ÉTAT FRANÇAIS.

MINISTÈRE DE LA PRODUCTION INDUSTRIELLE ET DES COMMUNICATIONS.

SERVICE DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION.

Gr. 14. — Cl. 6. N° 881.316

Procédé de séparation, par diffusion, de substances difficilement séparables.

Société dite : AUERGESELLSCHAFT AKTIENGESELLSCHAFT résidant en Allemagne.

Demandé le 16 avril 1942, à $16^h 40^m$, à Paris.

Délivré le 22 janvier 1943. — Publié le 21 avril 1943.

(Demande de brevet déposée en Allemagne le 21 septembre 1940. — Déclaration du déposant.)

On sait que les éléments chimiques ne sont pas à considérer comme des matières complètement uniformes, mais au contraire que la plupart des éléments se composent de plusieurs espèces d'atomes différentes, les espèces d'atomes appartenant à un élément se distinguant par leur poids atomique et non par leurs propriétés chimiques. On appelle isotopes les espèces d'atomes qui appartiennent au même élément, mais ont des poids atomiques différents. La séparation des isotopes les uns des autres pose un problème particulièrement difficile, parce qu'il n'y a pas de différences chimiques entre les isotopes à séparer et que, par suite, toutes les méthodes chimiques de séparation échouent. On a donc tenté de recourir à des méthodes physiques de séparation, dans lesquelles le poids atomique se manifeste de telle manière que l'on puisse escompter la différenciation des atomes de poids différents. Mais parmi tous les essais entrepris dans ce sens, la très grande majorité ont manqué leur but, une des premières raisons de ces échecs étant due au fait que les différences de poids atomiques des corps isotopes sont pour la plupart très faibles.

A maintes reprises, on a essayé de mettre à profit le fait qu'un atome plus léger doit posséder une vitesse de diffusion plus grande qu'un atome moins léger. On a donc fait diffuser à travers des membranes poreuses les espèces d'atomes étudiées en essayant de réaliser leur séparation par ce moyen. La majorité de ces essais n'ont toutefois pas réussi. Il a été trouvé, ces dernières années, un procédé par lequel on peut, dans de nombreux cas, exécuter une séparation d'isotopes avec une pleine réussite tout au moins pour des isotopes gazeux. Il s'agit du procédé par « thermo-diffusion » indiqué par Clusius. Mais le procédé en question, aussi bien que tous les autres procédés qui produisent pour le moins une certaine ségrégation des isotopes, se limitent généralement à des corps gazeux. Un inconvénient plus grave encore des procédés indiqués jusqu'à présent réside dans la grande complexité, le prix élevé et le manque de robustesse des appareils que nécessite leur mise en œuvre. A cela s'ajoute la très grande dépense d'énergie nécessaire pour la séparation d'une certaine quantité de matière, dans tous ces procédés. Dans quelques cas particuliers, on réussit à séparer jusqu'à un certain degré des paires d'isotopes déterminées, sans franchir le cadre d'un procédé de laboratoire, mais les

[881.316] — 2 —

procédés employés jusqu'à présent n'ont aucune chance d'être appliqués à l'échelle industrielle.

La présente invention concerne un procédé de séparation d'isotopes, exempt de tous les inconvénients caractéristiques des méthodes employées jusqu'à ce jour et qui, pour la première fois, permet de réaliser une séparation d'isotopes sur le plan industriel. Comme il s'agit ici d'un nouveau procédé physico-chimique de séparation, il est également applicable à la ségrégation d'autres substances difficilement séparables telles que, par exemple, les paires d'éléments formant des mélanges azéotropiques. En outre, le procédé n'est pas applicable uniquement aux gaz, mais encore particulièrement à des substances en solution. C'est là précisément qu'il convient d'apprécier l'importance particulière du nouveau procédé, car la séparation de substances dissoutes a une importance industrielle beaucoup plus grande que la séparation des seuls corps gazeux. En effet, les métaux notamment ne se trouvent pas en général normalement à l'état gazeux, tout au moins aux températures utilisables au laboratoire et en exploitation.

La description qui va suivre, en regard du dessin annexé, donné à titre d'exemple non limitatif, fera bien comprendre comment l'invention peut être réalisée, les particularités qui ressortent tant du dessin que du texte faisant, bien entendu, partie de celle-ci.

On décrira tout d'abord la forme de réalisation du procédé objet de l'invention qui est destinée à la séparation de substances à l'état dissous.

La fig. 1 sert à expliquer le procédé. Un cylindre 1, par exemple en tôle, est rempli d'une masse poreuse 2, telle que du sable, de la terre d'infusoires ou une masse céramique cohérente. La masse poreuse (telle que le sable) est noyée dans la solution des isotopes à séparer. A l'extrémité inférieure du cylindre, on évapore le solvant par la chaleur par ventilation ou par le vide, en prenant soin que l'évaporation soit suffisamment lente pour que le sel dissous ne risque pas de cristalliser. Par le haut, on verse du solvant frais goutte à goutte, en quantité égale à ce qui s'en évapore dans le bas. Il se passe alors le phénomène suivant : la solution se concentre au voisinage de la surface inférieure dans la mesure même où le solvant est évaporé à l'extrémité inférieure. Il se produit, par suite, une baisse de concentration de bas en haut et la matière dissoute commence à se diffuser de bas en haut. On a donc affaire ici à deux courants de sens contraires, L'un de ces courants est constitué par l'écoulement du solvant à travers la masse en direction descendante, l'autre est un courant de diffusion, en sens contraire, de la matière dissoute. Les atomes ou les ions ou molécules en solution, diffusent donc d'une manière ininterrompue de bas en haut, mais sans changer de place, car leur diffusion est continuellement compensée par le courant liquide s'écoulant à sa rencontre. (On pourrait illustrer les conditions régnant ici par l'exemple de l'écureuil dans sa cage rotative ; on sait que l'écureuil court continuellement sans changer de place, car la cage tourne en sens contraire). Grâce à la disposition adoptée, une diffusion ininterrompue et durable des isotopes s'établit de bas en haut et, par ce moyen, il se produit automatiquement une ségrégation, du fait que la partie basse de la solution s'enrichit peu à peu en isotope le plus lourd, la partie haute devenant plus riche en isotope le plus léger. Si l'on voulait entreprendre un fonctionnement de cette nature selon les méthodes usuelles de séparation, par exemple dans le genre de la cristallisation fractionnée, on serait conduit à employer des quantités de liquide exagérées et à surveiller et à préparer un très grand nombre de charges individuelles. Rien de tout cela n'est nécessaire pour le présent procédé. Tout le travail consiste à faire évaporer le solvant à l'extrémité inférieure de la colonne et à le faire retomber goutte à goutte à l'extrémité supérieure. Bien entendu, le dispositif doit comporter des appareils d'extraction, par exemple des tubulures d'aspiration qui permettent de prélever la solution de la colonne. Une telle colonne peut rester en service des mois, voire des années, sans nécessiter de frais importants en personnel de surveillance.

Soviets found Neustadt an der Orla factories that were uniquely skilled at producing nickel membrane filters for gaseous diffusion. What did those factories do during the war?

***Forgotten Creators* D.4.4, D.4.6, D.14**

30/II/52 (25)

The Mayflower

A HILTON HOTEL WASHINGTON · D. C.

3. Industrial contact · without USSR

* most nickel wire mesh for use as a barrier backing for the gaseous diffusion plant by East German factories — althoreports: such prod. in Moscow area
* the nickel wire for these screens, as well as looms for it, are also prod's of East German firms.
* apparently only EMIL · JAEGER firm, NEUSTADT/ORLA capable of making looms of the quality req'd for in prod. of fine nickel wire mesh
* former I. G. Farben plant: BITTERFELD = now Elektrochemisches Combinat, " > large fraction of the calcium used in reduction of the U > metal for use in the piles
* also believed: equipment > isotope sep. program ob'd from satellites, incl'g East Germany

Princeton University Library, Moe Berg Papers (C1413), Box 20, Folder 3--Loose Notes: Central Intelligence Agency.

How many gaseous diffusion cells did Germany produce and use during the war?

The Manhattan Project believed the German gaseous diffusion program was ahead of them.

RET

Metallurgical Laboratory
P.O. BOX 5207
CHICAGO 80, ILLINOIS

MUC-SKA-445
This document consists of 1 pages and 0 figures
No. 1 of 6 copies, Series A

BUTTERFIELD 4300

January 27, 1944

Brig. Gen. L. R. Groves
P.O. Box 2610
Washington, D.C.

Dear Gen. Groves:

Major Furman has told us that in connection with the work we are doing for him we should cover possible enemy activities in every phase of our project, that is, the X-10, Y-12, and K-25 processes.

We have dismissed as too improbable to require investigation the possibility that the enemy may be engaged in the Y-12 process on a scale of military importance. We believe, however, that due to the fact that the enemy was considerably in advance of us in certain work of the K-25 type before the war, there is a high probability that if he is doing anything of military interest in our field, he is operating along this line.

In order to suggest to Major Furman appropriate leads for investigation, we would like to request that Dr. Karl Cohen of the Columbia group be authorized to visit us and discuss various methods of accomplishing our result by K-25 processes. Dr. Cohen in his work for Dr. Urey has had wide experience in investigating several kinds of such processes, some of which have been dropped as not promising but may have been developed by the enemy.

Would it be possible for you to authorize such a visit in the near future?

Yours sincerely,

Samuel K. Allison

Samuel K. Allison

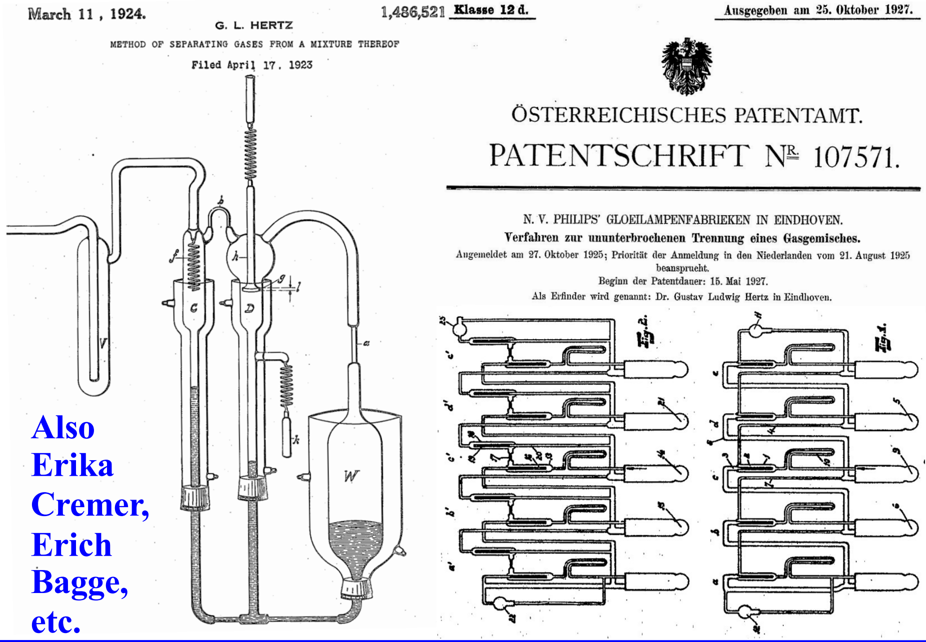
dj

CC Compton
Morrison
Vernon

Samuel K. Allison to Leslie R. Groves. 27 January 1944. NARA RG 77, Entry UD-22A, Box 170, Folder 32.60-1 GERMANY: Summary Reports (1944)

4. ^{235}U Enrichment: Gaseous Diffusion

Gustav Hertz patented gaseous diffusion in 1923, worked throughout the war despite his Jewish ancestry, then helped the Soviet Union build gaseous diffusion enrichment plants.


March 11, 1924. 1,486,521

G. L. HERTZ

METHOD OF SEPARATING GASES FROM A MIXTURE THEREOF

Filed April 17, 1923

Klasse 12 d. Ausgegeben am 25. Oktober 1927.

ÖSTERREICHISCHES PATENTAMT.

PATENTSCHRIFT Nr. 107571.

N. V. PHILIPS' GLOEILAMPENFABRIEKEN IN EINDHOVEN.

Verfahren zur ununterbrochenen Trennung eines Gasgemisches.

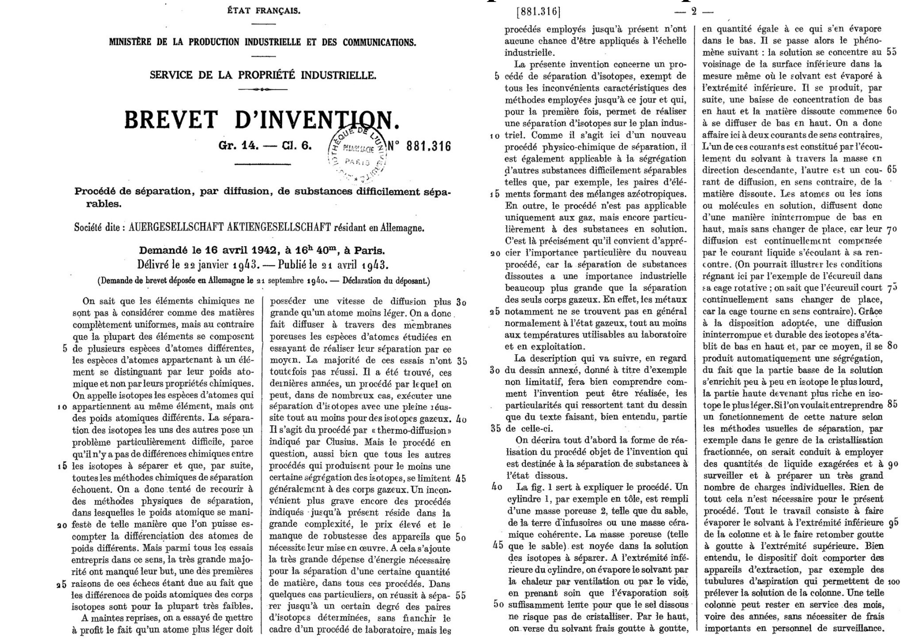
Angemeldet am 27. Oktober 1925; Priorität der Anmeldung in den Niederlanden vom 21. August 1925 beansprucht.

Beginn der Patentdauer: 15. Mai 1927.

Als Erfinder wird genannt: Dr. Gustav Ludwig Hertz in Eindhoven.

Also Erika Cremer, Erich Bagge, etc.

Auergesellschaft patented improved diffusion enrichment methods in 1940 and worked throughout the war. Then Nikolaus Riehl and other Auer personnel helped the Soviets.


ÉTAT FRANÇAIS.

MINISTÈRE DE LA PRODUCTION INDUSTRIELLE ET DES COMMUNICATIONS.

SERVICE DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION.

Gr. 14. — Cl. 6. N° 881.316

Procédé de séparation, par diffusion, de substances difficilement séparables.

Société dite : AUERGESELLSCHAFT AKTIENGESELLSCHAFT résidant en Allemagne.

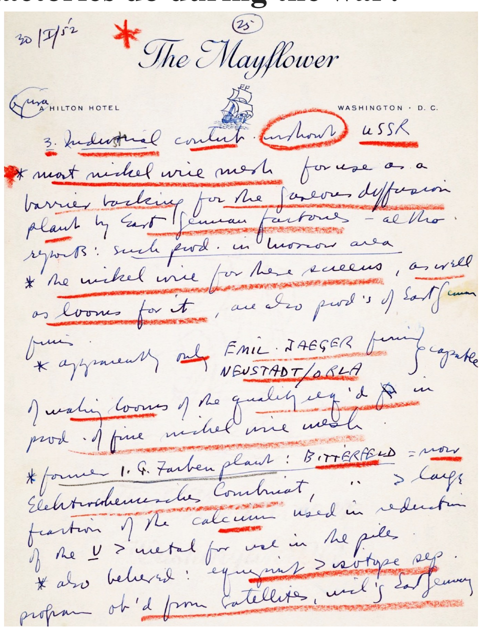
Demandé le 16 avril 1942, à 16h 40m, à Paris.

Délivré le 22 janvier 1943. — Publié le 21 avril 1943.

(Demande de brevet déposée en Allemagne le 21 septembre 1940. — Déclaration du déposant.)

Soviets found Neustadt an der Orla factories that were uniquely skilled at producing nickel membrane filters for gaseous diffusion. What did those factories do during the war?

Forgotten Creators D.4.4, D.4.6, D.14


The Mayflower

HILTON HOTEL WASHINGTON · D. C.

30/II/52

3. Industrial contacts with USSR

* most nickel wire mesh for use as a barrier backing for the gaseous diffusion plant by East German factories – all these reports: such prod. in Moscow area

* the nickel wire for these screens, as well as looms for it, are also prod's of East German firms

* apparently only EMIL JAEGER firm, NEUSTADT/ORLA capable of making looms of the quality req'd

* in prod. of fine nickel wire mesh

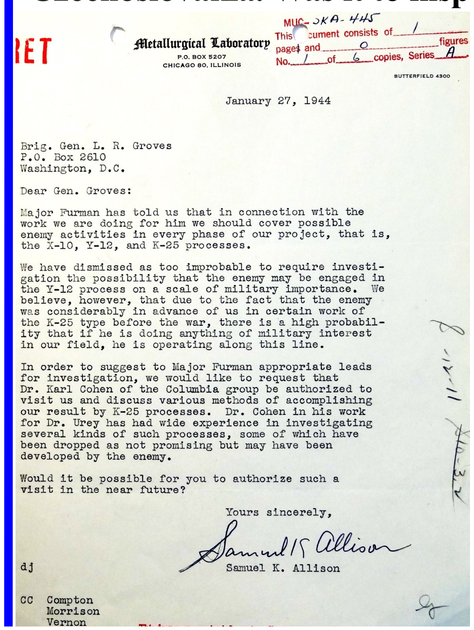
* former I. G. Farben plant: BITTERFELD = now large Elektrochemisches Kombinat, producing calcium used in reduction of the U > metal for use in the pile

* also believed: equipment > isotope sep. program ob'd from satellites, incl. East Germany

Princeton University Library, Moe Berg Papers (C1413), Box 20, Folder 3--Loose Notes: Central Intelligence Agency.

How many gaseous diffusion cells did Germany produce and use during the war?

The Manhattan Project believed the German gaseous diffusion program was ahead of them. In September 1946, Leslie Groves sent Percival C. Keith, chief designer of Oak Ridge K-25, on a high-risk, two-week, Top Secret trip to Czechoslovakia. Was it to inspect/sabotage a former German enrichment plant?


RET

Metallurgical Laboratory
P.O. BOX 5207
CHICAGO 80, ILLINOIS

MUC-SKA-445
This document consists of 1 pages and 0 figures
No. 1 of 6 copies, Series A

BUTTERFIELD 4300

January 27, 1944

Brig. Gen. L. R. Groves
P.O. Box 2610
Washington, D.C.

Dear Gen. Groves:

Major Furman has told us that in connection with the work we are doing for him we should cover possible enemy activities in every phase of our project, that is, the X-10, Y-12, and K-25 processes.

We have dismissed as too improbable to require investigation the possibility that the enemy may be engaged in the Y-12 process on a scale of military importance. We believe, however, that due to the fact that the enemy was considerably in advance of us in certain work of the K-25 type before the war, there is a high probability that if he is doing anything of military interest in our field, he is operating along this line.

In order to suggest to Major Furman appropriate leads for investigation, we would like to request that Dr. Karl Cohen of the Columbia group be authorized to visit us and discuss various methods of accomplishing our result by K-25 processes. Dr. Cohen in his work for Dr. Urey has had wide experience in investigating several kinds of such processes, some of which have been dropped as not promising but may have been developed by the enemy.

Would it be possible for you to authorize such a visit in the near future?

Yours sincerely,

Samuel K. Allison

Samuel K. Allison

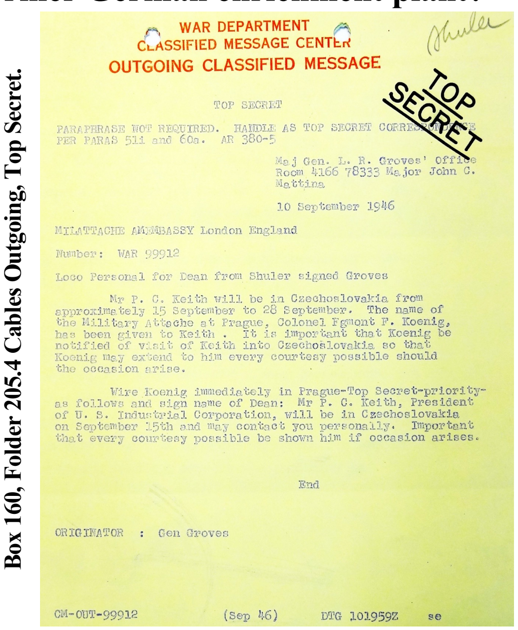
dj

CC Compton
Morrison
Vernon

Samuel K. Allison to Leslie R. Groves. 27 January 1944. NARA RG 77, Entry UD-22A, Box 170, Folder 32.60-1 GERMANY: Summary Reports (1944)

DECLASSIFIED
Authority NND

Leslie Groves to U.S. Military Attaché London. 10 Sept. 1946. Top Secret cable WAR 99912. NARA RG 77, Entry UD-22A, Box 160, Folder 205.4 Cables Outgoing, Top Secret.


WAR DEPARTMENT
CLASSIFIED MESSAGE CENTER
OUTGOING CLASSIFIED MESSAGE

Shuler

TOP SECRET

TOP SECRET

PARAPHRASE NOT REQUIRED. HANDLE AS TOP SECRET CORRESPONDENCE PER PARAS 51i and 60a. AR 380-5

Maj Gen. L. R. Groves' Office
Room 4166 78333 Major John C. Mattina

10 September 1946

MILATTACHE AMEMBASSY London England

Number: WAR 99912

Loco Personal for Dean from Shuler signed Groves

Mr P. C. Keith will be in Czechoslovakia from approximately 15 September to 28 September. The name of the Military Attache at Prague, Colonel Egmont F. Koenig, has been given to Keith. It is important that Koenig be notified of visit of Keith into Czechoslovakia so that Koenig may extend to him every courtesy possible should the occasion arise.

Wire Koenig immediately in Prague-Top Secret-priority-as follows and sign name of Dean: Mr P. C. Keith, President of U. S. Industrial Corporation, will be in Czechoslovakia on September 15th and may contact you personally. Important that every courtesy possible be shown him if occasion arises.

End

ORIGINATOR : Gen Groves

CM-OUT-99912 (Sep 46) DTG 101959Z se

4. ^{235}U Enrichment: Many Sites, Mostly Underground

4. ^{235}U Enrichment: Many Sites, Mostly Underground

OSS Report No. FF-83. 21 October 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.

1. The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive… 2… The radius of action is supposed to be about three kilometers... 3. Different conversations which have taken place with industrial leaders in charge of concentration of production of German war material give the impression that Germany has unlimited confidence in the use of this weapon, which is to bring them certain victory. 4. Herr Schneider, one of the directors of the German factories called Deutsche Waffen u. Munitions-fabrik (a combine representing some fifteen factories and 250,000 workers) declared with a smile: "… Our important factories where the assembly is carried out are all subterranean. An immense quantity of accessories is made in small lots everywhere throughout the country, so that bombing cannot interrupt the production."

4. ^{235}U Enrichment: Many Sites, Mostly Underground

OSS Report No. FF-83. 21 October 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.

1. The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive… 2… The radius of action is supposed to be about three kilometers... 3. Different conversations which have taken place with industrial leaders in charge of concentration of production of German war material give the impression that Germany has unlimited confidence in the use of this weapon, which is to bring them certain victory. 4. Herr Schneider, one of the directors of the German factories called Deutsche Waffen u. Munitions-fabrik (a combine representing some fifteen factories and 250,000 workers) declared with a smile: "… Our important factories where the assembly is carried out are all subterranean. An immense quantity of accessories is made in small lots everywhere throughout the country, so that bombing cannot interrupt the production."

MacFarland Istanbul to Shepardson OSS. 4 May 1944. Cable IN-9026. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45. ["Azusa" = OSS code word for nuclear.]

We have been informed by Azusa-Dahlia that the component of a new explosive is being produced by the I.G. Farben factory in the vicinity of Tropau (called Opava by the Czechs). This factory has 30,000 employees. In the vicinity of Maehrisch-Ostrau (called Moravska-Ostrava by the Czechs) there is an identical factory.

4. ^{235}U Enrichment: Many Sites, Mostly Underground

OSS Report No. FF-83. 21 October 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.

1. The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive… 2… The radius of action is supposed to be about three kilometers... 3. Different conversations which have taken place with industrial leaders in charge of concentration of production of German war material give the impression that Germany has unlimited confidence in the use of this weapon, which is to bring them certain victory. 4. Herr Schneider, one of the directors of the German factories called Deutsche Waffen u. Munitions-fabrik (a combine representing some fifteen factories and 250,000 workers) declared with a smile: "… Our important factories where the assembly is carried out are all subterranean. An immense quantity of accessories is made in small lots everywhere throughout the country, so that bombing cannot interrupt the production."

MacFarland Istanbul to Shepardson OSS. 4 May 1944. Cable IN-9026. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45. ["Azusa" = OSS code word for nuclear.]

We have been informed by Azusa-Dahlia that the component of a new explosive is being produced by the I.G. Farben factory in the vicinity of Tropau (called Opava by the Czechs). This factory has 30,000 employees. In the vicinity of Maehrisch-Ostrau (called Moravska-Ostrava by the Czechs) there is an identical factory.

F. A. Duwell. 5th Army POW Cage (Air), Target Notes A/16. 7 November 1944. AFHRA folder 512.619C-15A 1943-1945; AFHRA A5417 frames 966-967.

7. Other Underground Factories P/W claims that a number of underground factories are located between LANDSBERG and SCHONGAU on the west side of the RR line and main highway in a heavily wooded area... He had his information from members of Organization TODT, who had helped with construction there. 8. Electric Power Stations, LANDSBERG--SCHONGAU Along the river LECH between LANDSBERG and SCHONGAU four electric power stations are located… 9. Dynamite A. G. Kaufering at Landsberg This plant was begun in 1939-40 and at that time curious civilians were informed that they need not be concerned as the project was of little importance. However, this did not quiet the suspicions that something highly secret was being performed, suspicions that are still rife today. In May 1943 there was a sudden increase in activity after which time the place was put under heavy guard. The entire complex is set in the woods and is heavily camouflaged. An extensive network of roads was built into and through the woods. P/W knew that about 30 large tanks were partially buried near the factory, painted green on top, and covered over with trees and shrubs. He also knew that "Press Luft" (Compressed Air) was being prepared here for use in the factory and that some sort of munitions were being manufactured.

4. ^{235}U Enrichment: Many Sites, Mostly Underground

OSS Report No. FF-83. 21 October 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.

1. The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive… 2… The radius of action is supposed to be about three kilometers... 3. Different conversations which have taken place with industrial leaders in charge of concentration of production of German war material give the impression that Germany has unlimited confidence in the use of this weapon, which is to bring them certain victory. 4. Herr Schneider, one of the directors of the German factories called Deutsche Waffen u. Munitions-fabrik (a combine representing some fifteen factories and 250,000 workers) declared with a smile: "… Our important factories where the assembly is carried out are all subterranean. An immense quantity of accessories is made in small lots everywhere throughout the country, so that bombing cannot interrupt the production."

MacFarland Istanbul to Shepardson OSS. 4 May 1944. Cable IN-9026. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45. ["Azusa" = OSS code word for nuclear.]

We have been informed by Azusa-Dahlia that the component of a new explosive is being produced by the I.G. Farben factory in the vicinity of Tropau (called Opava by the Czechs). This factory has 30,000 employees. In the vicinity of Maehrisch-Ostrau (called Moravska-Ostrava by the Czechs) there is an identical factory.

F. A. Duwell. 5th Army POW Cage (Air), Target Notes A/16. 7 November 1944. AFHRA folder 512.619C-15A 1943-1945; AFHRA A5417 frames 966-967.

7. Other Underground Factories P/W claims that a number of underground factories are located between LANDSBERG and SCHONGAU on the west side of the RR line and main highway in a heavily wooded area... He had his information from members of Organization TODT, who had helped with construction there. 8. Electric Power Stations, LANDSBERG--SCHONGAU Along the river LECH between LANDSBERG and SCHONGAU four electric power stations are located… 9. Dynamite A. G. Kaufering at Landsberg This plant was begun in 1939-40 and at that time curious civilians were informed that they need not be concerned as the project was of little importance. However, this did not quiet the suspicions that something highly secret was being performed, suspicions that are still rife today. In May 1943 there was a sudden increase in activity after which time the place was put under heavy guard. The entire complex is set in the woods and is heavily camouflaged. An extensive network of roads was built into and through the woods. P/W knew that about 30 large tanks were partially buried near the factory, painted green on top, and covered over with trees and shrubs. He also knew that "Press Luft" (Compressed Air) was being prepared here for use in the factory and that some sort of munitions were being manufactured.

Philip Morrison to Francis J. Smith. 17 February 1945. Subject: Evaluation of Air Photos. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3 GERMANY: US Wartime Positive Int. (Nov. 44-June 45).

Dubnica (Czechoslovakia)--This plant has been carefully studied by the Crossbow Committee in interpretation report #U17. It is an excellent factory for making anything. More specifically, the underground facilities, which include quite sizeable steam installations, would make possible the location of a plant of LTD [enrichment], or similar style in fractional scale, at this site. The absence of visible handling facilities for large equipment, etc., is not conclusive, but it is a bit strange if this is really a normal factory for producing ordnance.

4. ^{235}U Enrichment: Many Sites, Mostly Underground

OSS Report No. FF-83. 21 October 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.
1. The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive… 2… The radius of action is supposed to be about three kilometers... 3. Different conversations which have taken place with industrial leaders in charge of concentration of production of German war material give the impression that Germany has unlimited confidence in the use of this weapon, which is to bring them certain victory. 4. Herr Schneider, one of the directors of the German factories called Deutsche Waffen u. Munitions-fabrik (a combine representing some fifteen factories and 250,000 workers) declared with a smile: "… Our important factories where the assembly is carried out are all subterranean. An immense quantity of accessories is made in small lots everywhere throughout the country, so that bombing cannot interrupt the production."

MacFarland Istanbul to Shepardson OSS. 4 May 1944. Cable IN-9026. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45. ["Azusa" = OSS code word for nuclear.]
We have been informed by Azusa-Dahlia that the component of a new explosive is being produced by the I.G. Farben factory in the vicinity of Tropau (called Opava by the Czechs). This factory has 30,000 employees. In the vicinity of Maehrisch-Ostrau (called Moravska-Ostrava by the Czechs) there is an identical factory.

F. A. Duwell. 5th Army POW Cage (Air), Target Notes A/16. 7 November 1944. AFHRA folder 512.619C-15A 1943-1945; AFHRA A5417 frames 966-967.
7. Other Underground Factories P/W claims that a number of underground factories are located between LANDSBERG and SCHONGAU on the west side of the RR line and main highway in a heavily wooded area... He had his information from members of Organization TODT, who had helped with construction there. 8. Electric Power Stations, LANDSBERG--SCHONGAU Along the river LECH between LANDSBERG and SCHONGAU four electric power stations are located… 9. Dynamite A. G. Kaufering at Landsberg This plant was begun in 1939-40 and at that time curious civilians were informed that they need not be concerned as the project was of little importance. However, this did not quiet the suspicions that something highly secret was being performed, suspicions that are still rife today. In May 1943 there was a sudden increase in activity after which time the place was put under heavy guard. The entire complex is set in the woods and is heavily camouflaged. An extensive network of roads was built into and through the woods. P/W knew that about 30 large tanks were partially buried near the factory, painted green on top, and covered over with trees and shrubs. He also knew that "Press Luft" (Compressed Air) was being prepared here for use in the factory and that some sort of munitions were being manufactured.

Philip Morrison to Francis J. Smith. 17 February 1945. Subject: Evaluation of Air Photos. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3 GERMANY: US Wartime Positive Int. (Nov. 44-June 45).
Dubnica (Czechoslovakia)--This plant has been carefully studied by the Crossbow Committee in interpretation report #U17. It is an excellent factory for making anything. More specifically, the underground facilities, which include quite sizeable steam installations, would make possible the location of a plant of LTD [enrichment], or similar style in fractional scale, at this site. The absence of visible handling facilities for large equipment, etc., is not conclusive, but it is a bit strange if this is really a normal factory for producing ordnance.

R. V. Shepherd. BIOS 313. Report on Visit to Czechoslovakia by Armament Design Department. p. 11.
Dubnica--An underground factory built before the war by Skoda. It was taken over by the Germans and operated by them. It was completely destroyed by the Germans when the Russians advanced into Slovakia.

4. ^{235}U Enrichment: Many Sites, Mostly Underground

OSS Report No. FF-83. 21 October 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.

1. The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive… 2… The radius of action is supposed to be about three kilometers... 3. Different conversations which have taken place with industrial leaders in charge of concentration of production of German war material give the impression that Germany has unlimited confidence in the use of this weapon, which is to bring them certain victory. 4. Herr Schneider, one of the directors of the German factories called Deutsche Waffen u. Munitions-fabrik (a combine representing some fifteen factories and 250,000 workers) declared with a smile: "… Our important factories where the assembly is carried out are all subterranean. An immense quantity of accessories is made in small lots everywhere throughout the country, so that bombing cannot interrupt the production."

MacFarland Istanbul to Shepardson OSS. 4 May 1944. Cable IN-9026. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45. ["Azusa" = OSS code word for nuclear.]

We have been informed by Azusa-Dahlia that the component of a new explosive is being produced by the I.G. Farben factory in the vicinity of Tropau (called Opava by the Czechs). This factory has 30,000 employees. In the vicinity of Maehrisch-Ostrau (called Moravska-Ostrava by the Czechs) there is an identical factory.

F. A. Duwell. 5th Army POW Cage (Air), Target Notes A/16. 7 November 1944. AFHRA folder 512.619C-15A 1943-1945; AFHRA A5417 frames 966-967.

7. Other Underground Factories P/W claims that a number of underground factories are located between LANDSBERG and SCHONGAU on the west side of the RR line and main highway in a heavily wooded area... He had his information from members of Organization TODT, who had helped with construction there. 8. Electric Power Stations, LANDSBERG--SCHONGAU Along the river LECH between LANDSBERG and SCHONGAU four electric power stations are located… 9. Dynamite A. G. Kaufering at Landsberg This plant was begun in 1939-40 and at that time curious civilians were informed that they need not be concerned as the project was of little importance. However, this did not quiet the suspicions that something highly secret was being performed, suspicions that are still rife today. In May 1943 there was a sudden increase in activity after which time the place was put under heavy guard. The entire complex is set in the woods and is heavily camouflaged. An extensive network of roads was built into and through the woods. P/W knew that about 30 large tanks were partially buried near the factory, painted green on top, and covered over with trees and shrubs. He also knew that "Press Luft" (Compressed Air) was being prepared here for use in the factory and that some sort of munitions were being manufactured.

Philip Morrison to Francis J. Smith. 17 February 1945. Subject: Evaluation of Air Photos. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3 GERMANY: US Wartime Positive Int. (Nov. 44-June 45).

Dubnica (Czechoslovakia)--This plant has been carefully studied by the Crossbow Committee in interpretation report #U17. It is an excellent factory for making anything. More specifically, the underground facilities, which include quite sizeable steam installations, would make possible the location of a plant of LTD [enrichment], or similar style in fractional scale, at this site. The absence of visible handling facilities for large equipment, etc., is not conclusive, but it is a bit strange if this is really a normal factory for producing ordnance.

R. V. Shepherd. BIOS 313. Report on Visit to Czechoslovakia by Armament Design Department. p. 11.

Dubnica--An underground factory built before the war by Skoda. It was taken over by the Germans and operated by them. It was completely destroyed by the Germans when the Russians advanced into Slovakia.

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. pp. 42, 493.

And how much more death, war damage, refugees, and destruction would have been the result if Hitler's opponents had not won--as Churchill said--"five minutes before midnight" and thus thwarted Hitler's new end-run defense in the spring of 1945. For with the A-9 "interglobal rockets" developed in Peenemünde, which also reached their targets in the USA, and with the small-pumpkin-sized "uranium bombs" (with their full destructive energy in a 3-km radius), which according to Schaub's information had been developed to ready prototypes at the Reichspost's research office in Lichterfelde, if Hitler had been able to make these weapons actually deployed, the suffering, the cruelty, the harshness, the extension, and the duration of World War II would certainly have been multiplied… According to Schaub, the "terrible weapons" meant above all the "uranium bomb" with the size of a small pumpkin which was to be produced in an underground SS plant in the southern Harz region (with a production capacity of 30,000 workers). The plant was relocated to the USSR by the Red Army in 1945 after Germany's unconditional surrender.

4. ^{235}U Enrichment: Many Sites, Mostly Underground

OSS Report No. FF-83. 21 October 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.

1. The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive… 2… The radius of action is supposed to be about three kilometers... 3. Different conversations which have taken place with industrial leaders in charge of concentration of production of German war material give the impression that Germany has unlimited confidence in the use of this weapon, which is to bring them certain victory. 4. Herr Schneider, one of the directors of the German factories called Deutsche Waffen u. Munitions-fabrik (a combine representing some fifteen factories and 250,000 workers) declared with a smile: "… Our important factories where the assembly is carried out are all subterranean. An immense quantity of accessories is made in small lots everywhere throughout the country, so that bombing cannot interrupt the production."

MacFarland Istanbul to Shepardson OSS. 4 May 1944. Cable IN-9026. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45. ["Azusa" = OSS code word for nuclear.]

We have been informed by Azusa-Dahlia that the component of a new explosive is being produced by the I.G. Farben factory in the vicinity of Tropau (called Opava by the Czechs). This factory has 30,000 employees. In the vicinity of Maehrisch-Ostrau (called Moravska-Ostrava by the Czechs) there is an identical factory.

F. A. Duwell. 5th Army POW Cage (Air), Target Notes A/16. 7 November 1944. AFHRA folder 512.619C-15A 1943-1945; AFHRA A5417 frames 966-967.

7. Other Underground Factories P/W claims that a number of underground factories are located between LANDSBERG and SCHONGAU on the west side of the RR line and main highway in a heavily wooded area... He had his information from members of Organization TODT, who had helped with construction there. 8. Electric Power Stations, LANDSBERG--SCHONGAU Along the river LECH between LANDSBERG and SCHONGAU four electric power stations are located… 9. Dynamite A. G. Kaufering at Landsberg This plant was begun in 1939-40 and at that time curious civilians were informed that they need not be concerned as the project was of little importance. However, this did not quiet the suspicions that something highly secret was being performed, suspicions that are still rife today. In May 1943 there was a sudden increase in activity after which time the place was put under heavy guard. The entire complex is set in the woods and is heavily camouflaged. An extensive network of roads was built into and through the woods. P/W knew that about 30 large tanks were partially buried near the factory, painted green on top, and covered over with trees and shrubs. He also knew that "Press Luft" (Compressed Air) was being prepared here for use in the factory and that some sort of munitions were being manufactured.

Philip Morrison to Francis J. Smith. 17 February 1945. Subject: Evaluation of Air Photos. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3 GERMANY: US Wartime Positive Int. (Nov. 44-June 45).

Dubnica (Czechoslovakia)--This plant has been carefully studied by the Crossbow Committee in interpretation report #U17. It is an excellent factory for making anything. More specifically, the underground facilities, which include quite sizeable steam installations, would make possible the location of a plant of LTD [enrichment], or similar style in fractional scale, at this site. The absence of visible handling facilities for large equipment, etc., is not conclusive, but it is a bit strange if this is really a normal factory for producing ordnance.

R. V. Shepherd. BIOS 313. Report on Visit to Czechoslovakia by Armament Design Department. p. 11.

Dubnica--An underground factory built before the war by Skoda. It was taken over by the Germans and operated by them. It was completely destroyed by the Germans when the Russians advanced into Slovakia.

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. pp. 42, 493.

And how much more death, war damage, refugees, and destruction would have been the result if Hitler's opponents had not won--as Churchill said--"five minutes before midnight" and thus thwarted Hitler's new end-run defense in the spring of 1945. For with the A-9 "interglobal rockets" developed in Peenemünde, which also reached their targets in the USA, and with the small-pumpkin-sized "uranium bombs" (with their full destructive energy in a 3-km radius), which according to Schaub's information had been developed to ready prototypes at the Reichspost's research office in Lichterfelde, if Hitler had been able to make these weapons actually deployed, the suffering, the cruelty, the harshness, the extension, and the duration of World War II would certainly have been multiplied… According to Schaub, the "terrible weapons" meant above all the "uranium bomb" with the size of a small pumpkin which was to be produced in an underground SS plant in the southern Harz region (with a production capacity of 30,000 workers). The plant was relocated to the USSR by the Red Army in 1945 after Germany's unconditional surrender.

PW INTELLIGENCE SECTION, HQ MAAF. 22 December 1944. AFHRA A6091 frame 1419.

SECRET WEAPONS, REDL ZIPF (A): At REDL ZIPF between VÖCKLAMARKT and VÖCKLABRUCK, experiments are being made in connection with the atomic bomb.

4. ^{235}U Enrichment: Many Sites, Mostly Underground

OSS Report No. FF-83. 21 October 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.
1. The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive… 2… The radius of action is supposed to be about three kilometers... 3. Different conversations which have taken place with industrial leaders in charge of concentration of production of German war material give the impression that Germany has unlimited confidence in the use of this weapon, which is to bring them certain victory. 4. Herr Schneider, one of the directors of the German factories called Deutsche Waffen u. Munitions-fabrik (a combine representing some fifteen factories and 250,000 workers) declared with a smile: "… Our important factories where the assembly is carried out are all subterranean. An immense quantity of accessories is made in small lots everywhere throughout the country, so that bombing cannot interrupt the production."

MacFarland Istanbul to Shepardson OSS. 4 May 1944. Cable IN-9026. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45. ["Azusa" = OSS code word for nuclear.]
We have been informed by Azusa-Dahlia that the component of a new explosive is being produced by the I.G. Farben factory in the vicinity of Tropau (called Opava by the Czechs). This factory has 30,000 employees. In the vicinity of Maehrisch-Ostrau (called Moravska-Ostrava by the Czechs) there is an identical factory.

F. A. Duwell. 5th Army POW Cage (Air), Target Notes A/16. 7 November 1944. AFHRA folder 512.619C-15A 1943-1945; AFHRA A5417 frames 966-967.
7. Other Underground Factories P/W claims that a number of underground factories are located between LANDSBERG and SCHONGAU on the west side of the RR line and main highway in a heavily wooded area... He had his information from members of Organization TODT, who had helped with construction there. 8. Electric Power Stations, LANDSBERG--SCHONGAU Along the river LECH between LANDSBERG and SCHONGAU four electric power stations are located… 9. Dynamite A. G. Kaufering at Landsberg This plant was begun in 1939-40 and at that time curious civilians were informed that they need not be concerned as the project was of little importance. However, this did not quiet the suspicions that something highly secret was being performed, suspicions that are still rife today. In May 1943 there was a sudden increase in activity after which time the place was put under heavy guard. The entire complex is set in the woods and is heavily camouflaged. An extensive network of roads was built into and through the woods. P/W knew that about 30 large tanks were partially buried near the factory, painted green on top, and covered over with trees and shrubs. He also knew that "Press Luft" (Compressed Air) was being prepared here for use in the factory and that some sort of munitions were being manufactured.

Philip Morrison to Francis J. Smith. 17 February 1945. Subject: Evaluation of Air Photos. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3 GERMANY: US Wartime Positive Int. (Nov. 44-June 45).
Dubnica (Czechoslovakia)--This plant has been carefully studied by the Crossbow Committee in interpretation report #U17. It is an excellent factory for making anything. More specifically, the underground facilities, which include quite sizeable steam installations, would make possible the location of a plant of LTD [enrichment], or similar style in fractional scale, at this site. The absence of visible handling facilities for large equipment, etc., is not conclusive, but it is a bit strange if this is really a normal factory for producing ordnance.

R. V. Shepherd. BIOS 313. Report on Visit to Czechoslovakia by Armament Design Department. p. 11.
Dubnica--An underground factory built before the war by Skoda. It was taken over by the Germans and operated by them. It was completely destroyed by the Germans when the Russians advanced into Slovakia.

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. pp. 42, 493.
And how much more death, war damage, refugees, and destruction would have been the result if Hitler's opponents had not won--as Churchill said--"five minutes before midnight" and thus thwarted Hitler's new end-run defense in the spring of 1945. For with the A-9 "interglobal rockets" developed in Peenemünde, which also reached their targets in the USA, and with the small-pumpkin-sized "uranium bombs" (with their full destructive energy in a 3-km radius), which according to Schaub's information had been developed to ready prototypes at the Reichspost's research office in Lichterfelde, if Hitler had been able to make these weapons actually deployed, the suffering, the cruelty, the harshness, the extension, and the duration of World War II would certainly have been multiplied… According to Schaub, the "terrible weapons" meant above all the "uranium bomb" with the size of a small pumpkin which was to be produced in an underground SS plant in the southern Harz region (with a production capacity of 30,000 workers). The plant was relocated to the USSR by the Red Army in 1945 after Germany's unconditional surrender.

PW INTELLIGENCE SECTION, HQ MAAF. 22 December 1944. AFHRA A6091 frame 1419.
SECRET WEAPONS, REDL ZIPF (A): At REDL ZIPF between VÖCKLAMARKT and VÖCKLABRUCK, experiments are being made in connection with the atomic bomb.

Report of Interrogation PW RAAB. 11 October 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
Redl Zipf plant. The product of the firm is known to the workers only as "liquid gas" and, based on PW's knowledge of the raw materials delivered to the plant, it would appear to be some kind of explosive… This firm, in turn, was importing large quantities of thorium from Hungary and elsewhere in the Balkans… The equipment inside the plant consists of circa 200 boilers of unusual construction in that they are completely lined with some argillaceous material and covered over on the outside with some white metal, name of which is unknown to PW, but it is supposed to be a non-magnetic substance. These boilers are situated in different compartments and are connected by a system of pipes and conduits running between the sections and through the concrete walls… The gas, or liquid, prepared was stored in large high-pressure cylinders about 3 1/2 to 4 meters in height and 1 1/2 to 2 meters in diameter. PW believes they were constructed of more than usual strength steel. They too, as well as all connections and valves, were lined with an earthenware type coating. The product, when ready for shipment, was sent to an already established munitions factory in Stadl Paura... It is noteworthy that the workers in the plant complained of loss of appetite... Peasants in the vicinity were required to make regular delivery of whole milk for the workers.

4. ^{235}U Enrichment: Many Sites, Mostly Underground

OSS Report No. FF-83. 21 October 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.
1. The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive… 2… The radius of action is supposed to be about three kilometers... 3. Different conversations which have taken place with industrial leaders in charge of concentration of production of German war material give the impression that Germany has unlimited confidence in the use of this weapon, which is to bring them certain victory. 4. Herr Schneider, one of the directors of the German factories called Deutsche Waffen u. Munitions-fabrik (a combine representing some fifteen factories and 250,000 workers) declared with a smile: "… Our important factories where the assembly is carried out are all subterranean. An immense quantity of accessories is made in small lots everywhere throughout the country, so that bombing cannot interrupt the production."

MacFarland Istanbul to Shepardson OSS. 4 May 1944. Cable IN-9026. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45. ["Azusa" = OSS code word for nuclear.]
We have been informed by Azusa-Dahlia that the component of a new explosive is being produced by the I.G. Farben factory in the vicinity of Tropau (called Opava by the Czechs). This factory has 30,000 employees. In the vicinity of Maehrisch-Ostrau (called Moravska-Ostrava by the Czechs) there is an identical factory.

F. A. Duwell. 5th Army POW Cage (Air), Target Notes A/16. 7 November 1944. AFHRA folder 512.619C-15A 1943-1945; AFHRA A5417 frames 966-967.
7. Other Underground Factories P/W claims that a number of underground factories are located between LANDSBERG and SCHONGAU on the west side of the RR line and main highway in a heavily wooded area... He had his information from members of Organization TODT, who had helped with construction there. 8. Electric Power Stations, LANDSBERG--SCHONGAU Along the river LECH between LANDSBERG and SCHONGAU four electric power stations are located… 9. Dynamite A. G. Kaufering at Landsberg This plant was begun in 1939-40 and at that time curious civilians were informed that they need not be concerned as the project was of little importance. However, this did not quiet the suspicions that something highly secret was being performed, suspicions that are still rife today. In May 1943 there was a sudden increase in activity after which time the place was put under heavy guard. The entire complex is set in the woods and is heavily camouflaged. An extensive network of roads was built into and through the woods. P/W knew that about 30 large tanks were partially buried near the factory, painted green on top, and covered over with trees and shrubs. He also knew that "Press Luft" (Compressed Air) was being prepared here for use in the factory and that some sort of munitions were being manufactured.

Philip Morrison to Francis J. Smith. 17 February 1945. Subject: Evaluation of Air Photos. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3 GERMANY: US Wartime Positive Int. (Nov. 44-June 45).
Dubnica (Czechoslovakia)--This plant has been carefully studied by the Crossbow Committee in interpretation report #U17. It is an excellent factory for making anything. More specifically, the underground facilities, which include quite sizeable steam installations, would make possible the location of a plant of LTD [enrichment], or similar style in fractional scale, at this site. The absence of visible handling facilities for large equipment, etc., is not conclusive, but it is a bit strange if this is really a normal factory for producing ordnance.

R. V. Shepherd. BIOS 313. Report on Visit to Czechoslovakia by Armament Design Department. p. 11.
Dubnica--An underground factory built before the war by Skoda. It was taken over by the Germans and operated by them. It was completely destroyed by the Germans when the Russians advanced into Slovakia.

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. pp. 42, 493.
And how much more death, war damage, refugees, and destruction would have been the result if Hitler's opponents had not won--as Churchill said--"five minutes before midnight" and thus thwarted Hitler's new end-run defense in the spring of 1945. For with the A-9 "interglobal rockets" developed in Peenemünde, which also reached their targets in the USA, and with the small-pumpkin-sized "uranium bombs" (with their full destructive energy in a 3-km radius), which according to Schaub's information had been developed to ready prototypes at the Reichspost's research office in Lichterfelde, if Hitler had been able to make these weapons actually deployed, the suffering, the cruelty, the harshness, the extension, and the duration of World War II would certainly have been multiplied… According to Schaub, the "terrible weapons" meant above all the "uranium bomb" with the size of a small pumpkin which was to be produced in an underground SS plant in the southern Harz region (with a production capacity of 30,000 workers). The plant was relocated to the USSR by the Red Army in 1945 after Germany's unconditional surrender.

PW INTELLIGENCE SECTION, HQ MAAF. 22 December 1944. AFHRA A6091 frame 1419.
SECRET WEAPONS, REDL ZIPF (A): At REDL ZIPF between VÖCKLAMARKT and VÖCKLABRUCK, experiments are being made in connection with the atomic bomb.

Report of Interrogation PW RAAB. 11 October 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
Redl Zipf plant. The product of the firm is known to the workers only as "liquid gas" and, based on PW's knowledge of the raw materials delivered to the plant, it would appear to be some kind of explosive… This firm, in turn, was importing large quantities of thorium from Hungary and elsewhere in the Balkans… The equipment inside the plant consists of circa 200 boilers of unusual construction in that they are completely lined with some argillaceous material and covered over on the outside with some white metal, name of which is unknown to PW, but it is supposed to be a non-magnetic substance. These boilers are situated in different compartments and are connected by a system of pipes and conduits running between the sections and through the concrete walls… The gas, or liquid, prepared was stored in large high-pressure cylinders about 3 1/2 to 4 meters in height and 1 1/2 to 2 meters in diameter. PW believes they were constructed of more than usual strength steel. They too, as well as all connections and valves, were lined with an earthenware type coating. The product, when ready for shipment, was sent to an already established munitions factory in Stadl Paura... It is noteworthy that the workers in the plant complained of loss of appetite... Peasants in the vicinity were required to make regular delivery of whole milk for the workers.

Cable IN 1788 from Caserta, Italy to OSS Director. #27074. AZUSA. 154 and Dix from 148. 19 January 1945. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45.
Octopus cables 18 January that partisans report experiments being conducted on atomic bombs at Sopron, Hungary and west of Vienna. We are asking that further inquiries be made discreetly. Meanwhile cable me whether you have had other indications on these localities. Ask Major Furman if Major Ham is still his representative in this Theater.

4. ^{235}U Enrichment: Many Sites, Mostly Underground

OSS Report No. FF-83. 21 October 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.
1. The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive… 2… The radius of action is supposed to be about three kilometers... 3. Different conversations which have taken place with industrial leaders in charge of concentration of production of German war material give the impression that Germany has unlimited confidence in the use of this weapon, which is to bring them certain victory. 4. Herr Schneider, one of the directors of the German factories called Deutsche Waffen u. Munitions-fabrik (a combine representing some fifteen factories and 250,000 workers) declared with a smile: "… Our important factories where the assembly is carried out are all subterranean. An immense quantity of accessories is made in small lots everywhere throughout the country, so that bombing cannot interrupt the production."

MacFarland Istanbul to Shepardson OSS. 4 May 1944. Cable IN-9026. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45. ["Azusa" = OSS code word for nuclear.]
We have been informed by Azusa-Dahlia that the component of a new explosive is being produced by the I.G. Farben factory in the vicinity of Tropau (called Opava by the Czechs). This factory has 30,000 employees. In the vicinity of Maehrisch-Ostrau (called Moravska-Ostrava by the Czechs) there is an identical factory.

F. A. Duwell. 5th Army POW Cage (Air), Target Notes A/16. 7 November 1944. AFHRA folder 512.619C-15A 1943-1945; AFHRA A5417 frames 966-967.
7. Other Underground Factories P/W claims that a number of underground factories are located between LANDSBERG and SCHONGAU on the west side of the RR line and main highway in a heavily wooded area... He had his information from members of Organization TODT, who had helped with construction there. 8. Electric Power Stations, LANDSBERG--SCHONGAU Along the river LECH between LANDSBERG and SCHONGAU four electric power stations are located… 9. Dynamite A. G. Kaufering at Landsberg This plant was begun in 1939-40 and at that time curious civilians were informed that they need not be concerned as the project was of little importance. However, this did not quiet the suspicions that something highly secret was being performed, suspicions that are still rife today. In May 1943 there was a sudden increase in activity after which time the place was put under heavy guard. The entire complex is set in the woods and is heavily camouflaged. An extensive network of roads was built into and through the woods. P/W knew that about 30 large tanks were partially buried near the factory, painted green on top, and covered over with trees and shrubs. He also knew that "Press Luft" (Compressed Air) was being prepared here for use in the factory and that some sort of munitions were being manufactured.

Philip Morrison to Francis J. Smith. 17 February 1945. Subject: Evaluation of Air Photos. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3 GERMANY: US Wartime Positive Int. (Nov. 44-June 45).
Dubnica (Czechoslovakia)--This plant has been carefully studied by the Crossbow Committee in interpretation report #U17. It is an excellent factory for making anything. More specifically, the underground facilities, which include quite sizeable steam installations, would make possible the location of a plant of LTD [enrichment], or similar style in fractional scale, at this site. The absence of visible handling facilities for large equipment, etc., is not conclusive, but it is a bit strange if this is really a normal factory for producing ordnance.

R. V. Shepherd. BIOS 313. Report on Visit to Czechoslovakia by Armament Design Department. p. 11.
Dubnica--An underground factory built before the war by Skoda. It was taken over by the Germans and operated by them. It was completely destroyed by the Germans when the Russians advanced into Slovakia.

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. pp. 42, 493.
And how much more death, war damage, refugees, and destruction would have been the result if Hitler's opponents had not won--as Churchill said--"five minutes before midnight" and thus thwarted Hitler's new end-run defense in the spring of 1945. For with the A-9 "interglobal rockets" developed in Peenemünde, which also reached their targets in the USA, and with the small-pumpkin-sized "uranium bombs" (with their full destructive energy in a 3-km radius), which according to Schaub's information had been developed to ready prototypes at the Reichspost's research office in Lichterfelde, if Hitler had been able to make these weapons actually deployed, the suffering, the cruelty, the harshness, the extension, and the duration of World War II would certainly have been multiplied… According to Schaub, the "terrible weapons" meant above all the "uranium bomb" with the size of a small pumpkin which was to be produced in an underground SS plant in the southern Harz region (with a production capacity of 30,000 workers). The plant was relocated to the USSR by the Red Army in 1945 after Germany's unconditional surrender.

PW INTELLIGENCE SECTION, HQ MAAF. 22 December 1944. AFHRA A6091 frame 1419.
SECRET WEAPONS, REDL ZIPF (A): At REDL ZIPF between VÖCKLAMARKT and VÖCKLABRUCK, experiments are being made in connection with the atomic bomb.

Report of Interrogation PW RAAB. 11 October 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
Redl Zipf plant. The product of the firm is known to the workers only as "liquid gas" and, based on PW's knowledge of the raw materials delivered to the plant, it would appear to be some kind of explosive… This firm, in turn, was importing large quantities of thorium from Hungary and elsewhere in the Balkans… The equipment inside the plant consists of circa 200 boilers of unusual construction in that they are completely lined with some argillaceous material and covered over on the outside with some white metal, name of which is unknown to PW, but it is supposed to be a non-magnetic substance. These boilers are situated in different compartments and are connected by a system of pipes and conduits running between the sections and through the concrete walls… The gas, or liquid, prepared was stored in large high-pressure cylinders about 3 1/2 to 4 meters in height and 1 1/2 to 2 meters in diameter. PW believes they were constructed of more than usual strength steel. They too, as well as all connections and valves, were lined with an earthenware type coating. The product, when ready for shipment, was sent to an already established munitions factory in Stadl Paura... It is noteworthy that the workers in the plant complained of loss of appetite... Peasants in the vicinity were required to make regular delivery of whole milk for the workers.

Cable IN 1788 from Caserta, Italy to OSS Director. #27074. AZUSA. 154 and Dix from 148. 19 January 1945. NARA RG 226, Entry A1-134, Box 219, Folder IN AZUSA Nov. '43 Sept. '45.
Octopus cables 18 January that partisans report experiments being conducted on atomic bombs at Sopron, Hungary and west of Vienna. We are asking that further inquiries be made discreetly. Meanwhile cable me whether you have had other indications on these localities. Ask Major Furman if Major Ham is still his representative in this Theater.

Frederick Loofbourow. 19 Sept. and 28 Oct. 1943. NARA RG 226, Entry 125, Box 6, Folder 78.
Our sources claim that there are large explosives factories in Hiltersheim, Magdeburg district. These factories are said to have been moved here from Ludwigshafen. They are located in underground, bomb-proof facilities. A special substance is produced here which is said to have an enormous explosive effect. In Ludwigshafen, this explosive was used on an experimental basis to blow up severely damaged houses and entire neighborhoods. With one kilogram, everything within a radius of approximately four kilometers should be literally razed away, or disintegrated to dust and ashes. We are told that this explosive will soon be used for other purposes. We are also informed that there are aircraft factories in Silesia (unfortunately we are not given exact details of the location) which cannot be entered without a pass. A son of a shipman we know works there. The employees are not allowed to leave the factories. They eat and sleep in specially equipped rooms. The factories are also located underground and are protected against air raids. It is suspected that something like a "secret weapon" is also being produced here…
Dr. Berg tells me that his friends know from countless sources that several factories and hundreds of workers have been transported from the Wiesental near Bâle to northern Germany. The workers' letters home are mailed from a great variety of towns--but all these towns are on the periphery of the Lüneburger Heide. The story he hears is that they are all working in vast underground factories putting out a new explosive in aerial bombs. He has even heard that the container of the explosive is spherical. A very large number of runways are being built in that region with calculated slowness and care to prevent detection from the air--and these are to accommodate the planes that will eventually come to load up with the new bombs for an attack on England. While I am gone he will assemble the details of this story for me--what kind of factories were removed--what kind of training the workers had had--names of any chemicals they may have worked with. He heard some part of the explosive was previously manufactured in the Wiesental before the whole business was concentrated in Lüneburger Heide. The concentration took place about 9 months ago.

[See *Forgotten Creators* D.4.6, D.8 for many more.]

During the final year of the war, all of Oak Ridge (labs + town) consumed an average of 0.189 GW of electrical power.

Manhattan District History. **Book I, Volume 12, Part 2, Appendix C-7.**

ELECTRIC POWER CONSUMPTION AND COSTS

CLINTON ENGINEER WORKS

OCTOBER 1943 THROUGH DECEMBER 1946

Period Ending	KWH Consumed	KW Demand	Total Costs
1 November 1943	3,912,040	11,400	$ 18,834.06
1 December 1943	9,105,000	18,300	34,171.50
1 January 1944	8,365,000	18,300	33,061.50
1 February 1944	10,725,000	23,100	41,785.50
1 March 1944	17,105,000	31,200	60,103.50
1 April 1944	27,665,000	48,600	94,735.50
1 May 1944	33,970,000	64,500	121,365.00
1 June 1944	41,478,000	73,800	142,671.00
1 July 1944	39,870,000	98,200	166,611.00
1 August 1944	46,140,000	104,200	182,496.00
1 September 1944	52,610,000	125,900	215,637.00
1 October 1944	63,280,000	144,450	251,676.00
1 November 1944	77,700,000	187,760	320,080.80
1 December 1944	90,370,000	222,050	376,119.00
1 January 1945	107,010,000	236,900	417,117.00
1 February 1945	123,668,000	242,633	448,295.64
1 March 1945	117,442,000	253,047	450,203.76
1 April 1945	150,950,000	290,487	540,900.96
1 May 1945	166,170,000	263,626	534,721.08
1 June 1945	179,160,000	269,866	560,945.28
1 July 1945	184,350,000	283,840	583,822.20
1 August 1945	198,870,000	291,800	614,199.00
1 September 1945	200,000,000	298,627	623,267.16
1 October 1945	117,920,000	292,867	493,926.36
1 November 1945	60,290,000	116,227	216,710.16
1 December 1945	48,020,000	122,347	204,914.76
1 January 1946	63,620,000	145,100	252,888.00

During the final year of the war, all of Oak Ridge (labs + town) consumed an average of 0.189 GW of electrical power.

***Manhattan District History.* Book I, Volume 12, Part 2, Appendix C-7.**

ELECTRIC POWER CONSUMPTION AND COSTS

CLINTON ENGINEER WORKS

OCTOBER 1943 THROUGH DECEMBER 1946

Period Ending	KWH Consumed	KW Demand	Total Costs
1 November 1943	3,912,040	11,400	$ 18,834.06
1 December 1943	9,105,000	18,300	34,171.50
1 January 1944	8,365,000	18,300	33,061.50
1 February 1944	10,725,000	23,100	41,785.50
1 March 1944	17,105,000	31,200	60,103.50
1 April 1944	27,665,000	48,600	94,735.50
1 May 1944	33,970,000	64,500	121,365.00
1 June 1944	41,478,000	73,800	142,671.00
1 July 1944	39,870,000	98,200	166,611.00
1 August 1944	46,140,000	104,200	182,496.00
1 September 1944	52,610,000	125,900	215,637.00
1 October 1944	63,280,000	144,450	251,676.00
1 November 1944	77,700,000	187,760	320,080.80
1 December 1944	90,370,000	222,050	376,119.00
1 January 1945	107,010,000	236,900	417,117.00
1 February 1945	123,668,000	242,633	448,295.64
1 March 1945	117,442,000	253,047	450,203.76
1 April 1945	150,950,000	290,487	540,900.96
1 May 1945	166,170,000	263,626	534,721.08
1 June 1945	179,160,000	269,866	560,945.28
1 July 1945	184,350,000	283,840	583,822.20
1 August 1945	198,870,000	291,800	614,199.00
1 September 1945	200,000,000	298,627	623,267.16
1 October 1945	117,920,000	292,867	493,926.36
1 November 1945	60,290,000	116,227	216,710.16
1 December 1945	48,020,000	122,347	204,914.76
1 January 1946	63,620,000	145,100	252,888.00

In 1944, the Greater German Reich produced at least 22 GW of power. Including all other countries aiding Germany, the total was probably around twice that.

United States Strategic Bombing Survey. 1947. *German Electric Utilities Industry Report.* p. 4.

BRIEF REVIEW OF THE ELECTRIC UTILITY INDUSTRY IN GERMANY

GENERAL.

1. Prewar Germany (including Austria and Sudeten territory) with a population according to 1939 census of 79,400,000 people and occupying an area of about 225,000 square miles, was largely industrial.

2. The principal industrial centers were:

The Ruhr and Saarland, for iron or steel production.
Berlin, for general manufacturing.
Bavaria and Prussia, for chemical manufacturing.
Saxony, for textile manufacturing.

See also BIOS 342. *The German Wartime Electricity Supply: Conditions, Development, Trends.*

The main centers of power generation were:

Rhine-Westphalia brown coal and hard coal areas.
Southwestern German water power area (including Austria.)
Central German brown coal area (including Leipzig and Berlin.)
Silesian hard coal area.

3. From data obtained from the office of the National Load Dispatcher the total generating station capacity, both public utility and private plant, in 1944 was 22 million KW. From the German diagram of principal interconnecting transmission lines, dated 15 February 1945, Exhibit D, it appears that the distribution of the more important generating stations both public and private of 50,000 KW capacity and over was as follows:

During the final year of the war, all of Oak Ridge (labs + town) consumed an average of 0.189 GW of electrical power.

Manhattan District History. Book I, Volume 12, Part 2, Appendix C-7.

ELECTRIC POWER CONSUMPTION AND COSTS

CLINTON ENGINEER WORKS

OCTOBER 1943 THROUGH DECEMBER 1946

Period Ending	KWH Consumed	KW Demand	Total Costs
1 November 1943	3,912,040	11,400	$ 18,834.06
1 December 1943	9,105,000	18,300	34,171.50
1 January 1944	8,365,000	18,300	33,061.50
1 February 1944	10,725,000	23,100	41,785.50
1 March 1944	17,105,000	31,200	60,103.50
1 April 1944	27,665,000	48,600	94,735.50
1 May 1944	33,970,000	64,500	121,365.00
1 June 1944	41,478,000	73,800	142,671.00
1 July 1944	39,870,000	98,200	166,611.00
1 August 1944	46,140,000	104,200	182,496.00
1 September 1944	52,610,000	125,900	215,637.00
1 October 1944	63,280,000	144,450	251,676.00
1 November 1944	77,700,000	187,760	320,080.80
1 December 1944	90,370,000	222,050	376,119.00
1 January 1945	107,010,000	236,900	417,117.00
1 February 1945	123,668,000	242,633	448,295.64
1 March 1945	117,442,000	253,047	450,203.76
1 April 1945	150,950,000	290,487	540,900.96
1 May 1945	166,170,000	263,626	534,721.08
1 June 1945	179,160,000	269,866	560,945.28
1 July 1945	184,350,000	283,840	583,822.20
1 August 1945	198,870,000	291,800	614,199.00
1 September 1945	200,000,000	298,627	623,267.16
1 October 1945	117,920,000	292,867	493,926.36
1 November 1945	60,290,000	116,227	216,710.16
1 December 1945	48,020,000	122,347	204,914.76
1 January 1946	63,620,000	145,100	252,888.00

Oak Ridge would have required 0.86% of the power of the Greater German Reich, or <0.5% of the total power aiding Germany.

In 1944, the Greater German Reich produced at least 22 GW of power. Including all other countries aiding Germany, the total was probably around twice that.

United States Strategic Bombing Survey. 1947. *German Electric Utilities Industry Report.* p. 4.

BRIEF REVIEW OF THE ELECTRIC UTILITY INDUSTRY IN GERMANY

GENERAL.

1. Prewar Germany (including Austria and Sudeten territory) with a population according to 1939 census of 79,400,000 people and occupying an area of about 225,000 square miles, was largely industrial.

2. The principal industrial centers were:

The Ruhr and Saarland, for iron or steel production.
Berlin, for general manufacturing.
Bavaria and Prussia, for chemical manufacturing.
Saxony, for textile manufacturing.

The main centers of power generation were:

Rhine-Westphalia brown coal and hard coal areas.
Southwestern German water power area (including Austria.)
Central German brown coal area (including Leipzig and Berlin.)
Silesian hard coal area.

See also BIOS 342. *The German Wartime Electricity Supply: Conditions, Development, Trends.*

3. From data obtained from the office of the National Load Dispatcher the total generating station capacity, both public utility and private plant, in 1944 was 22 million KW. From the German diagram of principal interconnecting transmission lines, dated 15 February 1945, Exhibit D, it appears that the distribution of the more important generating stations both public and private of 50,000 KW capacity and over was as follows:

During the final year of the war, all of Oak Ridge (labs + town) consumed an average of 0.189 GW of electrical power.

Manhattan District History. Book I, Volume 12, Part 2, Appendix C-7.

ELECTRIC POWER CONSUMPTION AND COSTS

CLINTON ENGINEER WORKS

OCTOBER 1943 THROUGH DECEMBER 1946

Period Ending	KWH Consumed	KW Demand	Total Costs
1 November 1943	3,912,040	11,400	$ 18,834.08
1 December 1943	9,105,000	18,300	34,171.50
1 January 1944	8,365,000	18,300	33,061.50
1 February 1944	10,725,000	23,100	41,785.50
1 March 1944	17,105,000	31,200	60,103.50
1 April 1944	27,665,000	48,600	94,735.50
1 May 1944	33,970,000	64,500	121,365.00
1 June 1944	41,478,000	73,800	142,671.00
1 July 1944	39,870,000	98,200	166,611.00
1 August 1944	46,140,000	104,200	182,496.00
1 September 1944	52,610,000	125,900	215,637.00
1 October 1944	63,280,000	144,450	251,676.00
1 November 1944	77,700,000	187,760	320,080.80
1 December 1944	90,370,000	222,050	376,119.00
1 January 1945	107,010,000	236,900	417,117.00
1 February 1945	123,668,000	242,633	448,295.64
1 March 1945	117,442,000	253,047	450,203.76
1 April 1945	150,950,000	290,487	540,900.96
1 May 1945	166,170,000	263,626	534,721.08
1 June 1945	179,160,000	269,866	560,945.28
1 July 1945	184,350,000	283,840	583,822.20
1 August 1945	198,870,000	291,800	614,199.00
1 September 1945	200,000,000	298,627	623,267.16
1 October 1945	117,920,000	292,867	493,926.36
1 November 1945	60,290,000	116,227	216,710.16
1 December 1945	48,020,000	122,347	204,914.76
1 January 1946	63,620,000	145,100	252,888.00

Oak Ridge would have required 0.86% of the power of the Greater German Reich, or <0.5% of the total power aiding Germany.

In 1944, the Greater German Reich produced at least 22 GW of power. Including all other countries aiding Germany, the total was probably around twice that.

United States Strategic Bombing Survey. 1947. *German Electric Utilities Industry Report.* p. 4.

BRIEF REVIEW OF THE ELECTRIC UTILITY INDUSTRY IN GERMANY

GENERAL.

1. Prewar Germany (including Austria and Sudeten territory) with a population according to 1939 census of 79,400,000 people and occupying an area of about 225,000 square miles, was largely industrial.

2. The principal industrial centers were:

The Ruhr and Saarland, for iron or steel production.
Berlin, for general manufacturing.
Bavaria and Prussia, for chemical manufacturing.
Saxony, for textile manufacturing.

The main centers of power generation were:

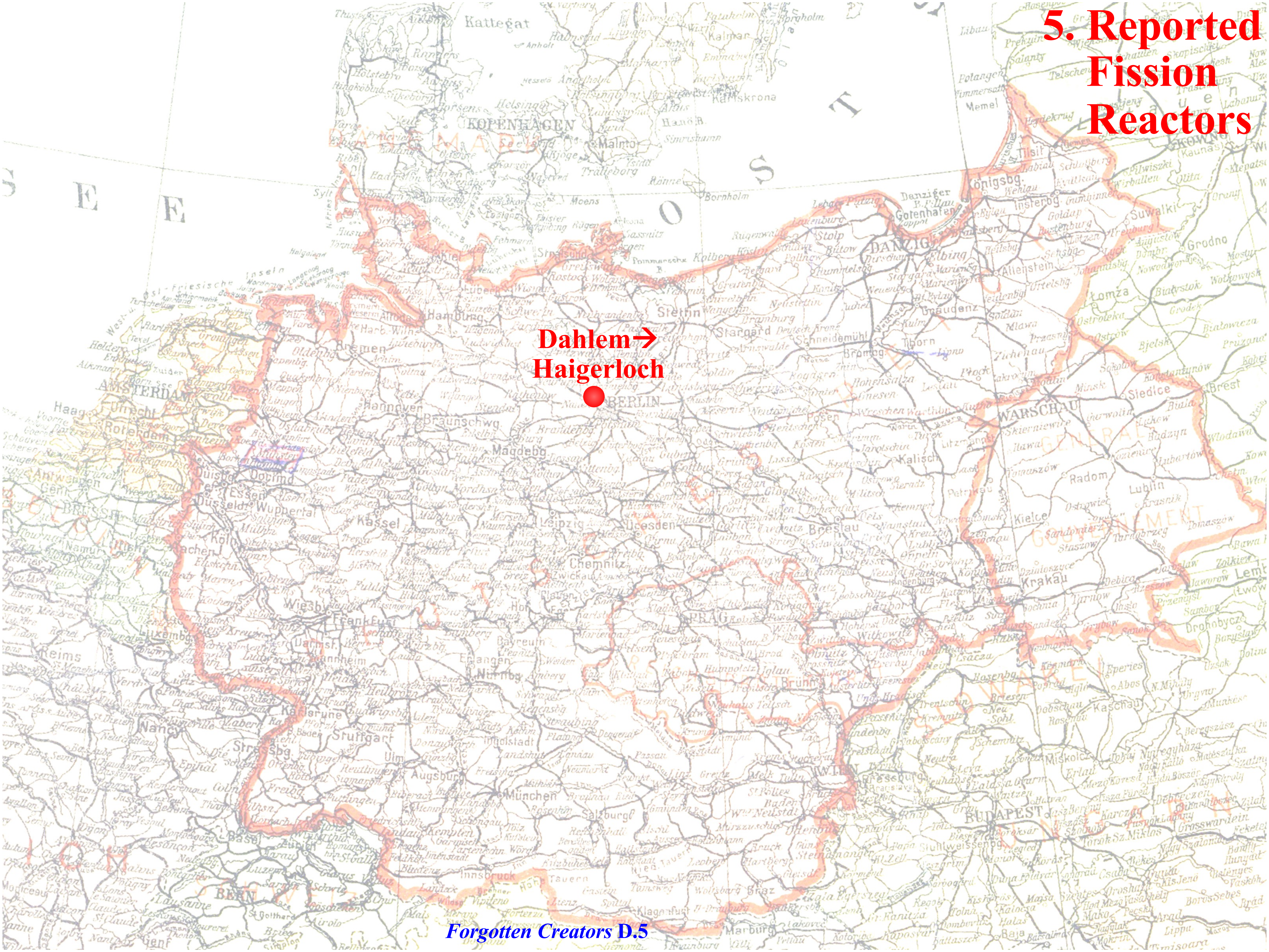
Rhine-Westphalia brown coal and hard coal areas.
Southwestern German water power area (including Austria.)
Central German brown coal area (including Leipzig and Berlin.)
Silesian hard coal area.

See also BIOS 342. *The German Wartime Electricity Supply: Conditions, Development, Trends.*

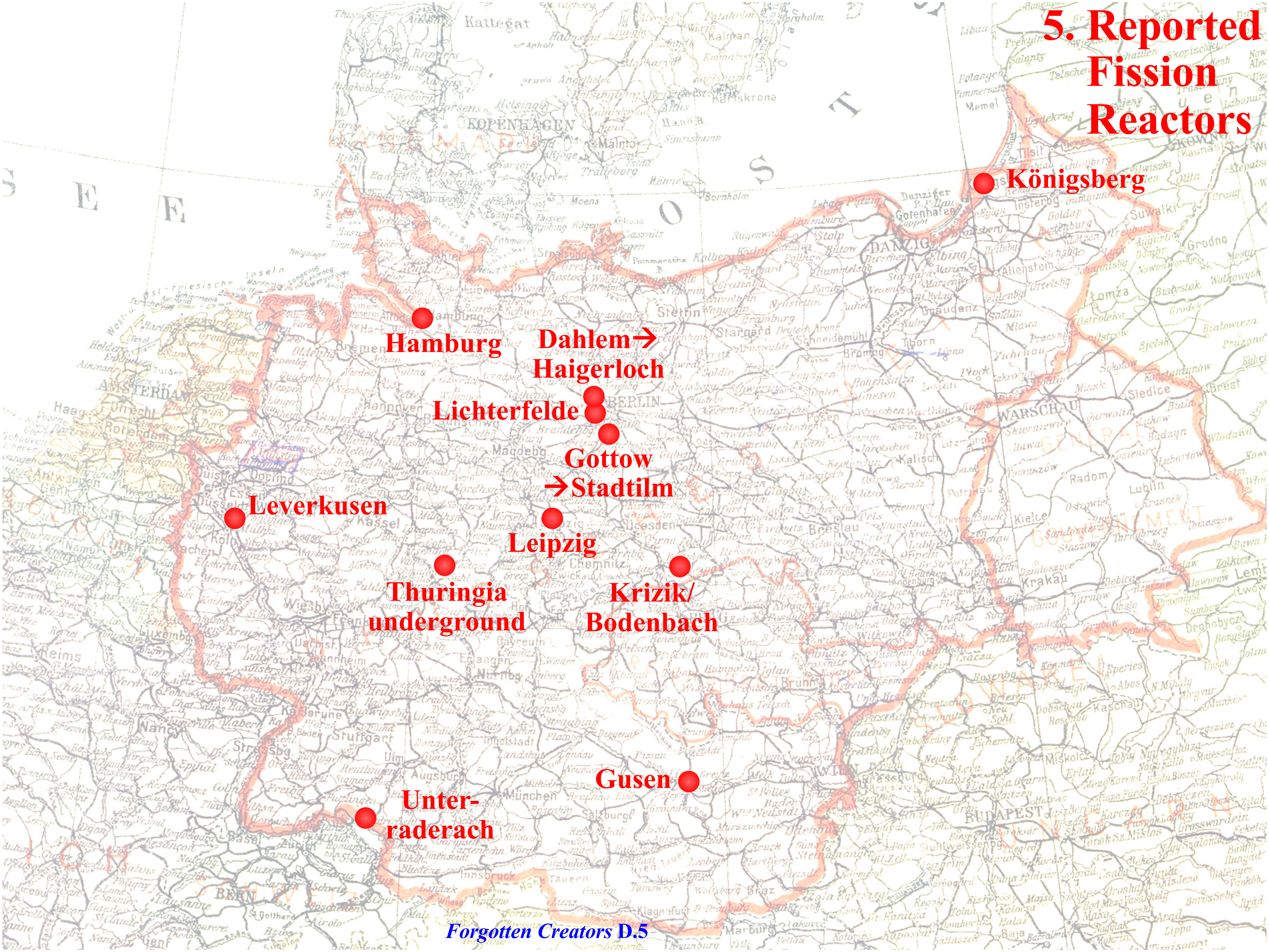
3. From data obtained from the office of the National Load Dispatcher the total generating station capacity, both public utility and private plant, in 1944 was 22 million KW. From the German diagram of principal interconnecting transmission lines, dated 15 February 1945, Exhibit D, it appears that the distribution of the more important generating stations both public and private of 50,000 KW capacity and over was as follows:

Other documents indicate that German enrichment was more efficient than Oak Ridge (centrifuges) and German bombs were more efficient than Little Boy (implosion), so Germany needed much less power than Oak Ridge.

5. Reported Fission Reactors



5. Reported Fission Reactors



5. Reported Fission Reactors

H. K. Calvert. 29 January 1945. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3 GERMANY: US Wartime Positive Int. (Nov. 44–June 45). [I. G. Farben was producing uranium hexafluoride, heavy water, graphite, aluminum, calcium, etc.]
At the LEVERKUSEN I G Farben Works, PW learned through an uncle, who is a director, that a special department has been installed in concrete structures like pillboxes, to which access is gained only through special passes, even high-ranking officers being refused admission under a special order issued 18 Nov by factory police. There is heavy A.A. defence of all calibers, and the general belief is that experiments are being made with special weapons of some kind.

Richard P. Fischer. June 1945. Report on German Supplies of Uranium-Bearing Raw Materials. NARA RG 77, Entry UD-22A, Box 163, Folder Australia.
About 50 to 60 tons of strongly radioactive "tarnsand" was delivered to the German Army… More likely the ``tarnsand'' was prepared from material in which the radioactivity has been artificially induced.

F.A.C. Wardenburg and J.A. Lane. 5 April 1945. Interrogation of Dr. Kohl, Works Manager of Degussa Plant No. 2, Frankfurt. NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1.
Metallic uranium was mixed with coal dust (carbon?) and with Tragacanth gum as a binding material and pressed into blocks, approximately 50% by weight of coal and uranium. The blocks were approximately 5 cm x 5 cm x 6 cm. About five tons as metallic uranium in total were delivered in this form.

S. McClintic 6 Jan 1945. AFHRA A5734 p. 1092
At UNTERRADERACH, near FRIEDRICHS-HAFEN, there is a large semi-underground factory which was constructed early last winter where strange experiments were taking place. Heavy clouds of smoke filled the sky in the day and at night a red glow. The experiments caused the earth to shake. These experiments are with atoms and when the experiments proved successful the plant went into operation. Workmen were not allowed to leave the factory.

Gerhard Dessauer to Leo Szilard. 6 July 1942. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-1 GERMANY: US Wartime Positive Int. (July 42-June 44).
I learned that the chain reaction of the uranium isotope is now successful. It is not explosive, but there is now the prospect of technical utilization.

MED Foreign Intelligence. 3 April 1944. Activities from 13 March to 31 March 1944. NARA RG 77, Entry UD-22A, Box 170, Folder 32.60-1.
Mr. [John Hitchcock] Chapin reported successful detection experiments and requested aircraft study.

F. J. Smith. 30 July 1945. NARA RG 77, Entry UD-22A, Box 163, Folder Australia.
Mr. Parks, a geologist for the Engineers who has recently returned to the States, was interviewed and he stated that there was sizeable pile of material that originally came from the Belgian-Congo now at Hamburg. The material was being used by the KWI and even though we don't know his interpretation of a sizeable pile, we believe it would be worthwhile looking into.

Königsberg

Hamburg

Dahlem→
Haigerloch

Lichterfelde

Gottow
→Stadtilm

Leverkusen

Leipzig

Thuringia
underground

Krizik/
Bodenbach

Gusen

Unter-
raderach

Wolfgang G. Schwanitz. *H-Soz-u-Kult, H-Net Reviews*. Feb. 2009.
After 1945 the Grand Mufti said that the enemy espionage by "Jewish, English and American intelligence services" caused "the greatest damage." They were able to discover the locations of "atomic reactors" in East Prussia.

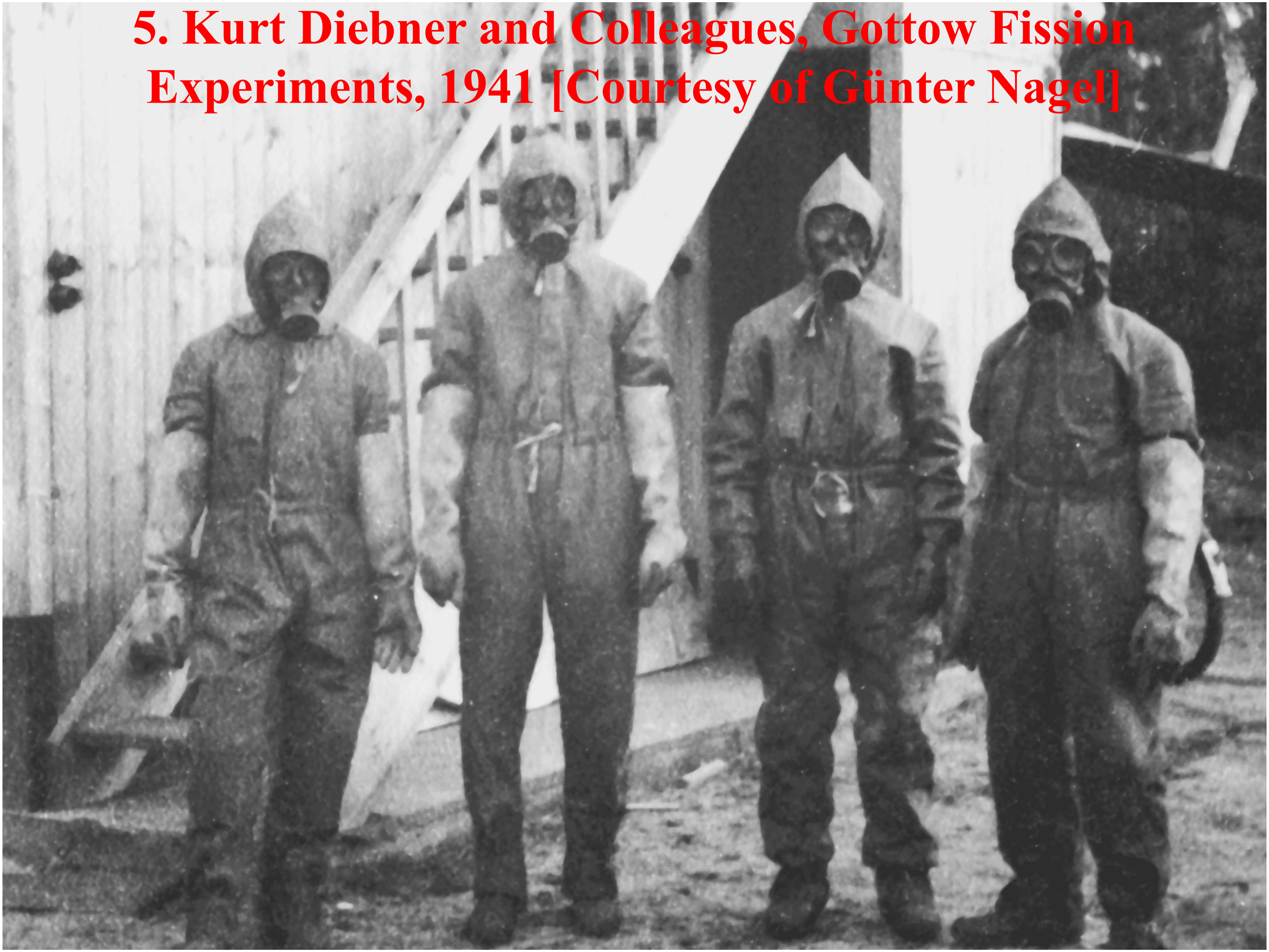
RAF Bomber Command. Campaign Diary. webarchive.nationalarchives.gov.uk/ukgwa/20070706054833/http://www.raf.mod.uk/bombercommand/aug44.html
29/30 August 1944 189 Lancasters of No 5 Group carried out one of the most successful No 5 Group attacks of the war on Königsberg at extreme range. Only 480 tons of bombs could be carried because of the range of the target but severe damage was caused around the 4 separate aiming points selected.

Joint Intelligence Committee. Exploitation of German Scientists and Technicians. 5 January 1946. J.I.C. 317/10. Appendix C. [NARA RG 218, Entry UD-1, Box 475, Folder CCS 471.9... (5-1-45)... Sec. 3.
Practically the entire staff of the German "URANMOTOR" Project at KRIZEK in Czechoslovakia under Prof. HUETTIG is working for the U.S.S.R.

NARA RG 319, Entry A1-134B, Folder Focke, Franz.
There was once a report of an atomic pile operated by Russians at Bodenbach, CSR…

Edward M. Pickett to Assistant Chief of Staff, G-2, USFET. 4 March 1946. Additional Supply of Uranium Oxide. NARA RG 77, Entry UD-22A, Box 169, Folder 32.32. Germ. Ind. TA.
Additional quantities of Uranium Oxide have been located in the amount of approximately five and one-half tons at Bad Tölz and Munich… Dr. Fritz REHBEIN stated during investigation that the Uranium Oxide is very active and can be extremely injurious to personnel not qualified in its handling.

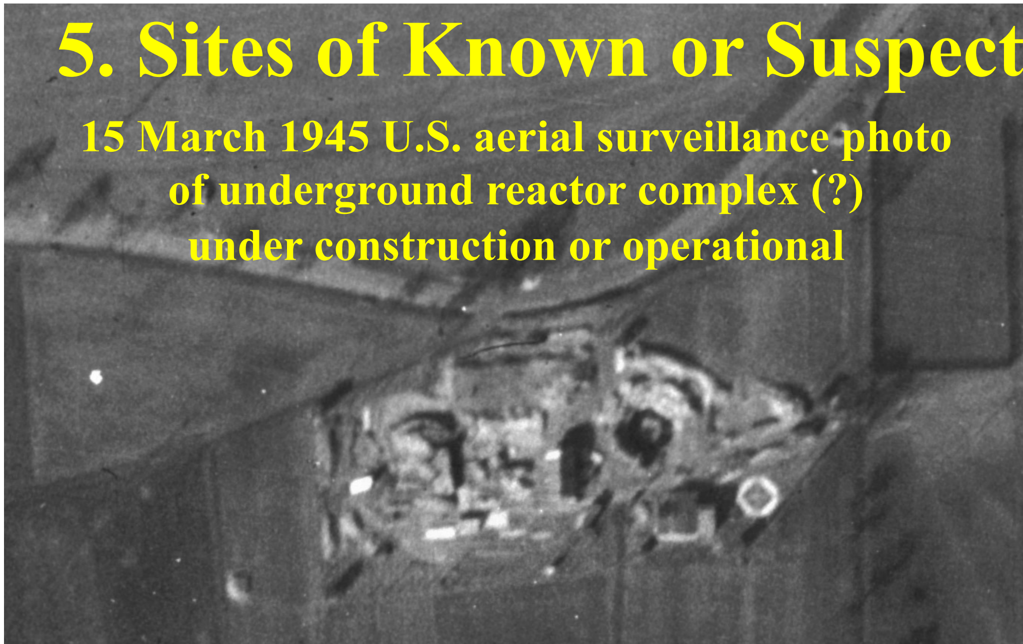
E. P. Dean to W. R. Shuler. 1 April 1946. Shipment of Uranium Compounds. NARA RG 77, Entry UD-22A, Box 169, Folder 32.32. Germ. Ind. TA.
G-2 moved very slowly and we had to prod them on three successive occasions... On the other hand, G-2 moved extremely quickly re the five tons of uranium oxide recently discovered at Bad Tölz.



5. Kurt Diebner and Colleagues, Gottow Fission Experiments, 1941 [Courtesy of Günter Nagel]

5. Sites of Known or Suspected Reactors: Gusen, Austria

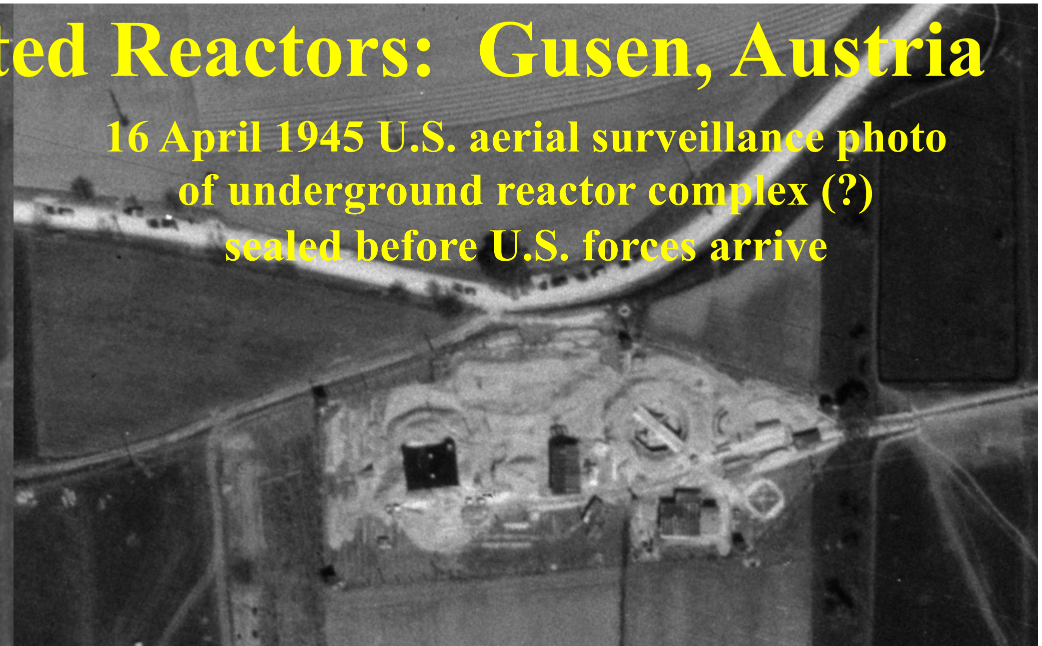
5. Sites of Known or Suspected Reactors: Gusen, Austria



15 March 1945 U.S. aerial surveillance photo of underground reactor complex (?) under construction or operational

5. Sites of Known or Suspected Reactors: Gusen, Austria

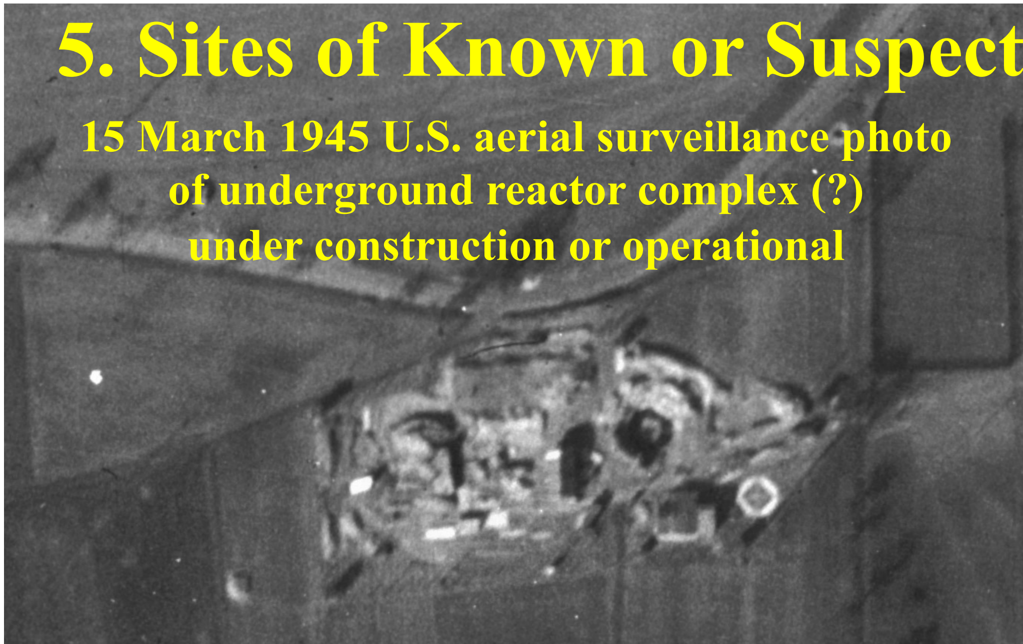
15 March 1945 U.S. aerial surveillance photo
of underground reactor complex (?)
under construction or operational



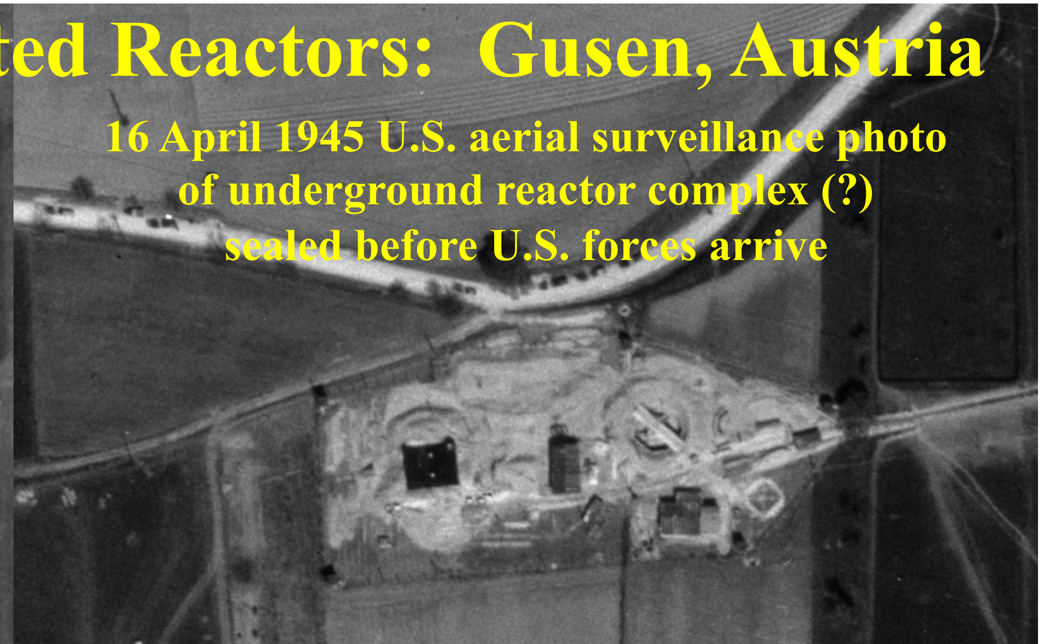
16 April 1945 U.S. aerial surveillance photo
of underground reactor complex (?)
sealed before U.S. forces arrive

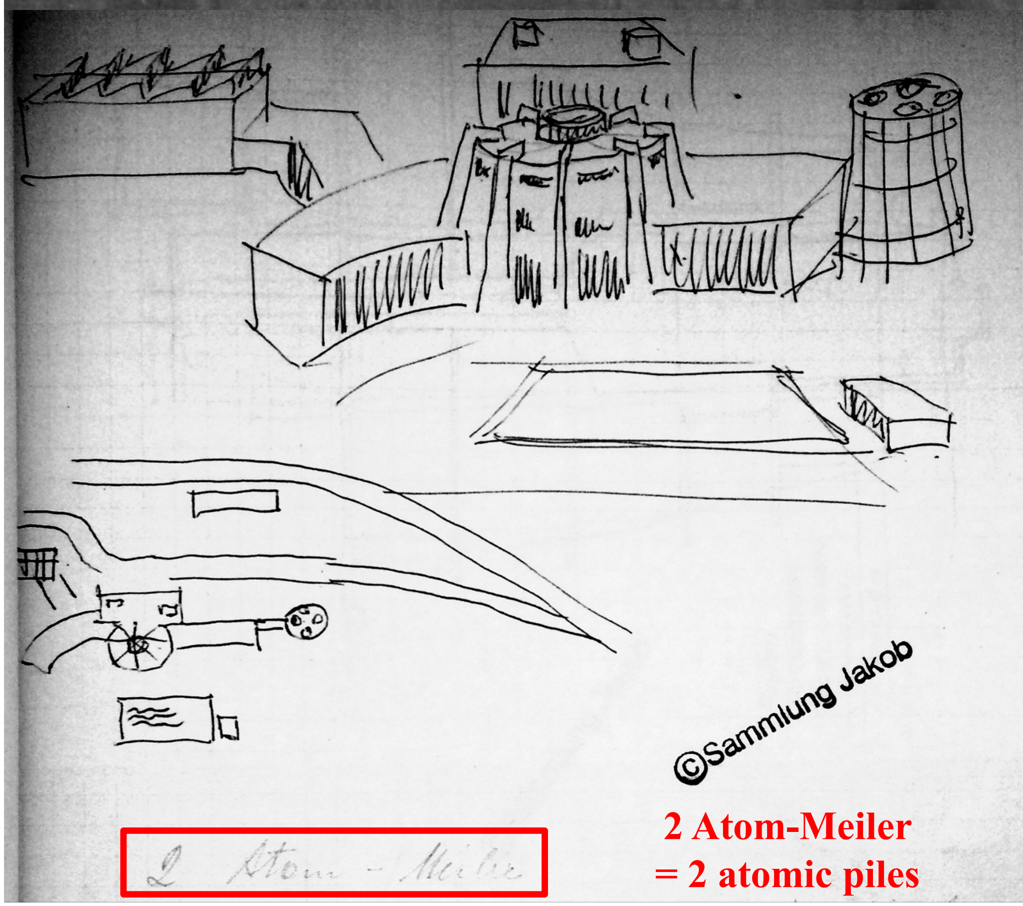
5. Sites of Known or Suspected Reactors: Gusen, Austria

15 March 1945 U.S. aerial surveillance photo
of underground reactor complex (?)
under construction or operational



16 April 1945 U.S. aerial surveillance photo
of underground reactor complex (?)
sealed before U.S. forces arrive



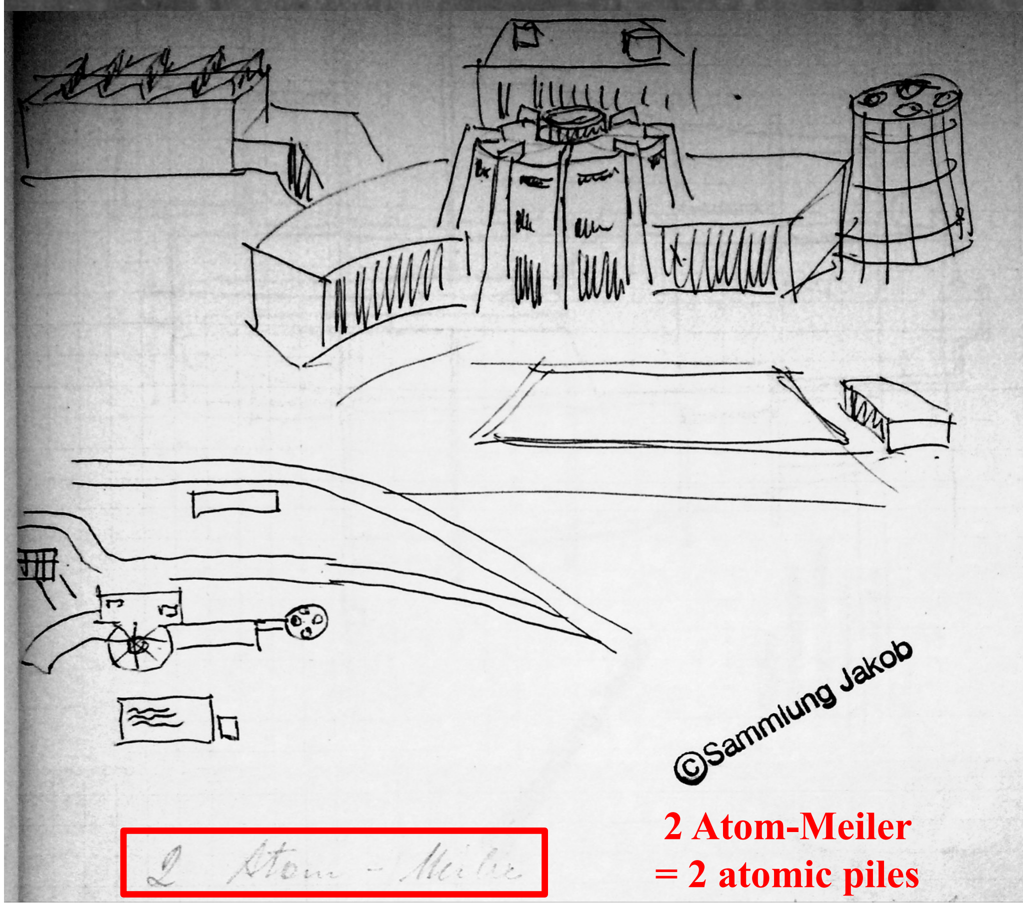


2 Atom-Meiler
= 2 atomic piles

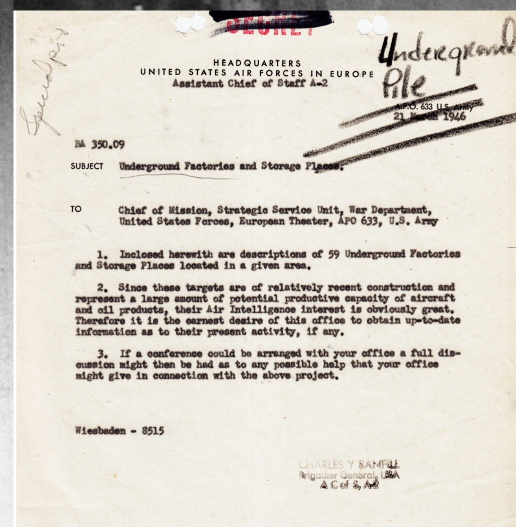
5. Sites of Known or Suspected Reactors: Gusen, Austria

15 March 1945 U.S. aerial surveillance photo of underground reactor complex (?) under construction or operational

16 April 1945 U.S. aerial surveillance photo of underground reactor complex (?) sealed before U.S. forces arrive



2 Atom-Meiler = 2 atomic piles



~~SECRET~~

Underground Pile

HEADQUARTERS
UNITED STATES AIR FORCES IN EUROPE
Assistant Chief of Staff A-2

Special Pile

A.P.O. 633 U.S. Army
~~21 March 1946~~

BA 350.09

SUBJECT Underground Factories and Storage Places.

TO Chief of Mission, Strategic Service Unit, War Department, United States Forces, European Theater, APO 633, U.S. Army

1. Inclosed herewith are descriptions of 59 Underground Factories and Storage Places located in a given area.

2. Since these targets are of relatively recent construction and represent a large amount of potential productive capacity of aircraft and oil products, their Air Intelligence interest is obviously great. Therefore it is the earnest desire of this office to obtain up-to-date information as to their present activity, if any.

3. If a conference could be arranged with your office a full discussion might then be had as to any possible help that your office might give in connection with the above project.

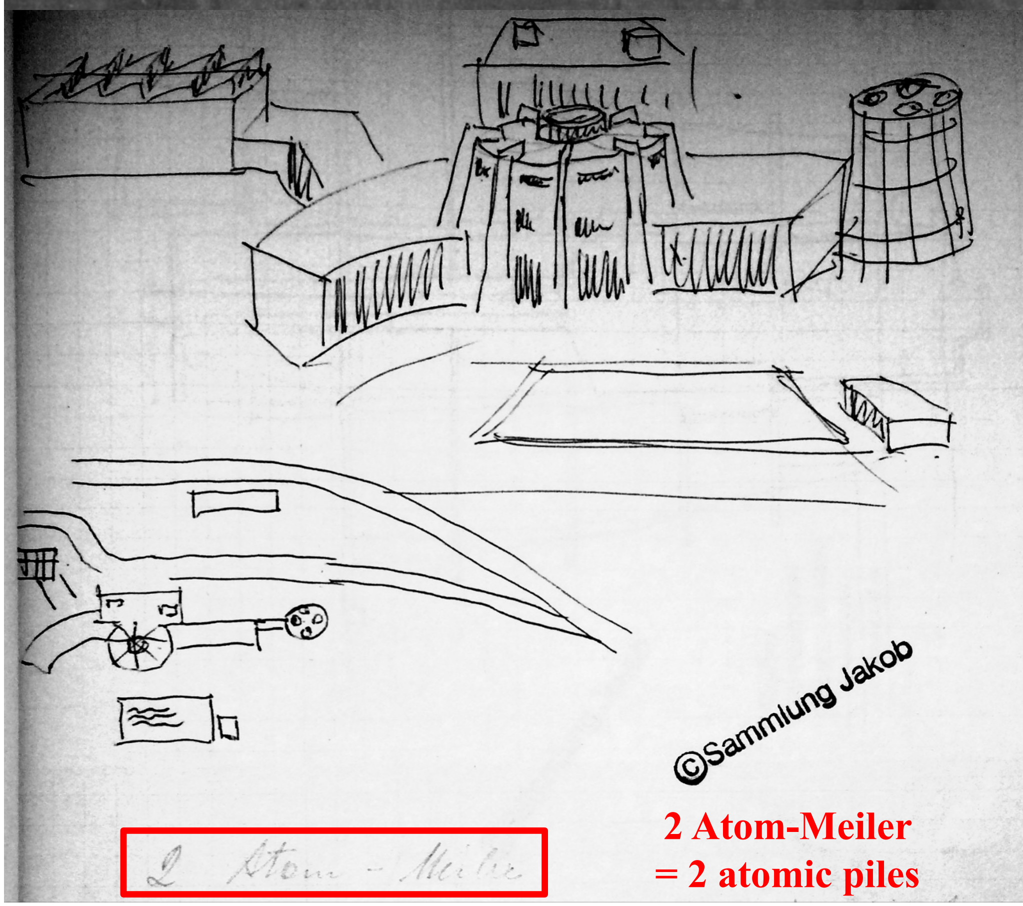
Wiesbaden - 8515

CHARLES Y BANFILL
Brigadier General, USA
A C of S, A-2

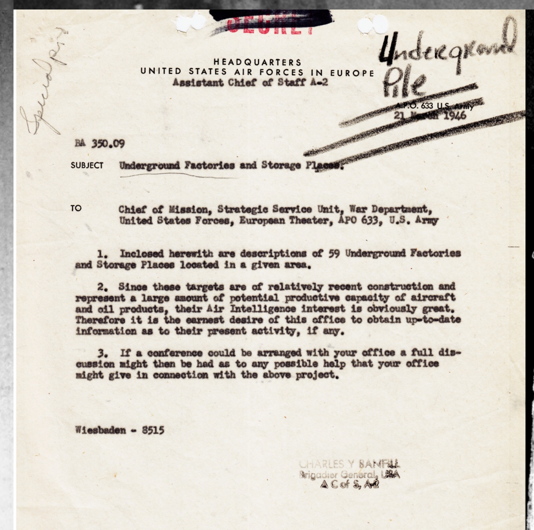
5. Sites of Known or Suspected Reactors: Gusen, Austria

15 March 1945 U.S. aerial surveillance photo
of underground reactor complex (?)
under construction or operational

16 April 1945 U.S. aerial surveillance photo
of underground reactor complex (?)
sealed before U.S. forces arrive



2 Atom-Meiler
= 2 atomic piles



[redacted]

Special pi...

HEADQUARTERS
UNITED STATES AIR FORCES IN EUROPE
Assistant Chief of Staff A-2

Underground Pile

A.P.O. 633 U.S. Army
21 [redacted] 1946

BA 350.09

SUBJECT Underground Factories and Storage Places.

TO Chief of Mission, Strategic Service Unit, War Department, United States Forces, European Theater, APO 633, U.S. Army

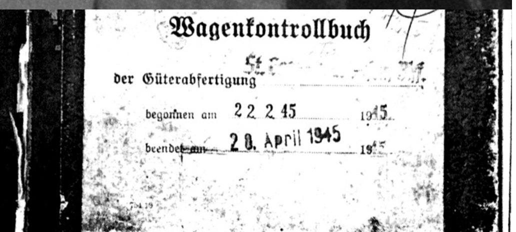
1. Inclosed herewith are descriptions of 59 Underground Factories and Storage Places located in a given area.

2. Since these targets are of relatively recent construction and represent a large amount of potential productive capacity of aircraft and oil products, their Air Intelligence interest is obviously great. Therefore it is the earnest desire of this office to obtain up-to-date information as to their present activity, if any.

3. If a conference could be arranged with your office a full discussion might then be had as to any possible help that your office might give in connection with the above project.

Wiesbaden - 8515

CHARLES Y BANFILL
Brigadier General, USA
A C of S, A-2



Wagenkontrollbuch

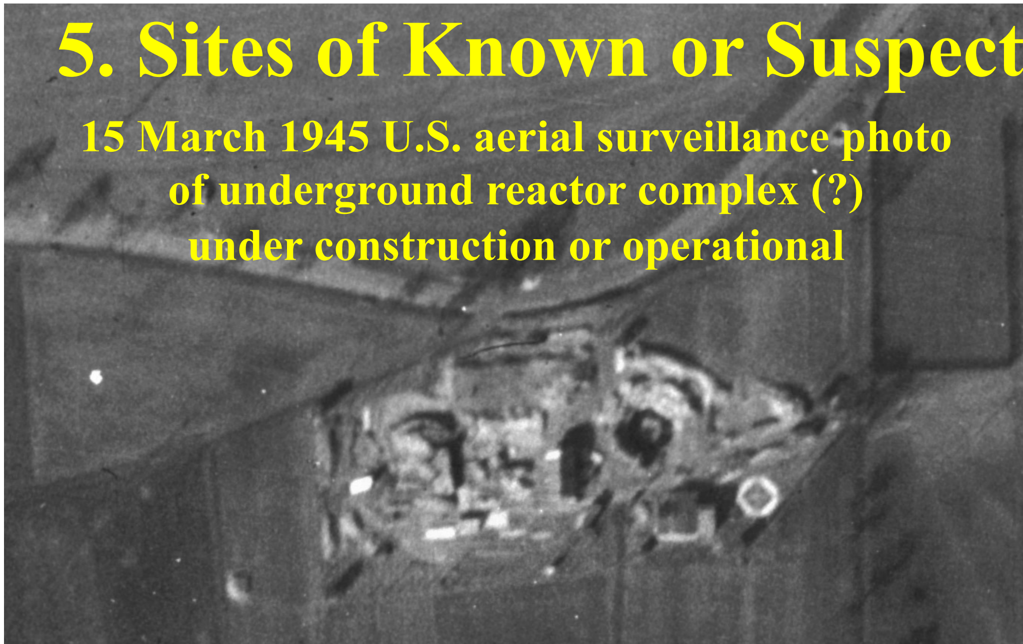
der Güterabfertigung St. ...

begonnen am 22.2.45 1945

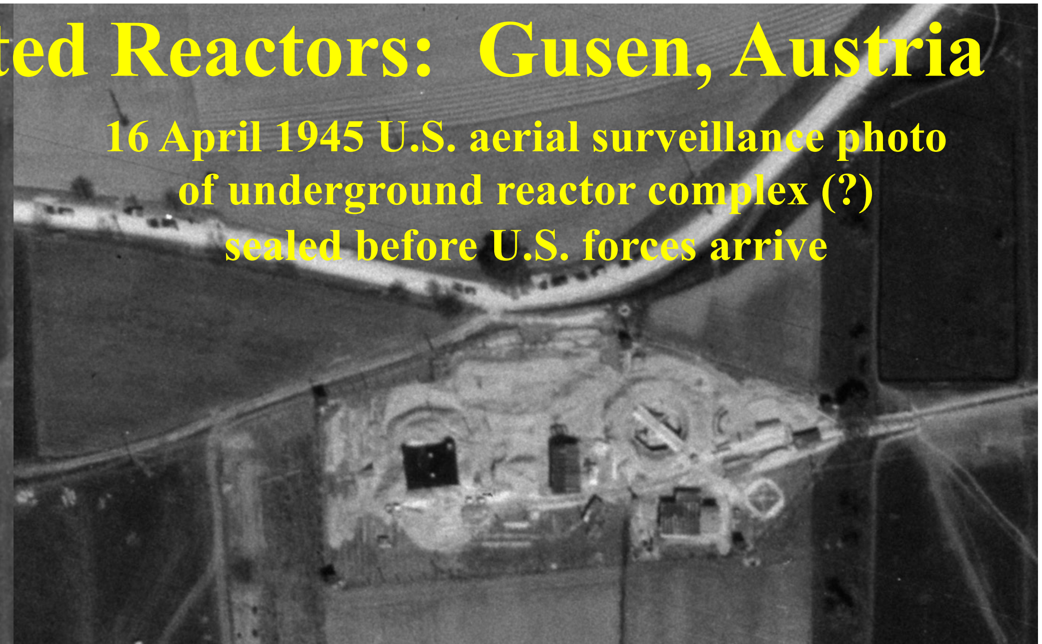
beendet am 20. April 1945 1945

1944-1945 Austrian train logbooks show several other nuclear sites sent regular shipments of codenamed products to Hans Kammler and Siegfried Flügge at this SS Gusen facility

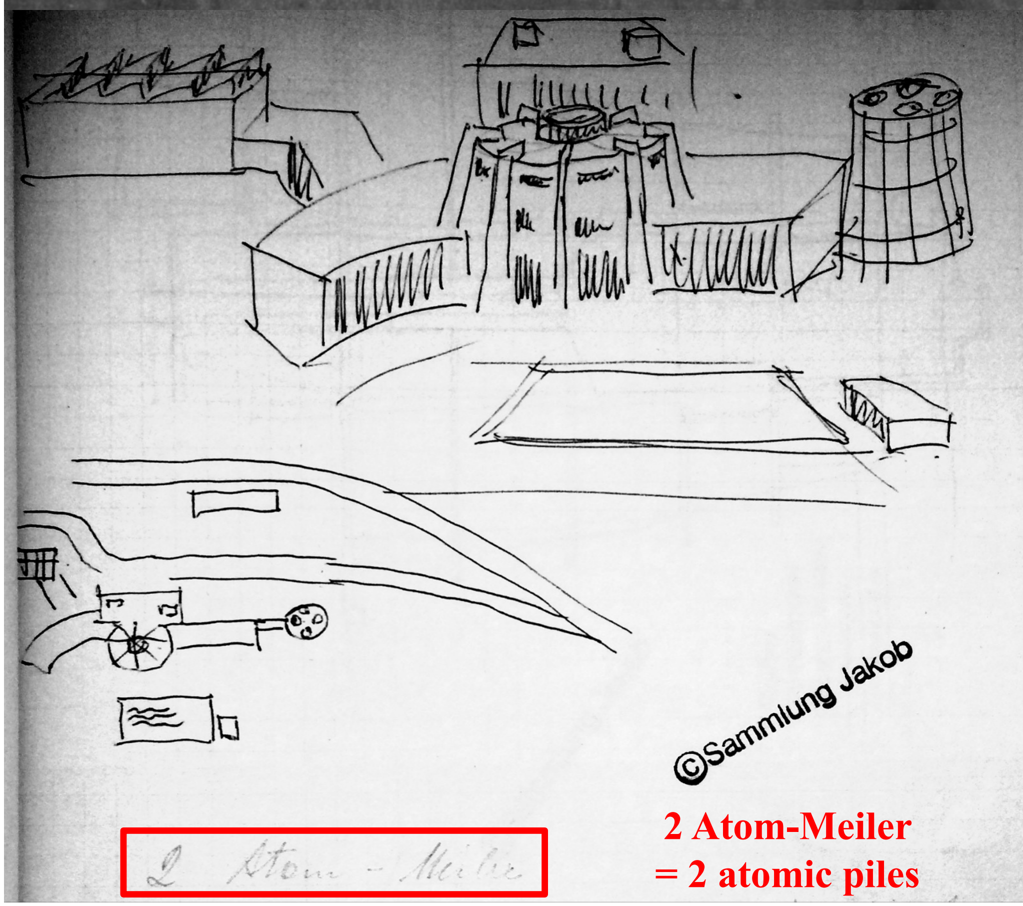
5. Sites of Known or Suspected Reactors: Gusen, Austria



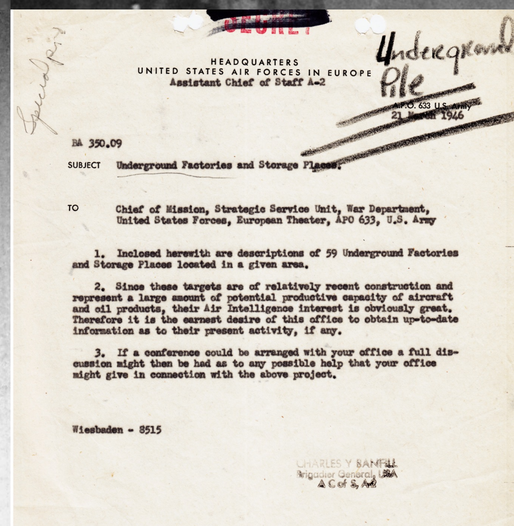
15 March 1945 U.S. aerial surveillance photo
of underground reactor complex (?)
under construction or operational



16 April 1945 U.S. aerial surveillance photo
of underground reactor complex (?)
sealed before U.S. forces arrive



2 Atom-Meiler
= 2 atomic piles



[redacted]

Underground Pile

HEADQUARTERS
UNITED STATES AIR FORCES IN EUROPE
Assistant Chief of Staff A-2

A.P.O. 633 U.S. Army
21 March 1946

BA 350.09

SUBJECT Underground Factories and Storage Places.

TO Chief of Mission, Strategic Service Unit, War Department, United States Forces, European Theater, APO 633, U.S. Army

1. Inclosed herewith are descriptions of 59 Underground Factories and Storage Places located in a given area.

2. Since these targets are of relatively recent construction and represent a large amount of potential productive capacity of aircraft and oil products, their Air Intelligence interest is obviously great. Therefore it is the earnest desire of this office to obtain up-to-date information as to their present activity, if any.

3. If a conference could be arranged with your office a full discussion might then be had as to any possible help that your office might give in connection with the above project.

Wiesbaden - 8515

CHARLES Y BANFILL
Brigadier General, USA
A C of S, A-2

1944-1945 Austrian train logbooks show several other nuclear sites sent regular shipments of codenamed products to Hans Kammler and Siegfried Flügge at this SS Gusen facility

Walter Chmielewski, son of Gusen commandant, 2016:

There was the precise talk of a total (of about) 30–40 kilometers of tunnels which have been created and partly in fact on two levels. This came through in talks with SS people and there is now nuclear research being carried out there. Under high pressure there is research, which could still save the nation, so to speak; the atomic bomb could be constructed, so that the initiative can be recovered again, yes. This was clearly stated in conversations in Gusen, that this research is already taking place. [*Forgotten Creators* D.5]

6. Breeding ^{239}Pu or ^{233}U in Electronuclear Systems

6. Breeding ^{239}Pu or ^{233}U in Electronuclear Systems

Germany produced particle accelerators from the Netherlands to Czech territory for a secret, high-priority program.

6. Breeding ^{239}Pu or ^{233}U in Electronuclear Systems

Germany produced particle accelerators from the Netherlands to Czech territory for a secret, high-priority program.

Werner Grothmann. 2002. Jonastalverein Archive, Arnstadt. p. 41.

It was attempted to produce plutonium without having a reactor. […] In the summer of 1944, when the uranium program had already been developed properly, decisive measures were taken, because there was evidence that plutonium could be produced, albeit with difficulty and in very small quantities. It was Himmler who commissioned us to use our technical capabilities to build the first machines for it. The construction drawings for it were not from our [SS] people. […] In addition, the Reichspost had its own very secret research facility nearby, but I do not know anything about it. The equipment for the plutonium matter was manufactured by Austrian companies and in the [Czech] Protectorate. This was so because Austrian scientists had better contacts to their own companies, which did excellent work by the way. The operation of the facility was supposed to be organized such that we [SS] provided the facility and also the construction of the underground rooms. The technicians there should operate them for us and Ohnesorge's people would provide the technical supervision. […] After the war I heard that we had material for one or two plutonium bombs.

6. Breeding ^{239}Pu or ^{233}U in Electronuclear Systems

Germany produced particle accelerators from the Netherlands to Czech territory for a secret, high-priority program.

Werner Grothmann. 2002. Jonastalverein Archive, Arnstadt. p. 41.

It was attempted to produce plutonium without having a reactor. […] In the summer of 1944, when the uranium program had already been developed properly, decisive measures were taken, because there was evidence that plutonium could be produced, albeit with difficulty and in very small quantities. It was Himmler who commissioned us to use our technical capabilities to build the first machines for it. The construction drawings for it were not from our [SS] people. […] In addition, the Reichspost had its own very secret research facility nearby, but I do not know anything about it. The equipment for the plutonium matter was manufactured by Austrian companies and in the [Czech] Protectorate. This was so because Austrian scientists had better contacts to their own companies, which did excellent work by the way. The operation of the facility was supposed to be organized such that we [SS] provided the facility and also the construction of the underground rooms. The technicians there should operate them for us and Ohnesorge's people would provide the technical supervision. […] After the war I heard that we had material for one or two plutonium bombs.

Air Raid, Sabotage Held Up Nazi Work on Atomic Bomb. AP. 1945.

PRAGUE, Aug. 23---(AP)---A shattering American air raid, Czech sabotage and an accident frustrated German experiments in Czechoslovakia seeking to develop an atomic bomb, newspaper accounts said here today. A German engineer named [W.] Isenbeck worked with the problem of releasing atomic energy in a radio plant at Vysocany, the accounts said. A blast and fire at the plant in 1943 followed by an American raid [25 March 1945] halted work soon after the plant resumed operations. Some mysterious apparatus was dispatched to the Imperial Research Institute in Berlin, but Czech workers believed they managed to damage the delicate mechanism before it was shipped, the stories said.

6. Breeding ^{239}Pu or ^{233}U in Electronuclear Systems

Germany produced particle accelerators from the Netherlands to Czech territory for a secret, high-priority program.

Werner Grothmann. 2002. Jonastalverein Archive, Arnstadt. p. 41.

It was attempted to produce plutonium without having a reactor. […] In the summer of 1944, when the uranium program had already been developed properly, decisive measures were taken, because there was evidence that plutonium could be produced, albeit with difficulty and in very small quantities. It was Himmler who commissioned us to use our technical capabilities to build the first machines for it. The construction drawings for it were not from our [SS] people. […] In addition, the Reichspost had its own very secret research facility nearby, but I do not know anything about it. The equipment for the plutonium matter was manufactured by Austrian companies and in the [Czech] Protectorate. This was so because Austrian scientists had better contacts to their own companies, which did excellent work by the way. The operation of the facility was supposed to be organized such that we [SS] provided the facility and also the construction of the underground rooms. The technicians there should operate them for us and Ohnesorge's people would provide the technical supervision. […] After the war I heard that we had material for one or two plutonium bombs.

Air Raid, Sabotage Held Up Nazi Work on Atomic Bomb. AP. 1945.

PRAGUE, Aug. 23---(AP)---A shattering American air raid, Czech sabotage and an accident frustrated German experiments in Czechoslovakia seeking to develop an atomic bomb, newspaper accounts said here today. A German engineer named [W.] Isenbeck worked with the problem of releasing atomic energy in a radio plant at Vysocany, the accounts said. A blast and fire at the plant in 1943 followed by an American raid [25 March 1945] halted work soon after the plant resumed operations. Some mysterious apparatus was dispatched to the Imperial Research Institute in Berlin, but Czech workers believed they managed to damage the delicate mechanism before it was shipped, the stories said.

Georgy Flerov. 1983 interview. www.gornictwo.walbrzych.pl/news-91-Tajemnice_kopalni_Walbrzycha.php

Nobody knows everything, because the Germans destroyed a lot of documents and experimental materials, and the Allies, the Americans, took a lot. […] I was in Waldenburg, but just before I came back from Germany to Moscow. […] Stalin and Kurchatov sent me there. There were reports that the Germans were conducting atomic tests. I went there as a representative of the Ministry of Light Machines. It turned out on the spot that the Germans were more advanced in the tests than one could have imagined. […] I found out that in Dresden the "Service" [NKVD] had captured a German scientist, a physicist, who told me about secret experiments in Waldenburg, so I took him with me and we went there, but he knew too little. […] You see, the Germans had a lot of research groups. My German worked in an institute in Dresden that belonged to the Postal Ministry. He was in Waldenburg only one time to install equipment, because that institute belonged to the SS. […] He was there only once. The car that carried him from the railway station drove around the city for a long time until the German had forgotten the way. Then they drove into the mine and drove him underground. He sat there for two days, worked, ate, and slept underground. When he finished, the car drove him around the city again, before he reached the station. And that is why the German could not find anything with me. […] He said that when he was there for the first time he was also afraid. He said that SS people were guarding everywhere; he described them as "sharp." He said they had strange emblems on their uniforms that he had never seen before. […] He said that with his colleagues he had installed a cyclotron there, but it turned out that it was the second one, because one was already there. They installed the second one. He told us that the mine had been specially adapted. There were trolleys, tables, all the necessary equipment, and at the entrances there were locks and guards. He could not enter because he did not have a special pass.

For more information, see *Forgotten Creators* D.6 and D.15.3

Reported Heavy Water Production

7. At Least 27 Reported Heavy Water Production Sites

7. At Least 27 Reported Heavy Water Production Sites

C. Chamberlain. Reveal Allied Capture of Nazi Atom Factory. *Chicago Daily Tribune.* 9 Aug. 1945.

The largest heavy water plant in Germany, where Nazi scientists were working feverishly to perfect an atomic bomb, was captured almost intact by the allies three months ago in a heavily wooded section four miles from Kiel. Cobwebs of plastic pipes connected eight huge vats holding thousands of gallons of plain water for processing into heavy water. I stumbled onto the factory two weeks after it was taken over by American and British technicians. Altho they gave me freedom to roam around the grounds, I was called on the carpet the next day for entering without authority from high officials and was required to pledge not to reveal what I had seen until it was released.

OSS London. 5 December 1944. T-2805-a. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.

GERMANY: ATOMIC PHYSICS Heavy Water Experimental Station. Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

https://www.cia.gov/readingroom/document/cia-rdp81-01028r000100080011-0

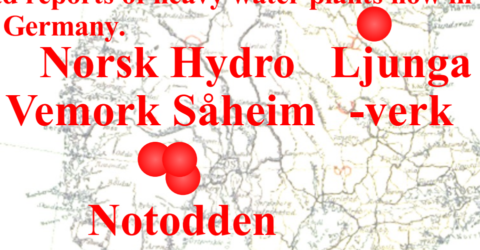
The dismantling of the Leuna Plant in Merseburg, Thuringia, Germany (Soviet Zone), was initiated in March 1946… 3. The following large installations were dismantled:… (j) The heavy water installation operating at atmospheric pressure was dismantled and possibly placed in a building near the Agricultural Exhibition Grounds in Moscow. (k) The heavy water installation operating at 700 atmospheres was taken to the Karpov Institute were it was being installed when we left in July 1948.

Interrogation of PW MAYER. 14 July 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.

PW is an educated man in his late thirties, a physical chemist by profession[...] PW believes that D2O (Heavy Hydrogen) is manufactured principally at GRIESHEIM ELEKTRON in fairly large quantities for distribution to research and scientific establishments.

B.K. Hough to L. Groves. 9 December 1943. NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1.

Dr. E. P. Wigner of Chicago mentioned to Dr. Urey that he has had reports of heavy water plants now in production in Germany.



Karl Cohen to F. Smith. 23 February 1945. Subject: Status of Enemy Separation Projects. NARA RG 77, Entry UD-22A, Box 166, Folder 32.22-1.

Heavy Water Production… Factories: Rjukan (now dismantled) Müggenberg, I. G. Farben

Ferdinand Cap. 23 November 1950 report.

At the invitation of Colonel Colonel GOUSSOT, Innsbruck, I had the opportunity to visit Mr. Werd's [wartime] heavy water extraction test facility in Weer near Wattens in Tyrol on 21 November 1950.

See *Forgotten Creators* D.7 for many more.

Cotrone

Stig Edfast. Sveriges Radio. 10 July 2015. https://www.sverigesradio.se/artikel/6209697

Ulf Sundholm has written books about the history of Ljungaverk and he now wants to open a museum. "They produced heavy water here in the factory during the war. It is a story that many older people have known about, but it has not been talked about," says author Ulf Sundholm. For six years he has been researching information and putting together a puzzle and can now show that heavy water from Fosfatbolaget in Ljungaverk was transported to Germany in containers during the Second World War… "The containers with heavy water went from Ljungaverk by train. They were transferred in Gällö to German transport trains."

Siegfried Knappe. 1992. *Soldat: Reflections of a German Soldier 1936-1949*. Orion. pp. 265-268.

Hitler had declared Breslau a fortress city, which meant that it was to be defended to the last man, even if it was surrounded and totally isolated… A factory for making heavy water for atomic experiments had been abandoned east of Breslau, and we had to plan and conduct a counterattack to destroy it and keep its secrets from falling into the hands of the Russians.

U.S. Embassy, Warsaw. 12 Aug. 1947. MIS-390731. Subject: Plants producing heavy water. NARA RG 319, Entry 85A, Box 2534, Folder 390731–390740.

It is believed that no plants designed specially for the production of heavy water exist in Poland [in 1947]. It is reliably reported that the Germans built one such plant near OSWIECIM (Auschwitz) but that it was destroyed or moved out by the SOVIETS in 1945.

R. W. Kirkman. 28 January 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-1.

According to Major Furman, the substance of the conversation referred to was to the effect that Degussa was producing heavy water at two plants located at Rheinfelden and Weissenstein on the Drau River, Austria.

7. At Least 27 Reported Heavy Water Production Sites

How many production sites were operational during the war?

How much heavy water was produced?

Where was it used?

Why are the reports still classified?

See *Forgotten Creators* D.7 for many more.

7. At Least 27 Reported Heavy Water Production Sites

DECLASSIFIED
Authority NND 017045
By [illegible] NARA Date 8/12/07

RESTRICTED CONFIDENTIAL SECRET TOP SECRET

INTRA-BRANCH ROUTING

BID SHEET

This sheet must be forwarded with the document to the Intelligence Library, where it will be permanently filed with the "Library File Copy" of the document

M. I. S. No. SD 3425

8600.0421
8600.0120
8600.0210

SCIEN BR/ RES UNIT 26 JUN 1946

RESTRICTED CONFIDENTIAL SECRET TOP SECRET

MILITARY INTELLIGENCE SERVICE

DECLASSIFIED
Authority NND 017045
By [illegible] NARA Date 8/12/07

WITHDRAWAL NOTICE

RG: 319
Tab #: 00001
Entry: 1041
Copies: 001
Pages: 0002

Box: 00051

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

Folder Title: 926136
Document Date: 06/07/1946
Document Ser#:

Description: MEMO FR: S. M. SKINNER TO: WAR DEPARTMENT GENERAL STAFF

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination.

NND: 20017045
Withdrawn: 09/11/2001 by: RUTHEMEYER

FOIA RETRIEVAL #: 20017045 00051 00001

NARA RG 319, Entry NM3-85M, Box 51, Folders 926136–926139

DECLASSIFIED
Authority NND 017045
By [illegible] NARA Date 8/12/07

WITHDRAWAL NOTICE

RG: 319
Tab #: 00002
Entry: 1041
Copies: 001
Pages: 0003

Box: 00051

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

Folder Title: 926137
Document Date: 06/07/1946
Document Ser#:

Description: MEMO FR: S. M. SKINNER TO: WAR DEPARTMENT GENERAL STAFF

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination.

NND: 20017045
Withdrawn: 09/11/2001 by: RUTHEMEYER

FOIA RETRIEVAL #: 20017045 00051 00002

DECLASSIFIED
Authority NND 017045
By [illegible] NARA Date 8/12/07

WITHDRAWAL NOTICE

RG: 319
Tab #: 00003
Entry: 1041
Copies: 001
Pages: 0002

Box: 00051

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

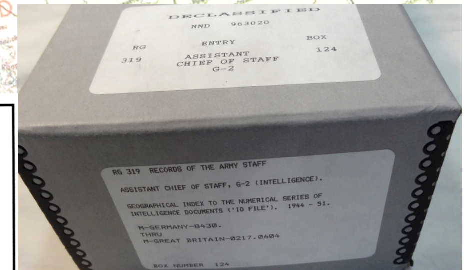
Folder Title: 926139
Document Date: 06/13/1946
Document Ser#:

Description: MEMO FR: S. M. SKINNER TO: CHIEF SCIENTIFIC BRANCH, WAR DEPART

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination.

NND: 20017045
Withdrawn: 09/11/2001 by: RUTHEMEYER

FOIA RETRIEVAL #: 20017045 00051 00003



DECLASSIFIED
Authority NND 963020

NARA RG 319, Entry A1-84E, Box 124

M-GERMANY	8600.0610	Nuclear Physics – Specialized Products – Plants producing heavy water.
COUNTRY OR AREA	BID NUMBER	NEW BID-NEW NUMBER

DATE	SOURCE	COMMENTS	M.I.S. NO.
15 Nov. 46	CIG	C- Heavy water produced at Leuna Plant near Halle in Sov.	323118
-Jul. 46	SSU	LD. (C)	301971

INTELLIGENCE LIBRARY

M-GERMANY	8600.0610	Nuclear Physics-Specialized Products-Plants producing heavy water.
COUNTRY OR AREA	BID NUMBER	

1948

DATE	SOURCE	COMMENTS	M.I.S. NO.
5 Feb. 48	Eucom	(R-1/16-48) Return of Heavy Water (C) Installation to the Leuna Works	438408
18 Mar. 48	Eucom	(R-15-9-48) (C) Prod at I G Farben, Bitterfeld.	450754

INTELLIGENCE LIBRARY

DECLASSIFIED
Authority NND 017045
By [illegible] NARA Date 8/12/07

RESTRICTED CONFIDENTIAL SECRET TOP SECRET

INTRA-BRANCH ROUTING

BID SHEET

This sheet must be forwarded with the document to the Intelligence Library, where it will be permanently filed with the "Library File Copy" of the document

M. I. S. No. SD 3418

8600.0120 Recruitment of German Scientists; Heavy Water Production at Halle
8600.0210 "
8600.0446 "

SCIEN BR/ RES UNIT 2 - JUL 1946

7 June 46 SSU (T)

RESTRICTED CONFIDENTIAL SECRET TOP SECRET

MILITARY INTELLIGENCE SERVICE

NARA RG 319, Entry NM3-85M, Box 51, Folders 926136–926139

How many production sites were operational during the war?

How much heavy water was produced?

Where was it used?

Why are the reports still classified?

See *Forgotten Creators* D.7 for many more.

7. Production of Other Potentially Nuclear-Related Materials

7. Production of Other Potentially Nuclear-Related Materials

Material	Non-nuclear applications	Nuclear applications	Wartime production
Deuterium/ heavy water	Isotope labeling of molecules	Producing tritium, neutrons, fusion; neutron moderator for reactor	At least 27 reported production plants
Lithium	Glass, ceramics, metals	Producing tritium, neutrons, fusion	Hundreds of tons
Beryllium	Metal alloys	Neutron production/reflection	Tons
Boron	Glass, ceramics, metals	Neutron absorber	Large quantities
Graphite	Rocket rudders, electrodes	Neutron moderator for reactor	Tens of thousands of tons
Fluorine	Industrial production	U hexafluoride for enrichment	Thousands of tons
Aluminum	Metal structures, packaging	Reactor fuel cladding, bomb casings	Thousands of tons
Calcium	Metal alloys	Th/U/Pu purification	Thousands of tons
Nickel	Batteries, alloys	Resists corrosion by U hexafluoride	Thousands of tons
Zirconium	High-temp. metals, ceramics	Reactor fuel cladding	Tons
Cadmium	Nickel-cadmium batteries	Neutron absorber	Thousands of tons

7. Production of Other Potentially Nuclear-Related Materials

Material	Non-nuclear applications	Nuclear applications	Wartime production
Deuterium/ heavy water	Isotope labeling of molecules	Producing tritium, neutrons, fusion; neutron moderator for reactor	At least 27 reported production plants
Lithium	Glass, ceramics, metals	Producing tritium, neutrons, fusion	Hundreds of tons
Beryllium	Metal alloys	Neutron production/reflection	Tons
Boron	Glass, ceramics, metals	Neutron absorber	Large quantities
Graphite	Rocket rudders, electrodes	Neutron moderator for reactor	Tens of thousands of tons
Fluorine	Industrial production	U hexafluoride for enrichment	Thousands of tons
Aluminum	Metal structures, packaging	Reactor fuel cladding, bomb casings	Thousands of tons
Calcium	Metal alloys	Th/U/Pu purification	Thousands of tons
Nickel	Batteries, alloys	Resists corrosion by U hexafluoride	Thousands of tons
Zirconium	High-temp. metals, ceramics	Reactor fuel cladding	Tons
Cadmium	Nickel-cadmium batteries	Neutron absorber	Thousands of tons

Some sites were producing multiple nuclear-related materials. I.G. Farben's Bitterfeld facility was producing heavy water, graphite, aluminum, and calcium, and perhaps other relevant materials.

7. Production of Other Potentially Nuclear-Related Materials

Material	Non-nuclear applications	Nuclear applications	Wartime production
Deuterium/ heavy water	Isotope labeling of molecules	Producing tritium, neutrons, fusion; neutron moderator for reactor	At least 27 reported production plants
Lithium	Glass, ceramics, metals	Producing tritium, neutrons, fusion	Hundreds of tons
Beryllium	Metal alloys	Neutron production/reflection	Tons
Boron	Glass, ceramics, metals	Neutron absorber	Large quantities
Graphite	Rocket rudders, electrodes	Neutron moderator for reactor	Tens of thousands of tons
Fluorine	Industrial production	U hexafluoride for enrichment	Thousands of tons
Aluminum	Metal structures, packaging	Reactor fuel cladding, bomb casings	Thousands of tons
Calcium	Metal alloys	Th/U/Pu purification	Thousands of tons
Nickel	Batteries, alloys	Resists corrosion by U hexafluoride	Thousands of tons
Zirconium	High-temp. metals, ceramics	Reactor fuel cladding	Tons
Cadmium	Nickel-cadmium batteries	Neutron absorber	Thousands of tons

Some sites were producing multiple nuclear-related materials. I.G. Farben's Bitterfeld facility was producing heavy water, graphite, aluminum, and calcium, and perhaps other relevant materials.

Significant quantities of many of these nuclear-related materials were also shipped to Japan, along with at least 560 kg of (possibly enriched) uranium and other cutting-edge military technologies.

7. Production of Other Potentially Nuclear-Related Materials

Material	Non-nuclear applications	Nuclear applications	Wartime production
Deuterium/ heavy water	Isotope labeling of molecules	Producing tritium, neutrons, fusion; neutron moderator for reactor	At least 27 reported production plants
Lithium	Glass, ceramics, metals	Producing tritium, neutrons, fusion	Hundreds of tons
Beryllium	Metal alloys	Neutron production/reflection	Tons
Boron	Glass, ceramics, metals	Neutron absorber	Large quantities
Graphite	Rocket rudders, electrodes	Neutron moderator for reactor	Tens of thousands of tons
Fluorine	Industrial production	U hexafluoride for enrichment	Thousands of tons
Aluminum	Metal structures, packaging	Reactor fuel cladding, bomb casings	Thousands of tons
Calcium	Metal alloys	Th/U/Pu purification	Thousands of tons
Nickel	Batteries, alloys	Resists corrosion by U hexafluoride	Thousands of tons
Zirconium	High-temp. metals, ceramics	Reactor fuel cladding	Tons
Cadmium	Nickel-cadmium batteries	Neutron absorber	Thousands of tons

Some sites were producing multiple nuclear-related materials. I.G. Farben's Bitterfeld facility was producing heavy water, graphite, aluminum, and calcium, and perhaps other relevant materials.

Significant quantities of many of these nuclear-related materials were also shipped to Japan, along with at least 560 kg of (possibly enriched) uranium and other cutting-edge military technologies.

After the war, many of these same German plants continued to produce these same materials for the U.S. and Soviet nuclear weapons programs.

Archival documents in *Forgotten Creators* D.7, D.14

7. Disposal of Radioactive Waste at the End of the War

Hasso Ziegler. Die "Konzertsäle" von Asse sind strahlensicher: Endlagerung radioaktiver Abfallprodukte in 500-Meter tiefen Abbaukammern. *Hannoversche Allgemeine Zeitung*, 29 July 1974:

Extensive preparatory work is still going on for the highly radioactive waste, which will accumulate at the earliest from 1976 onwards in West Germany and be stored in Asse (mainly the residues from reprocessed fission products, for example reactor fuel rods). It is thought to sink them—vitrified beforehand—in special chambers (drill holes) to a depth of fifteen hundred meters.

Asked about the occasional bad news that appears every now and then regarding the supposedly dangerous storage of radioactive waste, Alwin Urff, mining engineer and deputy technical plant manager in Asse, only shook his head: "Here in the mine nothing can happen anyway. When we began storage in 1967, our company first sank radioactive waste from the last war, that uranium waste which arose in the preparation of the German atomic bomb. Specifically we had to get that out of concrete bunkers near Munich, where it had been deposited at the time, because back then one did not know where the devil one should leave the stuff…"

8. German Fission Pit Masses

8. German Fission Pit Masses

Erich Schumann, Kurt Diebner, et al. February 1942 [1941 data]. Energiegewinnung aus Uran: Ergebnisse der vom Heereswaffenamt veranlassten Forschungsarbeiten zur Nutzbarmachung von Atomkernenergien. AMPG, I. Abteilung, Rep. 34, Nr. 105.

From U_{238} a substance ("element 94") is formed by the absorption of neutrons, which must be even easier to fission than U_{235}. Since this substance is chemically different from uranium, it must be possible to separate it easily from the uranium of a previously operating machine [used reactor fuel]. But today we know neither the amount in which it is produced nor its properties precisely enough for a completely safe prediction. Since there are some free neutrons in each substance, it would be enough to spatially combine a sufficient amount (probably about 10--100 kg) to ignite the explosive.

8. German Fission Pit Masses

Erich Schumann, Kurt Diebner, et al. February 1942 [1941 data]. Energiegewinnung aus Uran: Ergebnisse der vom Heereswaffenamt veranlassten Forschungsarbeiten zur Nutzbarmachung von Atomkernenergien. AMPG, I. Abteilung, Rep. 34, Nr. 105.

From U_{238} a substance ("element 94") is formed by the absorption of neutrons, which must be even easier to fission than U_{235}. Since this substance is chemically different from uranium, it must be possible to separate it easily from the uranium of a previously operating machine [used reactor fuel]. But today we know neither the amount in which it is produced nor its properties precisely enough for a completely safe prediction. Since there are some free neutrons in each substance, it would be enough to spatially combine a sufficient amount (probably about 10--100 kg) to ignite the explosive.

Manfred von Ardenne. 1990. Die Erinnerungen. 10th ed. Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms."

8. German Fission Pit Masses

Erich Schumann, Kurt Diebner, et al. February 1942 [1941 data]. Energiegewinnung aus Uran: Ergebnisse der vom Heereswaffenamt veranlassten Forschungsarbeiten zur Nutzbarmachung von Atomkernenergien. AMPG, I. Abteilung, Rep. 34, Nr. 105.

From U_{238} a substance ("element 94") is formed by the absorption of neutrons, which must be even easier to fission than U_{235}. Since this substance is chemically different from uranium, it must be possible to separate it easily from the uranium of a previously operating machine [used reactor fuel]. But today we know neither the amount in which it is produced nor its properties precisely enough for a completely safe prediction. Since there are some free neutrons in each substance, it would be enough to spatially combine a sufficient amount (probably about 10--100 kg) to ignite the explosive.

Manfred von Ardenne. 1990. Die Erinnerungen. 10th ed. Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms."

Josef Schintlmeister. 7. August 1945. NARA RG 77, Entry UD-22A, Box 167, Folder 32.12-2 GERMANY: Personnel (Jan 45 – Dec 45).

I take tonight's publication of the first technical application of uranium fission [Hiroshima] as an opportunity to inform you that work on this problem was also carried out at the [Vienna] Second Physics Institute during the war. [...] The technical utilization of nuclear energy in uranium fission requires very difficult and very expensive work. With a few kilograms of the new element [plutonium], which is incomparably easier and cheaper to obtain, it will in all likelihood be possible to build a nuclear device without the effort required to date, since it is to be expected that nuclear fission will occur more easily than with uranium and also that considerably more neutrons will be released during fission, so that the chain reaction will proceed smoothly.

8. German Fission Pit Masses

Erich Schumann, Kurt Diebner, et al. February 1942 [1941 data]. Energiegewinnung aus Uran: Ergebnisse der vom Heereswaffenamt veranlassten Forschungsarbeiten zur Nutzbarmachung von Atomkernenergien. AMPG, I. Abteilung, Rep. 34, Nr. 105.

From U_{238} a substance ("element 94") is formed by the absorption of neutrons, which must be even easier to fission than U_{235}. Since this substance is chemically different from uranium, it must be possible to separate it easily from the uranium of a previously operating machine [used reactor fuel]. But today we know neither the amount in which it is produced nor its properties precisely enough for a completely safe prediction. Since there are some free neutrons in each substance, it would be enough to spatially combine a sufficient amount (probably about 10--100 kg) to ignite the explosive.

Manfred von Ardenne. 1990. Die Erinnerungen. 10th ed. Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms."

Josef Schintlmeister. 7. August 1945. NARA RG 77, Entry UD-22A, Box 167, Folder 32.12-2 GERMANY: Personnel (Jan 45 – Dec 45).

I take tonight's publication of the first technical application of uranium fission [Hiroshima] as an opportunity to inform you that work on this problem was also carried out at the [Vienna] Second Physics Institute during the war. [...] The technical utilization of nuclear energy in uranium fission requires very difficult and very expensive work. With a few kilograms of the new element [plutonium], which is incomparably easier and cheaper to obtain, it will in all likelihood be possible to build a nuclear device without the effort required to date, since it is to be expected that nuclear fission will occur more easily than with uranium and also that considerably more neutrons will be released during fission, so that the chain reaction will proceed smoothly.

Edmund Tilley. Brief Operational Report on [censored] and Other Germans and Italians Connected with Project Abstract. 19 August 1947. NARA RG 319, Entry A1-134A, Box 29, Folder Operation Oberjoch.

25. Prof. Dr. NIELS [Walter Nielsch?], now said to be in the United States, was, according to [censored,] concerned with chemical and atomic problems at TUCHELER HEIDE and produced a number of atomic bombs, weighing from 1 to 5 kilograms. NIELS should be traced and questioned in detail.

8. German Fission Pit Masses

Erich Schumann, Kurt Diebner, et al. February 1942 [1941 data]. Energiegewinnung aus Uran: Ergebnisse der vom Heereswaffenamt veranlassten Forschungsarbeiten zur Nutzbarmachung von Atomkernenergien. AMPG, I. Abteilung, Rep. 34, Nr. 105.

From U_{238} a substance ("element 94") is formed by the absorption of neutrons, which must be even easier to fission than U_{235}. Since this substance is chemically different from uranium, it must be possible to separate it easily from the uranium of a previously operating machine [used reactor fuel]. But today we know neither the amount in which it is produced nor its properties precisely enough for a completely safe prediction. Since there are some free neutrons in each substance, it would be enough to spatially combine a sufficient amount (probably about 10--100 kg) to ignite the explosive.

Manfred von Ardenne. 1990. Die Erinnerungen. 10th ed. Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms."

Josef Schintlmeister. 7. August 1945. NARA RG 77, Entry UD-22A, Box 167, Folder 32.12-2 GERMANY: Personnel (Jan 45 – Dec 45).

I take tonight's publication of the first technical application of uranium fission [Hiroshima] as an opportunity to inform you that work on this problem was also carried out at the [Vienna] Second Physics Institute during the war. [...] The technical utilization of nuclear energy in uranium fission requires very difficult and very expensive work. With a few kilograms of the new element [plutonium], which is incomparably easier and cheaper to obtain, it will in all likelihood be possible to build a nuclear device without the effort required to date, since it is to be expected that nuclear fission will occur more easily than with uranium and also that considerably more neutrons will be released during fission, so that the chain reaction will proceed smoothly.

Edmund Tilley. Brief Operational Report on [censored] and Other Germans and Italians Connected with Project Abstract. 19 August 1947. NARA RG 319, Entry A1-134A, Box 29, Folder Operation Oberjoch.

25. Prof. Dr. NIELS [Walter Nielsch?], now said to be in the United States, was, according to [censored,] concerned with chemical and atomic problems at TUCHELER HEIDE and produced a number of atomic bombs, weighing from 1 to 5 kilograms. NIELS should be traced and questioned in detail.

So gross wie eine Ananas... *Der Spiegel*, 4 June 1967, pp. 80-93.

[O]n 4 June 1942 Heisenberg was summoned to Berlin for the crucial secret meeting of the German atomic body[.…] So Heisenberg immediately turned to the military applications of nuclear fission—to uranium-235 and to plutonium. When he had finished his paper, a brief dialogue ensued that has been vividly remembered by all present. Milch inquired about the size of a bomb whose effect would be enough to destroy a large city. Heisenberg: "About the size of a pineapple." He referred to the [fissile] explosive charge and demonstrated its size with his hands.

8. German Fission Pit Masses

Erich Schumann, Kurt Diebner, et al. February 1942 [1941 data]. Energiegewinnung aus Uran: Ergebnisse der vom Heereswaffenamt veranlassten Forschungsarbeiten zur Nutzbarmachung von Atomkernenergien. AMPG, I. Abteilung, Rep. 34, Nr. 105.

From U_{238} a substance ("element 94") is formed by the absorption of neutrons, which must be even easier to fission than U_{235}. Since this substance is chemically different from uranium, it must be possible to separate it easily from the uranium of a previously operating machine [used reactor fuel]. But today we know neither the amount in which it is produced nor its properties precisely enough for a completely safe prediction. Since there are some free neutrons in each substance, it would be enough to spatially combine a sufficient amount (probably about 10--100 kg) to ignite the explosive.

Manfred von Ardenne. 1990. Die Erinnerungen. 10th ed. Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms."

Josef Schintlmeister. 7. August 1945. NARA RG 77, Entry UD-22A, Box 167, Folder 32.12-2 GERMANY: Personnel (Jan 45 – Dec 45).

I take tonight's publication of the first technical application of uranium fission [Hiroshima] as an opportunity to inform you that work on this problem was also carried out at the [Vienna] Second Physics Institute during the war. [...] The technical utilization of nuclear energy in uranium fission requires very difficult and very expensive work. With a few kilograms of the new element [plutonium], which is incomparably easier and cheaper to obtain, it will in all likelihood be possible to build a nuclear device without the effort required to date, since it is to be expected that nuclear fission will occur more easily than with uranium and also that considerably more neutrons will be released during fission, so that the chain reaction will proceed smoothly.

Edmund Tilley. Brief Operational Report on [censored] and Other Germans and Italians Connected with Project Abstract. 19 August 1947. NARA RG 319, Entry A1-134A, Box 29, Folder Operation Oberjoch.

25. Prof. Dr. NIELS [Walter Nielsch?], now said to be in the United States, was, according to [censored,] concerned with chemical and atomic problems at TUCHELER HEIDE and produced a number of atomic bombs, weighing from 1 to 5 kilograms. NIELS should be traced and questioned in detail.

So gross wie eine Ananas... *Der Spiegel*, 4 June 1967, pp. 80-93.

[O]n 4 June 1942 Heisenberg was summoned to Berlin for the crucial secret meeting of the German atomic body[….] So Heisenberg immediately turned to the military applications of nuclear fission—to uranium-235 and to plutonium. When he had finished his paper, a brief dialogue ensued that has been vividly remembered by all present. Milch inquired about the size of a bomb whose effect would be enough to destroy a large city. Heisenberg: "About the size of a pineapple." He referred to the [fissile] explosive charge and demonstrated its size with his hands.

A.P.W.I.U. (Ninth Air Force) 96/1945. 19 August 1945. Investigations, Research, Developments, and Practical Use of the German Atomic Bomb. AFHRA B-5737, pp. 340-345.

2. Dr. EDSE, well known chemist, wrote: At the Institute for Physical Chemistry of the Hamburg University I worked on problems concerning nuclear physics under the direction of Prof. Dr. P. HARTECK. […] The disintegration of one kg ^{235}U delivers an amount of energy of (1000/235) x 160 x 23x10^6 kg cal = 1.6x10^{10} kg cal, whereas one kg of TNT only delivers 1000 kg cal when detonating. Out of this follows that an atomic bomb of 3 lbs ^{235}U has the same effect as a bomb of 20,000 tons of TNT.

8. German Fission Pit Masses

Erich Schumann, Kurt Diebner, et al. February 1942 [1941 data]. Energiegewinnung aus Uran: Ergebnisse der vom Heereswaffenamt veranlassten Forschungsarbeiten zur Nutzbarmachung von Atomkernenergien. AMPG, I. Abteilung, Rep. 34, Nr. 105.

From U_{238} a substance ("element 94") is formed by the absorption of neutrons, which must be even easier to fission than U_{235}. Since this substance is chemically different from uranium, it must be possible to separate it easily from the uranium of a previously operating machine [used reactor fuel]. But today we know neither the amount in which it is produced nor its properties precisely enough for a completely safe prediction. Since there are some free neutrons in each substance, it would be enough to spatially combine a sufficient amount (probably about 10--100 kg) to ignite the explosive.

Manfred von Ardenne. 1990. Die Erinnerungen. 10th ed. Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms."

Josef Schintlmeister. 7. August 1945. NARA RG 77, Entry UD-22A, Box 167, Folder 32.12-2 GERMANY: Personnel (Jan 45 – Dec 45).

I take tonight's publication of the first technical application of uranium fission [Hiroshima] as an opportunity to inform you that work on this problem was also carried out at the [Vienna] Second Physics Institute during the war. [...] The technical utilization of nuclear energy in uranium fission requires very difficult and very expensive work. With a few kilograms of the new element [plutonium], which is incomparably easier and cheaper to obtain, it will in all likelihood be possible to build a nuclear device without the effort required to date, since it is to be expected that nuclear fission will occur more easily than with uranium and also that considerably more neutrons will be released during fission, so that the chain reaction will proceed smoothly.

Edmund Tilley. Brief Operational Report on [censored] and Other Germans and Italians Connected with Project Abstract. 19 August 1947. NARA RG 319, Entry A1-134A, Box 29, Folder Operation Oberjoch.

25. Prof. Dr. NIELS [Walter Nielsch?], now said to be in the United States, was, according to [censored,] concerned with chemical and atomic problems at TUCHELER HEIDE and produced a number of atomic bombs, weighing from 1 to 5 kilograms. NIELS should be traced and questioned in detail.

So gross wie eine Ananas... *Der Spiegel*, 4 June 1967, pp. 80-93.

[O]n 4 June 1942 Heisenberg was summoned to Berlin for the crucial secret meeting of the German atomic body[….] So Heisenberg immediately turned to the military applications of nuclear fission—to uranium-235 and to plutonium. When he had finished his paper, a brief dialogue ensued that has been vividly remembered by all present. Milch inquired about the size of a bomb whose effect would be enough to destroy a large city. Heisenberg: "About the size of a pineapple." He referred to the [fissile] explosive charge and demonstrated its size with his hands.

A.P.W.I.U. (Ninth Air Force) 96/1945. 19 August 1945. Investigations, Research, Developments, and Practical Use of the German Atomic Bomb. AFHRA B-5737, pp. 340-345.

2. Dr. EDSE, well known chemist, wrote: At the Institute for Physical Chemistry of the Hamburg University I worked on problems concerning nuclear physics under the direction of Prof. Dr. P. HARTECK. […] The disintegration of one kg ^{235}U delivers an amount of energy of (1000/235) x 160 x 23x10^6 kg cal = 1.6x10^{10} kg cal, whereas one kg of TNT only delivers 1000 kg cal when detonating. Out of this follows that an atomic bomb of 3 lbs ^{235}U has the same effect as a bomb of 20,000 tons of TNT.

OSS. 19 September 1943. NARA RG 226, Entry 125, Box 6, Folder 78.

Our sources claim that there are large explosives factories in Hiltersheim, Magdeburg district. These factories are said to have been moved here from Ludwigshafen. They are located in underground, bomb-proof facilities. A special substance is produced here which is said to have an enormous explosive effect. […] With one kilogram, everything within a radius of approximately four kilometers should be literally razed away, or disintegrated to dust and ashes.

8. German Fission Pit Masses

Erich Schumann, Kurt Diebner, et al. February 1942 [1941 data]. Energiegewinnung aus Uran: Ergebnisse der vom Heereswaffenamt veranlassten Forschungsarbeiten zur Nutzbarmachung von Atomkernenergien. AMPG, I. Abteilung, Rep. 34, Nr. 105.

From U_{238} a substance ("element 94") is formed by the absorption of neutrons, which must be even easier to fission than U_{235}. Since this substance is chemically different from uranium, it must be possible to separate it easily from the uranium of a previously operating machine [used reactor fuel]. But today we know neither the amount in which it is produced nor its properties precisely enough for a completely safe prediction. Since there are some free neutrons in each substance, it would be enough to spatially combine a sufficient amount (probably about 10--100 kg) to ignite the explosive.

Manfred von Ardenne. 1990. Die Erinnerungen. 10th ed. Herbig. p. 159.

During visits to Dahlem and Lichterfelde in 1941, I had asked Professor Otto Hahn how many grams of pure uranium-235 would be needed to unleash a nuclear chain reaction in an instant. He answered me: "A few kilograms."

Josef Schintlmeister. 7. August 1945. NARA RG 77, Entry UD-22A, Box 167, Folder 32.12-2 GERMANY: Personnel (Jan 45 – Dec 45).

I take tonight's publication of the first technical application of uranium fission [Hiroshima] as an opportunity to inform you that work on this problem was also carried out at the [Vienna] Second Physics Institute during the war. [...] The technical utilization of nuclear energy in uranium fission requires very difficult and very expensive work. With a few kilograms of the new element [plutonium], which is incomparably easier and cheaper to obtain, it will in all likelihood be possible to build a nuclear device without the effort required to date, since it is to be expected that nuclear fission will occur more easily than with uranium and also that considerably more neutrons will be released during fission, so that the chain reaction will proceed smoothly.

Edmund Tilley. Brief Operational Report on [censored] and Other Germans and Italians Connected with Project Abstract. 19 August 1947. NARA RG 319, Entry A1-134A, Box 29, Folder Operation Oberjoch.

25. Prof. Dr. NIELS [Walter Nielsch?], now said to be in the United States, was, according to [censored,] concerned with chemical and atomic problems at TUCHELER HEIDE and produced a number of atomic bombs, weighing from 1 to 5 kilograms. NIELS should be traced and questioned in detail.

So gross wie eine Ananas... *Der Spiegel*, 4 June 1967, pp. 80-93.

[O]n 4 June 1942 Heisenberg was summoned to Berlin for the crucial secret meeting of the German atomic body[….] So Heisenberg immediately turned to the military applications of nuclear fission—to uranium-235 and to plutonium. When he had finished his paper, a brief dialogue ensued that has been vividly remembered by all present. Milch inquired about the size of a bomb whose effect would be enough to destroy a large city. Heisenberg: "About the size of a pineapple." He referred to the [fissile] explosive charge and demonstrated its size with his hands.

A.P.W.I.U. (Ninth Air Force) 96/1945. 19 August 1945. Investigations, Research, Developments, and Practical Use of the German Atomic Bomb. AFHRA B-5737, pp. 340-345.

2. Dr. EDSE, well known chemist, wrote: At the Institute for Physical Chemistry of the Hamburg University I worked on problems concerning nuclear physics under the direction of Prof. Dr. P. HARTECK. […] The disintegration of one kg ^{235}U delivers an amount of energy of (1000/235) x 160 x 23×10^6 kg cal = 1.6×10^{10} kg cal, whereas one kg of TNT only delivers 1000 kg cal when detonating. Out of this follows that an atomic bomb of 3 lbs ^{235}U has the same effect as a bomb of 20,000 tons of TNT.

OSS. 19 September 1943. NARA RG 226, Entry 125, Box 6, Folder 78.

Our sources claim that there are large explosives factories in Hiltersheim, Magdeburg district. These factories are said to have been moved here from Ludwigshafen. They are located in underground, bomb-proof facilities. A special substance is produced here which is said to have an enormous explosive effect. […] With one kilogram, everything within a radius of approximately four kilometers should be literally razed away, or disintegrated to dust and ashes.

Erich Rundnagel, in: Gerhardt Remdt and Gunter Wermusch. 2006. *Rätsel Jonastal.* 2nd ed. Meiningen: Heinrich Jung. pp. 125-126.

I was mainly involved with Dr. Rehbein and engineer Rackwitz, with whom I came into a kind of relationship of trust. […] Then he told me that something was being developed here that had a greater explosive power than anything I could imagine as an old pioneer. Rehbein just smiled and said the whole bomb was only a few decimeters tall, but weighs about eight kilograms. When I asked him if I could see the thing, he waved it off: "That could cost us both our heads."

Critical Masses and Radii for Different Fission Fuels and Conditions

Conditions	Uranium-233	Uranium-235	Neptunium-237	Plutonium-239
No reflector **No compression** **No fusion**	14.2 kg 5.676 cm	45.9 kg 8.37 cm	25.92 kg 6.736 cm	16.7 kg 6.346 cm
Reflector **No compression** **No fusion**	3.55 kg 3.58 cm	11.5 kg 5.27 cm	6.48 kg 4.24 cm	4.18 kg 4.00 cm
No reflector **Compression** **No fusion**	1.58 kg 2.73 cm (before compression)	5.10 kg 4.02 cm (before compression)	2.88 kg 3.24 cm (before compression)	1.86 kg 3.05 cm (before compression)
Reflector **Compression** **No fusion**	0.394 kg 1.72 cm (before compression)	1.28 kg 2.53 cm (before compression)	0.720 kg 2.04 cm (before compression)	0.464 kg 1.92 cm (before compression)
Reflector **Compression** **Fusion neutrons**	<0.394 kg <1.72 cm (before compression)	<1.28 kg <2.53 cm (before compression)	<0.720 kg <2.04 cm (before compression)	<0.464 kg <1.92 cm (before compression)

Based on critical masses and spherical radii with no reflector, no compression, and no fusion [Bruce Cameron Reed, 2011, *The Physics of the Manhattan Project,* 2nd ed., Berlin: Springer, p. 46].

Reflector/tamper reduces critical mass by a factor of 4 [Robert Serber, 1992, *The Los Alamos Primer,* Berkeley: University of California Press, p. 31].

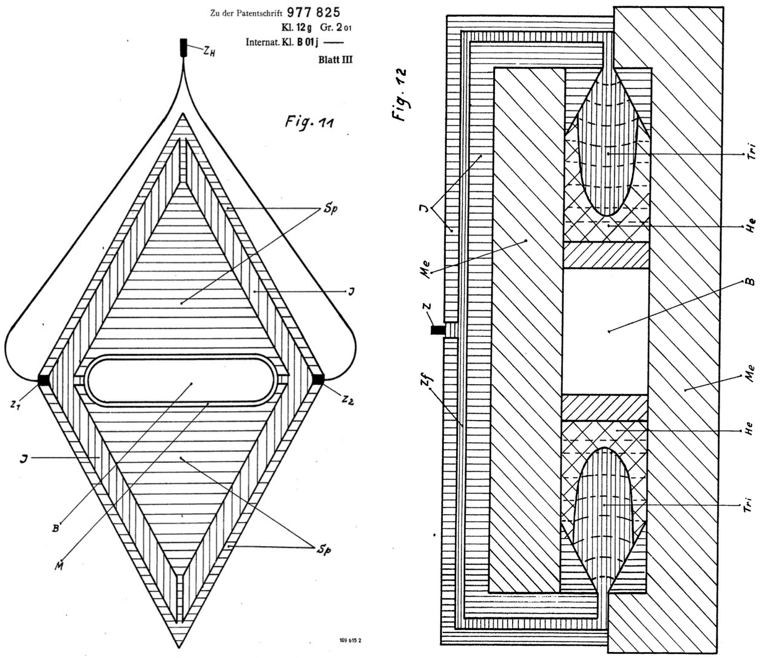
Shock compression reduces critical mass by a factor of 9 [Carey Sublette, 2019, *The Nuclear Weapon Archive,* Section 2.1.4, nuclearweaponarchive.org].

Coupled fusion and fission reactions further improve performance [Friedwardt Winterberg, 2010, *The Release of Thermonuclear Energy by Inertial Confinement,* Singapore: World Scientific, pp. 36, 206-208].

8. Fission Bomb, Mass ~300 kg, Yield <1 kT, Tested 1944-45?

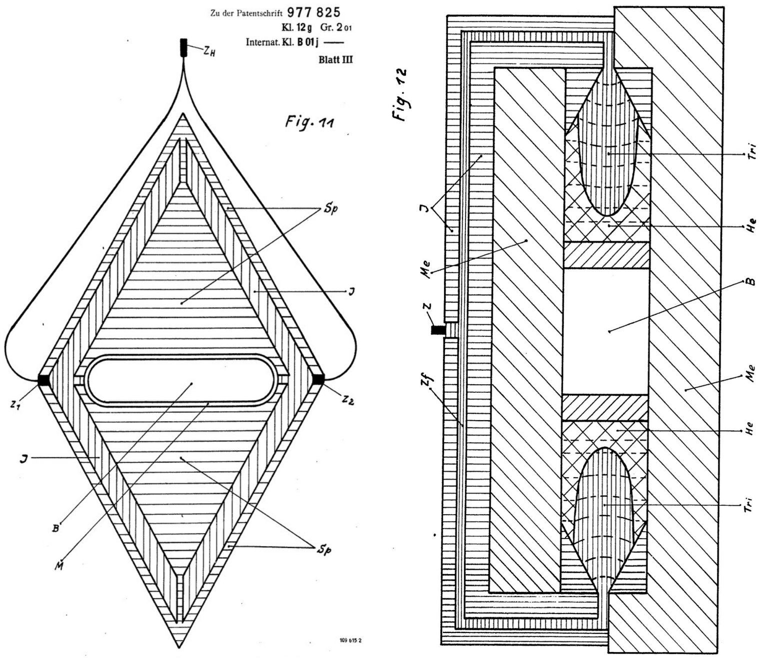
8. Fission Bomb, Mass ~300 kg, Yield <1 kT, Tested 1944-45?

Erich Schumann and Walter Trinks. DE977825.



8. Fission Bomb, Mass ~300 kg, Yield <1 kT, Tested 1944-45?

Erich Schumann and Walter Trinks. DE977825.

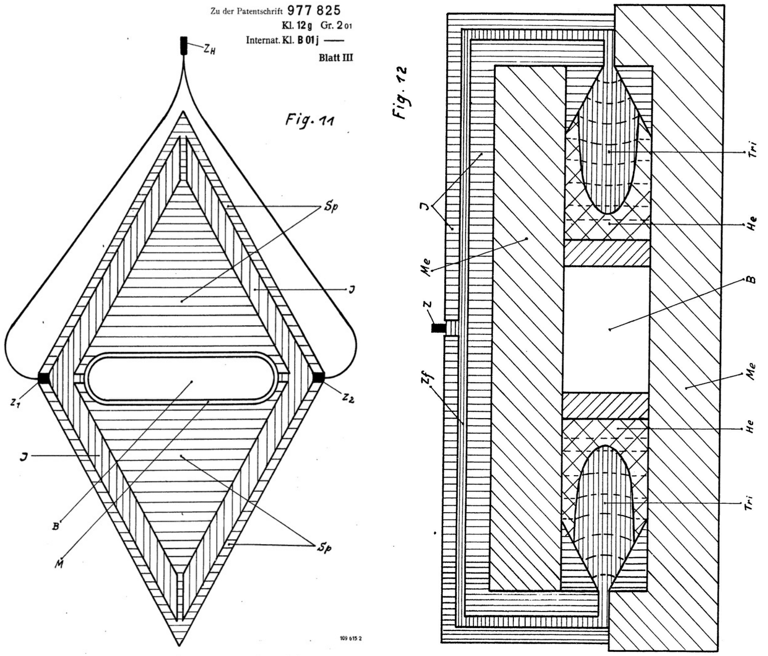


T. J. Betts and R. P. Linstead. 15 Sept. 1945. AFHRA A5186 pp. 904–1026.

Certain items have been omitted because of security considerations… Of particular significance were the statements, made by German experts in the rocket and controlled missile field, that much of the priority accorded their work by the German High Command was in anticipation of the use of atomic explosives. These authorities stated that KWI had repeatedly assured Hitler that an atomic explosive would be available for use within a comparatively short time. During the last months of work by the Peenemünde staff, V-weapons were designed with much smaller war-heads. Quite possibly this trend was in anticipation of the successful development of a German atomic explosive.

8. Fission Bomb, Mass ~300 kg, Yield <1 kT, Tested 1944-45?

Erich Schumann and Walter Trinks. DE977825.



T. J. Betts and R. P. Linstead. 15 Sept. 1945. AFHRA A5186 pp. 904–1026.

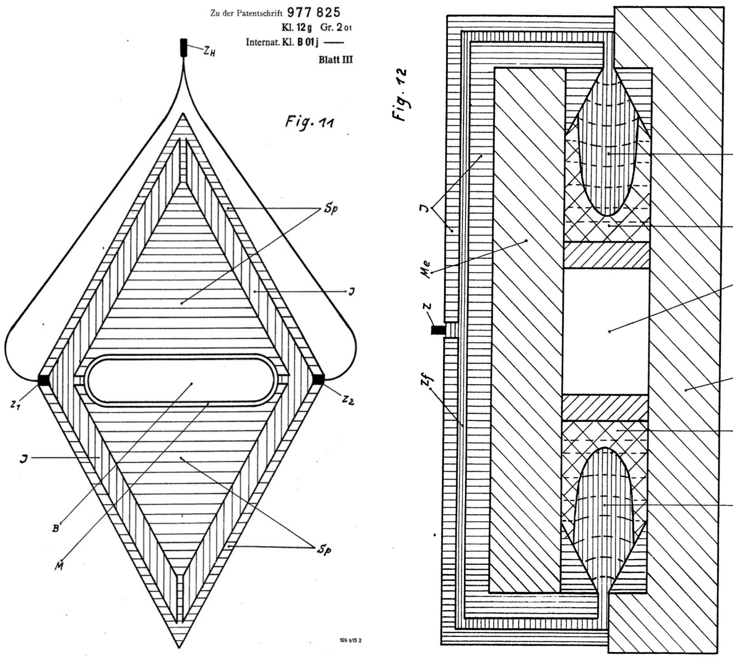
Certain items have been omitted because of security considerations… Of particular significance were the statements, made by German experts in the rocket and controlled missile field, that much of the priority accorded their work by the German High Command was in anticipation of the use of atomic explosives. These authorities stated that KWI had repeatedly assured Hitler that an atomic explosive would be available for use within a comparatively short time. During the last months of work by the Peenemünde staff, V-weapons were designed with much smaller war-heads. Quite possibly this trend was in anticipation of the successful development of a German atomic explosive.

Werner Grothmann. 2002. pp. 9, 18.

What I know is the actual preparation for the prototype production of the two fully constructed atomic bomb types for uranium and plutonium… I was not allowed to know anything about it, so I can only say that there were two standard types for use against cities and two more of a different size, which were supposed to be tactical and contain smaller charges. I learned only after the war that one of the two smaller ones would have had a charge equivalent, that is a comparable explosive material quantity, of I believe 130 tons. This was supposed to be used against railway tunnels, port facilities and military installations. The point was that the small weapons required only very little material, which overcame first of all the shortage [of fission fuel]… I know that the smaller was about the size of the SC 250, but the weight was higher.

8. Fission Bomb, Mass ~300 kg, Yield <1 kT, Tested 1944-45?

Erich Schumann and Walter Trinks. DE977825.



T. J. Betts and R. P. Linstead. 15 Sept. 1945. AFHRA A5186 pp. 904–1026.

Certain items have been omitted because of security considerations… Of particular significance were the statements, made by German experts in the rocket and controlled missile field, that much of the priority accorded their work by the German High Command was in anticipation of the use of atomic explosives. These authorities stated that KWI had repeatedly assured Hitler that an atomic explosive would be available for use within a comparatively short time. During the last months of work by the Peenemünde staff, V-weapons were designed with much smaller war-heads. Quite possibly this trend was in anticipation of the successful development of a German atomic explosive.

Werner Grothmann. 2002. pp. 9, 18.

What I know is the actual preparation for the prototype production of the two fully constructed atomic bomb types for uranium and plutonium… I was not allowed to know anything about it, so I can only say that there were two standard types for use against cities and two more of a different size, which were supposed to be tactical and contain smaller charges. I learned only after the war that one of the two smaller ones would have had a charge equivalent, that is a comparable explosive material quantity, of I believe 130 tons. This was supposed to be used against railway tunnels, port facilities and military installations. The point was that the small weapons required only very little material, which overcame first of all the shortage [of fission fuel]… I know that the smaller was about the size of the SC 250, but the weight was higher.

SECRET

Distribution: 27 Mar 45
Mr Merck
Lt Col Cole (2)
SGO
NDD
OSS
OSRD
ETOUSA
Col Paget
Dr. Maas
Scien.Br.
Col Pash

WAR DEPARTMENT
Military Intelligence Service
Washington

26 March 1945

BW INFORMATION

SOURCE: MFIU No 1, 13 March 45, (From CPM) PW Intelligence Bulletin No 1/47 Desperation Warfare

EXTRACT

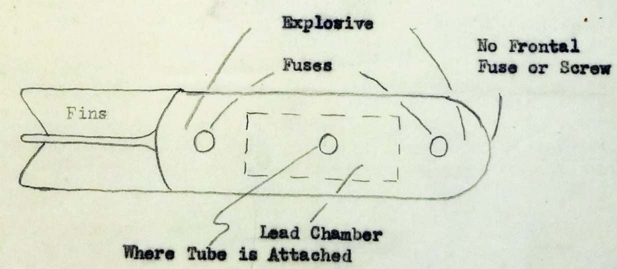
* * * * * * * * *

16. Microbe Bombs

PW (captured 1 Mar vic AMMERN) saw appr one hundred 250 kg bombs stored in a hall at Flughorst Ost, MAGDELBURG. PW was told that these were microbe bombs.

As described to PW, the bomb has two detonating chambers (one in front and one in back) with 2 side fuzes. In the center of the shell is an empty lead lined chamber with threaded opening on the side into which a tube is screwed. The opening has 8 threads and when the tube is screwed into the last thread it is opened and the microbes which have been stored in the tube escape into the chamber. The opening is smeared with a gelatinous substance to prevent the escape of germs.

PW thinks the germs are of cholera type.



* * * * * * * * *

G-2 COMMENT:

This (250kg) seems quite large for a single BW bomb. Further interrogation is contemplated, and information will be forwarded.

NARA RG 165, Entry NM84-187, Box 137, Folder BW 55

DECLASSIFIED
Authority NND 750122

Small prolate warhead with two-point ignition, similar to (but less powerful than) postwar U.S. designs such as W45.

For more information, see *Forgotten Creators* D.8, D.15.

8. Fission Bomb Design: 23 March 1945 Letter from General Ivan Ilyichev (Head of GRU) to Joseph Stalin

НАРОДНЫЙ КОМИССАРИАТ ОБОРОНЫ СОЮЗА ССР

ГЛАВНОЕ РАЗВЕДЫВАТЕЛЬНОЕ УПРАВЛЕНИЕ КРАСНОЙ АРМИИ

3 марта 1945

№ [illegible]

г. Москва

Вх. № [illegible]

НАЧАЛЬНИКУ ГЕНЕРАЛЬНОГО ШТАБА КРАСНОЙ АРМИИ

ГЕНЕРАЛУ АРМИИ тов. АНТОНОВУ

Докладываю:

Наш достоверный источник из Германии сообщает:

"Немцы в последнее время произвели два взрыва бомбы большой мощности в Тюрингии. Взрывы произошли в лесной местности в обстановке строжайшей секретности. От центра взрыва деревья повалены на расстоянии 500-600 метров. Уничтожены специально построенные для опытов укрепления и сооружения. Находящиеся в центре взрыва военнопленные погибли, причем зачастую от них не осталось следов. Военнопленные, находящиеся за центром взрыва, имеют ожоги лица и тела, сила которых зависит от расстояния от центра взрыва. Испытания проводились в максимально глухом районе. На объектах испытания режим секретности максимальный. Въезды и выезды разрешены только по особому удостоверению. Команды СС оцепили район испытания и опрашивали каждого приближающегося к этому району человека. Бомба предположительно снаряженная ураном 235 массой около двух тонн была привезена в место взрыва на специальной [illegible] платформе. Вместе с ней были доставлены цистерны с жидким кислородом. При бомбе постоянно находились 20 человек охраны с собаками. Взрыв бомбы сопровождался образованием взрывной волны большой мощности, развитием высокой температуры. Кроме этого наблюдался мощный радиоактивный эффект. Бомба представляет из себя шар диаметром

-2-

130 см.

Бомба состоит из:

1. Высоковольтной разрядной трубки, [illegible] от специальных генераторов
2. Шара, состоящего из металлического урана [illegible]
3. Замедлителя
4. Защитного футляра
5. Взрывчатого вещества
6. Детонаторного устройства
7. Оболочки из стали

Все части бомбы вставляются друг в друга.

Инициатор или запал бомбы.

Состоит из специальной трубки, кото[illegible]ет быстрые нейтроны. Ее питают специал[illegible]торы создающие в трубке высокое напряжение [illegible] результате быстрые нейтроны атакуют акти[illegible] материал.

Активный материал бомбы.

Активным материалом бомбы является уран [illegible] Он представляет из себя шар, внутрь которого через отверстие вставляется инициатор. Отверстие после этого закрывается пробкой, сделанной из урана 235.

Защитный футляр.

Шар из урана закрывается защитным [illegible] из алюминия, покрытого слоем кадмия. [illegible] но задерживают тепловые нейтроны, [illegible] урана 235, которые могут вызвать преждевременную детонацию.

Взрывчатое вещество.

После слоя кадмия помещается взрывчатое вещество, состоящее из пористого тринитротолуола,

-3-

пропитанного жидким кислородом.

Тринитротолуол состоит из брусков, специально подобранной формы. Внутренняя поверхность брусков имеет сферический диаметр, совпадающий с наружной поверхностью кадмия. К каждому из брусков подведен один детонатор с двумя электрозапалами.

Оболочка.

Тринитротолуол покрыт защитной оболочкой из легкого алюминиевого сплава. Сверху на эту оболочку крепится подрывное устройство.

Наружная оболочка.

Сверху подрывного устройства устанавливается наружная оболочка из бронированной стали.

Обтекатель.

На бронированную оболочку может устанавливаться обтекатель легкого сплава, для последующей установки бомбы на ракетном двигателе типа "ФАУ".

Сборка бомбы.

Шар, состоящий из металлического урана, помещается внутрь защитного футляра, состоящего из алюминия, покрытого слоем кадмия, так чтобы отверстие в шаре совпадало с отверстием в футляре. Через это отверстие вставляется инициатор после чего отверстие закрывается пробкой из урана. После этого алюминиевый шар, покрытый кадмием, закрывается пробкой, на которую сверху кладется последний брусок тринитротолуола. Далее в отверстие в защитной оболочке закрывающее тринитротолуол, закачивается жидкий кислород.

После чего бомба готова к работе.

Запал бомбы.

Запал бомбы осуществляется [illegible] высоковольтной разрядной трубки. Она [illegible] поток нейтронов, атакующий активный [illegible] В процессе воздействия на уран потока [illegible] из него выделяется элемент 93, который [illegible] возникновение цепной реакции. Далее, под[illegible] устройство взрывает взрывчатое вещество [illegible] это происходит направленный к центру [illegible] взрыва наружного слоя тринитротолуола в [illegible] с жидким кислородом. Это позволяет перевести уран 235 через критическую массу. Предположительно перед взрывом, урановый шар облучают [illegible] с энергией не [illegible] 6 миллионов электрон[illegible] что многократно повышает его взрывн[illegible]

ЗАКЛЮЧЕНИЕ.

Несомненно, немцами производятся [illegible] бомбы большой разрушительной силы. В случае успешного окончания и производства подобных бомб в достаточном количестве они будут обладать оружием, способным замедлить наше наступление".

НАЧАЛЬНИК ГЛ. РАЗВЕДУПРАВЛЕНИЯ КРАСНОЙ АРМИИ
ГЕНЕРАЛ-ЛЕЙТЕНАНТ

Отпеч. 4 экз.
Экз. № 1 - т. Сталину
-"- № 2 - т. Молотову
-"- № 3 - т. Антонову
-"- № 4 - в дело
16л.

Archive of the President of the Russian Federation, Fund 93, Division 81 (45), List 37. Found in 2003 by Rainer Karlsch.

The letter appears to be genuine. It is part of a paper trail of earlier and later documents, some of which were already published.

8. Fission Bomb Design: Ilyichev to Stalin, 23 March 1945

Our trustworthy source from Germany reports:

The Germans have in recent times carried out two large-capacity bomb explosions in Thuringia. The explosions took place in a forest area, under conditions of strictest secrecy. Trees fell at a distance of 500–600 meters from the center of the explosion. Buildings and fortifications specially constructed for the tests have been destroyed.

Prisoners of war who were near the epicenter of the explosion died, often without leaving a trace. Prisoners of war who were in the area beyond the center of the explosion have burns on their face and body, the strength of which depends on their position in relation to the epicenter of the explosion. The tests were carried out in a remote deserted area. The regime of secrecy at the test site was at maximum level. Entrance and exit from the territory are by special pass only. SS soldiers have surrounded the area of tests and interrogated any person approaching the area.

The bomb, supposedly filled with uranium 235 and weighing approximately two tons, was brought to the test site on a specially constructed truck. Dewars of liquid oxygen were delivered together with it. The bomb was permanently guarded by 20 guards with dogs. The bomb explosion was accompanied by a large explosive wave and high temperature. In addition, a massive radioactive effect was observed. The bomb is a sphere with a diameter of 130 cm.

The bomb consists of:

1. High-voltage discharge tube, which is charged by special generators
2. A sphere made of metal uranium 235
3. A delay mechanism [tamper]
4. Protective casing
5. Explosive substance
6. Detonating mechanism
7. Steel casing

All parts of the bomb fit inside each other.

8. Fission Bomb Design: Ilyichev to Stalin, 23 March 1945

Initiator or bomb fuse.

Consists of a special tube, which creates fast neutrons. It is charged by special generators, which create high voltage inside the tube. As a result, fast neutrons attack active material.

Active bomb material.

Active bomb material is uranium 235. It represents a sphere with an opening into which an initiator is inserted. Once this is done, the opening is sealed by a cork made of uranium 235.

Protective casing.

The uranium sphere is encased in a protective aluminum casing, which is covered by a layer of cadmium. This significantly impedes thermal neutrons emanating from uranium 235, which can cause premature detonation.

Explosive matter.

After the layer of cadmium it is placed inside explosives that consist of porous TNT saturated with liquid oxygen; TNT is made up of bars of a specially chosen shape. The inner surface of the bars has a spherical curvature, which is the same as that of the external surface of the cadmium layer. Each of the bars is supplied with one detonator or two electrical fuses.

Casing.

TNT is covered by a protective layer made of a light aluminum alloy. A blasting mechanism is attached on top of this casing.

Exterior casing.

An exterior casing of armored steel is installed above the blasting mechanism.

Fairing.

A fairing made of a light alloy can be installed on top of the armored casing for future installation on a rocket of the V-type.

Bomb assembly.

The sphere, which consists of metal uranium, is placed inside a protective casing, which consists of aluminum, covered in a layer of cadmium, so that the opening in the

8. Fission Bomb Design: Ilyichev to Stalin, 23 March 1945

sphere coinciding with the opening is sealed off by a uranium cork. After this the aluminum sphere, covered in cadmium, is sealed off by a cork, on top of which the last bar of TNT is placed. Next, liquid oxygen is pumped through the opening inside a protective casing, which covers the TNT. After this the bomb is ready for deployment.

Bomb ignition.

The bomb ignition is carried out with the help of a high-voltage discharge tube. It forms a flow of neutrons, which attack the active material. When the flow of neutrons impacts upon uranium, element 93 fissions, which speeds up the creation of a chain reaction. Next, the detonating mechanism detonates the explosive matter, after which a shock from the explosion of the external layer of TNT mixed with liquid oxygen takes place, which is directed toward the center. This allows the uranium to reach a critical mass.

Ahead of this, before the explosion, the uranium sphere is irradiated with gamma-rays, the energy of which does not exceed 6 million electron volts, which many times increases its explosive qualities.

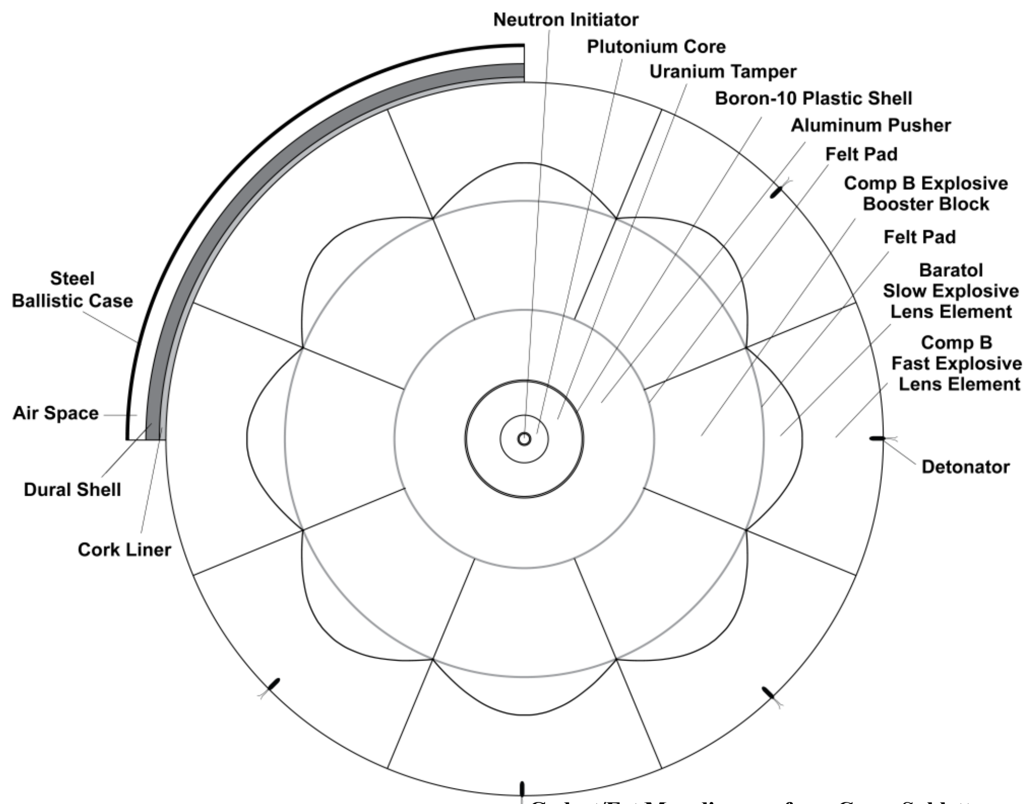
CONCLUSION.

Without doubt, the Germans are carrying out tests of a bomb of high destructive force. In the event of their successful conclusion and production of such bombs in sufficient quantities, they will have weapons capable of slowing down our advance.

Marshal Georgy Zhukov. 2 October 1945. Report to Joseph Stalin. Archive of the President of the Russian Federation, Fund 93, Division 77 (45), List 4-11. Based on the collected materials, it can be concluded that the German scientists in the field of theoretical and practical research and application of atomic energy have achieved good results up to the creation of the atomic bomb.

8. Fission Bomb, Mass 2000 kg, Yield 10s of kT, Tested 1944-45

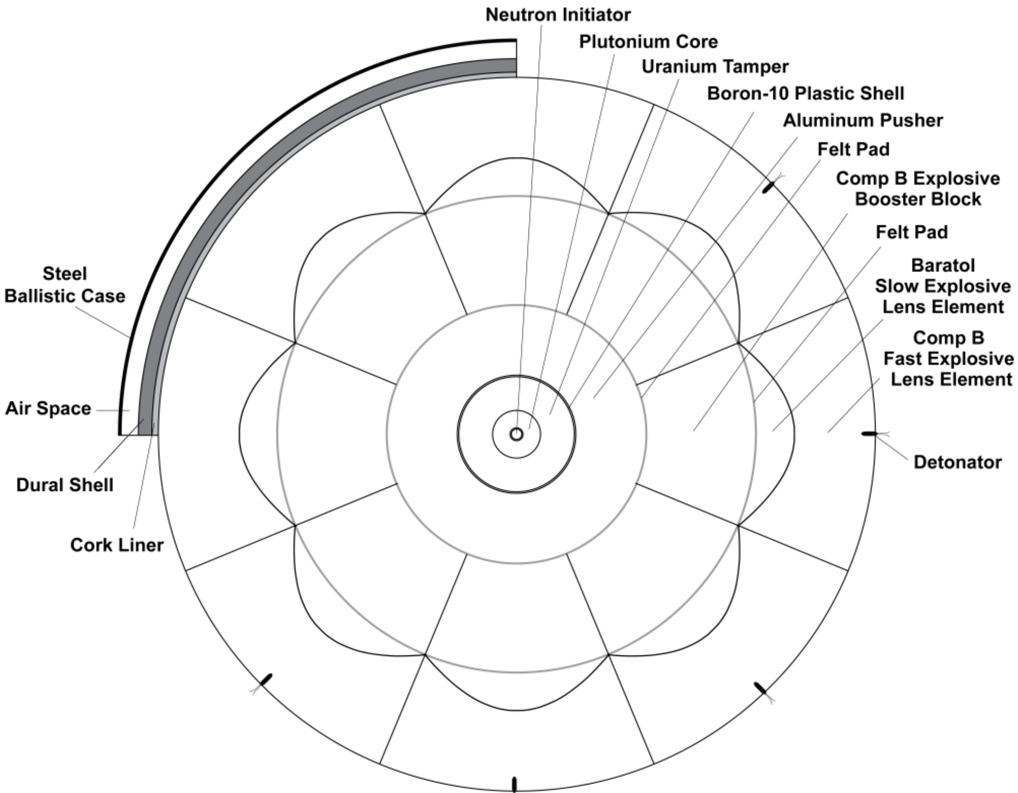
8. Fission Bomb, Mass 2000 kg, Yield 10s of kT, Tested 1944-45



Gadget/Fat Man diagram from Carey Sublette
nuclearweaponarchive.org/Nwfaq/Gadget2_sm.png

Component	Gadget/Fat Man
Neutron initiator	~ 7 g beryllium/polonium-210 "urchin" 1.25 cm radius
Pit	6.2 kg ^{239}Pu 4.6 cm radius
Tamper/ reflector	108 kg natural U 11.1 cm radius
Neutron absorber	Boron-10 plastic 3.2 mm thick
Pusher	130 kg aluminum 23.5 cm radius
Explosive	Composition B and baratol 2500 kg, segmented ~ 70 cm radius
Explosive case	~ 180 kg aluminum 72.5 cm radius
Ballistic case	Steel 4.5 mm thick 75 cm radius
Overall radius	75 cm
Total mass	3000 kg (bomb only) 4670 kg (with shell and fins)
Delivery system	Boeing B-29 heavy bomber
Explosive yield	20 kilotons

8. Fission Bomb, Mass 2000 kg, Yield 10s of kT, Tested 1944-45



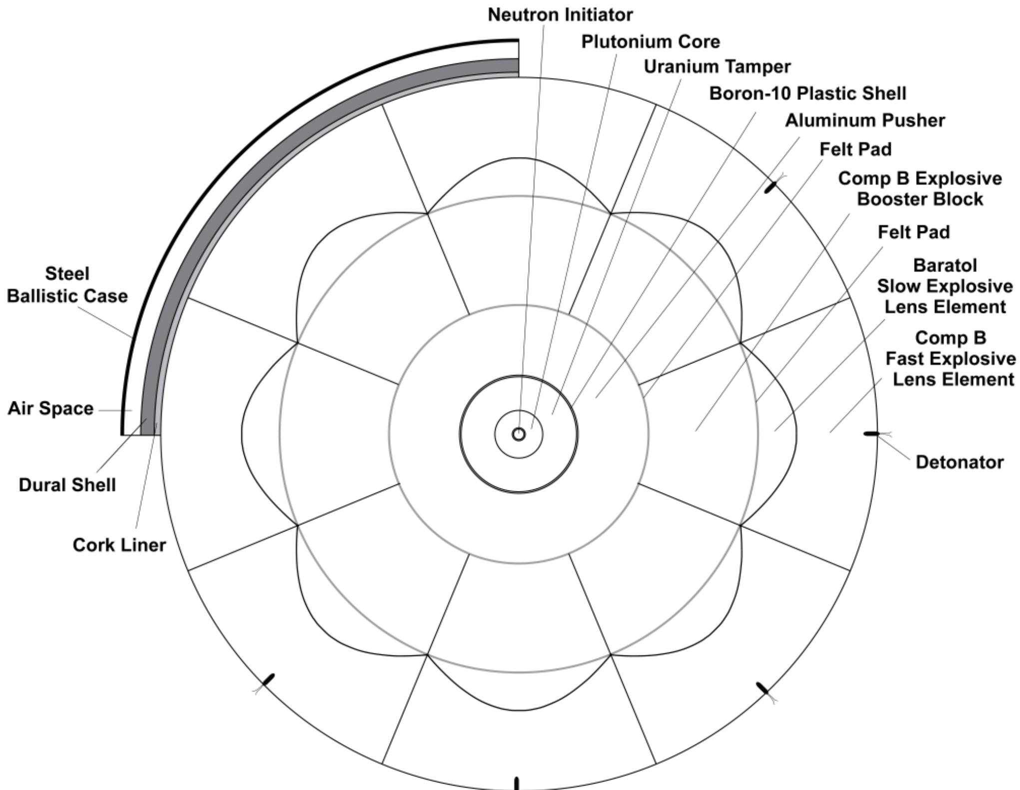
Gadget/Fat Man diagram from Carey Sublette
nuclearweaponarchive.org/Nwfaq/Gadget2_sm.png

Component	Gadget/Fat Man	Thuringian Device
Neutron initiator	~ 7 g beryllium/polonium-210 "urchin" 1.25 cm radius	Deuterium + lithium with high voltage ~ 1.25 cm radius and/or external 6 MeV betatron
Pit	6.2 kg ^{239}Pu 4.6 cm radius	**For test:** ~1 kg inner layer of ^{235}U with ~ 5–10 kg natural or low-enriched U outer layer **For deployment:** ~ 5–10 kg ^{235}U ~ 5 cm radius
Tamper/ reflector	108 kg natural U 11.1 cm radius	~ 100 kg natural U ~ 11 cm radius
Neutron absorber	Boron-10 plastic 3.2 mm thick	~ 1.3 kg cadmium ~ 1 mm thick
Pusher	130 kg aluminum 23.5 cm radius	~ 130 kg aluminum ~ 23 cm radius
Explosive	Composition B and baratol 2500 kg, segmented ~ 70 cm radius	TNT, RDX, and liquid oxygen ~ 1400 kg, segmented ~ 63 cm radius
Explosive case	~ 180 kg aluminum 72.5 cm radius	~ 140 kg aluminum ~ 64 cm radius
Ballistic case	Steel 4.5 mm thick 75 cm radius	~ 190 kg steel ~ 4.5 mm thick 65 cm radius
Overall radius	75 cm	~ 65 cm
Total mass	3000 kg (bomb only) 4670 kg (with shell and fins)	~ 2000 kg
Delivery system	Boeing B-29 heavy bomber	A-4, A-9, or A-9/A-10 ballistic missile
Explosive yield	20 kilotons	**For test:** < 1 kiloton **For deployment:** ~ 5–100 kilotons

Sources:

J. C. Clark. 18 September 1945. KO-29365. NARA RG 77, Entry UD-22A, Box 165, Alsos Material.
Kurt Diebner. Patent GB 841,387. 30 November 1956.
Kurt Diebner. 1962. *Kerntechnik* 4:3:89-93.
Werner Grothmann, 2002. Jonastalverein Archive, Arnstadt. pp. 9, 18.
Gottfried Guderley. 1942. *Luftfahrtforschung*, 19:302.
Caperton Horsley. 1945. CIOS XXVIII-31. Investigation of the X-Ray Industry in Germany.
Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.
Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.
Irene König. 16 July 2004 interview by Heiko Petermann.
Igor Kurchatov. 30 March 1945. APRF, Fund 93, Division 81 (45), List 24-25.
Frederick Loofbourow. 28 Oct. 1943. NARA RG 226, Entry 125, Box 6, Folder 78.
Ordnance Technical Intelligence. Aug. 1945. NARA RG 498, Microfilm MP63-9_0137, frames 623-626.
Erwin Respondek. 6 November 1945. NARA RG 226, Entry A1-210, Box 447, Folder WN 16162-16171.
Erich Rundnagel, in Remdt and Wermusch. 2006. *Rätsel Jonastal*. 2nd ed. Heinrich Jung. pp. 125-126.
Erich Schumann. 2 October 1940. Bundesarchiv Militárarchiv Freiburg N822/17.
Erich Schumann. 1943. HEC 5919. Imperial War Museum Duxford Archive.
Erich Schumann and Gerd Hinrichs. 1943. HEC 2590. Imperial War Museum Duxford.
Erich Schumann to Ernst Telschow. 2 April 1948. AMPG, Abt. III, Rep. 83, Nr. 286.
Erich Schumann and Walter Trinks. Patent DE977825. 13 August 1952.
Erich Schumann and Walter Trinks. Patent DE977863. 13 August 1952.
Walter Trinks. 1945. NARA RG 319, Entry A1-134B, Folder XE098301 Trinks, Walter.
Walter Trinks. Patent DE977839. 13 August 1952.
Walter Trinks. Patent DE977862. 13 August 1952.
U.S. Embassy Warsaw. 7 March 1946. NARA RG 77, Entry UD-22A, Box 160, Folder 205.2.
Germans Are Still Striving to Perfect New V Weapons. *New York Times*. 22 October 1944, p. E5.
V-3? *Time*, 27 November 1944, p. 88.

8. Fission Bomb, Mass 2000 kg, Yield 10s of kT, Tested 1944-45



Gadget/Fat Man diagram from Carey Sublette nuclearweaponarchive.org/Nwfaq/Gadget2_sm.png

Component	Gadget/Fat Man	Thuringian Device
Neutron initiator	~ 7 g beryllium/polonium-210 "urchin" 1.25 cm radius	Deuterium + lithium with high voltage ~ 1.25 cm radius and/or external 6 MeV betatron
Pit	6.2 kg ^{239}Pu 4.6 cm radius	**For test:** ~1 kg inner layer of ^{235}U with ~ 5–10 kg natural or low-enriched U outer layer **For deployment:** ~ 5–10 kg ^{235}U ~ 5 cm radius
Tamper/ reflector	108 kg natural U 11.1 cm radius	~ 100 kg natural U ~ 11 cm radius
Neutron absorber	Boron-10 plastic 3.2 mm thick	~ 1.3 kg cadmium ~ 1 mm thick
Pusher	130 kg aluminum 23.5 cm radius	~ 130 kg aluminum ~ 23 cm radius
Explosive	Composition B and baratol 2500 kg, segmented ~ 70 cm radius	TNT, RDX, and liquid oxygen ~ 1400 kg, segmented ~ 63 cm radius
Explosive case	~ 180 kg aluminum 72.5 cm radius	~ 140 kg aluminum ~ 64 cm radius
Ballistic case	Steel 4.5 mm thick 75 cm radius	~ 190 kg steel ~ 4.5 mm thick 65 cm radius
Overall radius	75 cm	~ 65 cm
Total mass	3000 kg (bomb only) 4670 kg (with shell and fins)	~ 2000 kg
Delivery system	Boeing B-29 heavy bomber	A-4, A-9, or A-9/A-10 ballistic missile
Explosive yield	20 kilotons	**For test:** < 1 kiloton **For deployment:** ~ 5–100 kilotons

A number of sources reported at least four successful test explosions from October 1944 to March 1945.

Test explosions were likely kept as small as possible by using just enough fuel to briefly achieve criticality, both to conserve weapons-grade fuel and to minimize the mess made in German territory.

With enough fuel, fielded versions could have had larger explosive yields than the first U.S. fission bombs.

For more information, see *Forgotten Creators* D.8 and D.15.

Sources:

J. C. Clark. 18 September 1945. KO-29365. NARA RG 77, Entry UD-22A, Box 165, Alsos Material.
Kurt Diebner. Patent GB 841,387. 30 November 1956.
Kurt Diebner. 1962. *Kerntechnik* 4:3:89-93.
Werner Grothmann, 2002. Jonastalverein Archive, Arnstadt. pp. 9, 18.
Gottfried Guderley. 1942. *Luftfahrtforschung*, 19:302.
Caperton Horsley. 1945. CIOS XXVIII-31. Investigation of the X-Ray Industry in Germany.
Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.
Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.
Irene König. 16 July 2004 interview by Heiko Petermann.
Igor Kurchatov. 30 March 1945. APRF, Fund 93, Division 81 (45), List 24-25.
Frederick Loofbourow. 28 Oct. 1943. NARA RG 226, Entry 125, Box 6, Folder 78.
Ordnance Technical Intelligence. Aug. 1945. NARA RG 498, Microfilm MP63-9_0137, frames 623-626.
Erwin Respondek. 6 November 1945. NARA RG 226, Entry A1-210, Box 447, Folder WN 16162-16171.
Erich Rundnagel, in Remdt and Wermusch. 2006. *Rätsel Jonastal*. 2nd ed. Heinrich Jung. pp. 125-126.
Erich Schumann. 2 October 1940. Bundesarchiv Militárarchiv Freiburg N822/17.
Erich Schumann. 1943. HEC 5919. Imperial War Museum Duxford Archive.
Erich Schumann and Gerd Hinrichs. 1943. HEC 2590. Imperial War Museum Duxford.
Erich Schumann to Ernst Telschow. 2 April 1948. AMPG, Abt. III, Rep. 83, Nr. 286.
Erich Schumann and Walter Trinks. Patent DE977825. 13 August 1952.
Erich Schumann and Walter Trinks. Patent DE977863. 13 August 1952.
Walter Trinks. 1945. NARA RG 319, Entry A1-134B, Folder XE098301 Trinks, Walter.
Walter Trinks. Patent DE977839. 13 August 1952.
Walter Trinks. Patent DE977862. 13 August 1952.
U.S. Embassy Warsaw. 7 March 1946. NARA RG 77, Entry UD-22A, Box 160, Folder 205.2.
Germans Are Still Striving to Perfect New V Weapons. *New York Times*. 22 October 1944, p. E5.
V-3? *Time*, 27 November 1944, p. 88.

8. Some Manufacturers of Suitable Bomb Components

8. Some Manufacturers of Suitable Bomb Components

D+Li fusion neutron initiator: **C.H.F. Müller (Hamburg) and other suppliers**

CIOS XXVIII-31

Prof. Bierman of A.E.G., in Berlin, was reported to be working on the design of a 20 megavolt betatron.

During the past two years, C. H. F. Muller has constructed and delivered five "neutron generators". Three of these were rated at 1.5 megavolts, one at 1.2 megavolts, and one at .9 megavolts. They have on order, but have not yet completed,

one additional neutron generator rated at .9 megavolts and another rated at 2.4 megavolts. These "neutron generators", or "deutron accelerators", accelerate ionized heavy hydrogen against a beryllium or a lithium target. The neutron output at .9 megavolts when using a beryllium target was estimated to be equivalent to the neutron output of 2 kilograms of radium plus beryllium; when using a lithium target, 3 kilograms; when using a beryllium target at 1.5 megavolts, 13 kilograms; when using a lithium target, 8 kilograms.

The Phillips "cascade" circuit was used for these neutron generators. Although the electrical output of these generators could be as high as 5 ma., the ion source limited this equipment to 0.8 ma. for continuous operation, regardless of voltage.

At 0.8 ma. the ripple was about 1%, at 5 ma., about 5%.

8. Some Manufacturers of Suitable Bomb Components

D+Li fusion neutron initiator: C.H.F. Müller (Hamburg) and other suppliers

Betatron ($e^- \rightarrow \gamma \rightarrow n$) initiator: Siemens-Reiniger (Erlangen) and other suppliers

CIOS XXVIII-31

C. H. F. Muller A.-G., working in cooperation with, and under the direction of, the M. V. Research Association (M. V. Forschungs-Vereign), at Wrist, completed the construction of a 15 megavolt betatron about the first of this year. This betatron operates on 50 cycles. The average current of the high voltage electron beam is approximately .03 microamperes. The output of gamma radiation was reported to be approximately equivalent to one kilogram of radium. This betatron is now installed at Wrist.

In December, 1944, the M. V. Research Association completed the calculations and layouts of a 200 megavolt betatron, to operate on 50 cycles. It was estimated that the average electron beam current of this betatron would be in the order of one milliampere. The total weight was expected to be approximately 30 tons. This betatron was to be constructed by Brown Boveri and Cie A.-G. in Heidelberg. It is understood that Brown Boveri completed detailed construction drawings of this betatron about the first of March of this year.

Dr. W. Müller, of C. H. F. Müller, recently constructed a very small 2 megavolt betatron which weighed less than 100 pounds. This betatron operated on 50 cycles and had a sealed off tube but the output was only sufficient to increase a Geiger counter to about three times its normal rate.

Two betatrons had recently been constructed and were being tested at the Siemens-Reiniger plant in Erlangen. The first of these betatrons to be completed operates on 500 cycles and provides an electron acceleration of 6 megavolts. The second, most recently constructed, betatron operates on 50 cycles and provides an electron acceleration of 7 megavolts. Plans were being made at this plant to construct a 50 cycle, 15 megavolt betatron. Siemens reported that their particular interest in betatron development was in order to provide a means for experimental work with electron beam cancer therapy.

Prof. Bierman of A.E.G., in Berlin, was reported to be working on the design of a 20 megavolt betatron.

During the past two years, C. H. F. Muller has constructed and delivered five "neutron generators". Three of these were rated at 1.5 megavolts, one at 1.2 megavolts, and one at .9 megavolts. They have on order, but have not yet completed,

one additional neutron generator rated at .9 megavolts and another rated at 2.4 megavolts. These "neutron generators", or "deutron accelerators", accelerate ionized heavy hydrogen against a beryllium or a lithium target. The neutron output at .9 megavolts when using a beryllium target was estimated to be equivalent to the neutron output of 2 kilograms of radium plus beryllium; when using a lithium target, 3 kilograms; when using a beryllium target at 1.5 megavolts, 13 kilograms; when using a lithium target, 8 kilograms.

The Phillips "cascade" circuit was used for these neutron generators. Although the electrical output of these generators could be as high as 5 ma., the ion source limited this equipment to 0.8 ma. for continuous operation, regardless of voltage.

At 0.8 ma. the ripple was about 1%, at 5 ma., about 5%.

8. Some Manufacturers of Suitable Bomb Components

D+Li fusion neutron initiator:	**C.H.F. Müller (Hamburg) and other suppliers**
Betatron ($e^- \rightarrow \gamma \rightarrow n$) initiator:	**Siemens-Reiniger (Erlangen) and other suppliers**
Uranium-235 fission pit:	**SS-controlled enrichment sites (discussed earlier)**

CIOS XXVIII-31

C. H. F. Muller A.-G., working in cooperation with, and under the direction of, the M. V. Research Association (M. V. Forschungs-Vereign), at Wrist, completed the construction of a 15 megavolt betatron about the first of this year. This betatron operates on 50 cycles. The average current of the high voltage electron beam is approximately .03 microamperes. The output of gamma radiation was reported to be approximately equivalent to one kilogram of radium. This betatron is now installed at Wrist.

In December, 1944, the M. V. Research Association completed the calculations and layouts of a 200 megavolt betatron, to operate on 50 cycles. It was estimated that the average electron beam current of this betatron would be in the order of one milliampere. The total weight was expected to be approximately 30 tons. This betatron was to be constructed by Brown Boveri and Cie A.-G. in Heidelberg. It is understood that Brown Boveri completed detailed construction drawings of this betatron about the first of March of this year.

Dr. W. Müller, of C. H. F. Müller, recently constructed a very small 2 megavolt betatron which weighed less than 100 pounds. This betatron operated on 50 cycles and had a sealed off tube but the output was only sufficient to increase a Geiger counter to about three times its normal rate.

Two betatrons had recently been constructed and were being tested at the Siemens-Reiniger plant in Erlangen. The first of these betatrons to be completed operates on 500 cycles and provides an electron acceleration of 6 megavolts. The second, most recently constructed, betatron operates on 50 cycles and provides an electron acceleration of 7 megavolts. Plans were being made at this plant to construct a 50 cycle, 15 megavolt betatron. Siemens reported that their particular interest in betatron development was in order to provide a means for experimental work with electron beam cancer therapy.

Prof. Bierman of A.E.G., in Berlin, was reported to be working on the design of a 20 megavolt betatron.

During the past two years, C. H. F. Muller has constructed and delivered five "neutron generators". Three of these were rated at 1.5 megavolts, one at 1.2 megavolts, and one at .9 megavolts. They have on order, but have not yet completed,

one additional neutron generator rated at .9 megavolts and another rated at 2.4 megavolts. These "neutron generators", or "deutron accelerators", accelerate ionized heavy hydrogen against a beryllium or a lithium target. The neutron output at .9 megavolts when using a beryllium target was estimated to be equivalent to the neutron output of 2 kilograms of radium plus beryllium; when using a lithium target, 3 kilograms; when using a beryllium target at 1.5 megavolts, 13 kilograms; when using a lithium target, 8 kilograms.

The Phillips "cascade" circuit was used for these neutron generators. Although the electrical output of these generators could be as high as 5 ma., the ion source limited this equipment to 0.8 ma. for continuous operation, regardless of voltage.

At 0.8 ma. the ripple was about 1%, at 5 ma., about 5%.

8. Some Manufacturers of Suitable Bomb Components

D+Li fusion neutron initiator:	**C.H.F. Müller (Hamburg) and other suppliers**
Betatron ($e^- \rightarrow \gamma \rightarrow n$) initiator:	**Siemens-Reiniger (Erlangen) and other suppliers**
Uranium-235 fission pit:	**SS-controlled enrichment sites (discussed earlier)**
Unenriched uranium tamper:	**Auer/Degussa (Oranienburg and other locations)**

CIOS XXVIII-31

C. H. F. Muller A.-G., working in cooperation with, and under the direction of, the M. V. Research Association (M. V. Forschungs-Vereign), at Wrist, completed the construction of a 15 megavolt betatron about the first of this year. This betatron operates on 50 cycles. The average current of the high voltage electron beam is approximately .03 microamperes. The output of gamma radiation was reported to be approximately equivalent to one kilogram of radium. This betatron is now installed at Wrist.

In December, 1944, the M. V. Research Association completed the calculations and layouts of a 200 megavolt betatron, to operate on 50 cycles. It was estimated that the average electron beam current of this betatron would be in the order of one milliampere. The total weight was expected to be approximately 30 tons. This betatron was to be constructed by Brown Boveri and Cie A.-G. in Heidelberg. It is understood that Brown Boveri completed detailed construction drawings of this betatron about the first of March of this year.

Dr. W. Müller, of C. H. F. Müller, recently constructed a very small 2 megavolt betatron which weighed less than 100 pounds. This betatron operated on 50 cycles and had a sealed off tube but the output was only sufficient to increase a Geiger counter to about three times its normal rate.

Two betatrons had recently been constructed and were being tested at the Siemens-Reiniger plant in Erlangen. The first of these betatrons to be completed operates on 500 cycles and provides an electron acceleration of 6 megavolts. The second, most recently constructed, betatron operates on 50 cycles and provides an electron acceleration of 7 megavolts. Plans were being made at this plant to construct a 50 cycle, 15 megavolt betatron. Siemens reported that their particular interest in betatron development was in order to provide a means for experimental work with electron beam cancer therapy.

Prof. Bierman of A.E.G., in Berlin, was reported to be working on the design of a 20 megavolt betatron.

During the past two years, C. H. F. Muller has constructed and delivered five "neutron generators". Three of these were rated at 1.5 megavolts, one at 1.2 megavolts, and one at .9 megavolts. They have on order, but have not yet completed,

one additional neutron generator rated at .9 megavolts and another rated at 2.4 megavolts. These "neutron generators", or "deutron accelerators", accelerate ionized heavy hydrogen against a beryllium or a lithium target. The neutron output at .9 megavolts when using a beryllium target was estimated to be equivalent to the neutron output of 2 kilograms of radium plus beryllium; when using a lithium target, 3 kilograms; when using a beryllium target at 1.5 megavolts, 13 kilograms; when using a lithium target, 8 kilograms.

The Phillips "cascade" circuit was used for these neutron generators. Although the electrical output of these generators could be as high as 5 ma., the ion source limited this equipment to 0.8 ma. for continuous operation, regardless of voltage.

At 0.8 ma. the ripple was about 1%, at 5 ma., about 5%.

8. Some Manufacturers of Suitable Bomb Components

D+Li fusion neutron initiator:	**C.H.F. Müller (Hamburg) and other suppliers**
Betatron ($e^- \rightarrow \gamma \rightarrow n$) initiator:	**Siemens-Reiniger (Erlangen) and other suppliers**
Uranium-235 fission pit:	**SS-controlled enrichment sites (discussed earlier)**
Unenriched uranium tamper:	**Auer/Degussa (Oranienburg and other locations)**
Cadmium-electroplated aluminum:	**Kampschulte, Blasberg, Wilhelm Meyer, etc.**

C. H. F. Muller A.-G., working in cooperation with, and under the direction of, the M. V. Research Association (M. V. Forschungs-Vereign), at Wrist, completed the construction of a 15 megavolt betatron about the first of this year. This betatron operates on 50 cycles. The average current of the high voltage electron beam is approximately .03 microamperes. The output of gamma radiation was reported to be approximately equivalent to one kilogram of radium. This betatron is now installed at Wrist.

In December, 1944, the M. V. Research Association completed the calculations and layouts of a 200 megavolt betatron, to operate on 50 cycles. It was estimated that the average electron beam current of this betatron would be in the order of one milliampere. The total weight was expected to be approximately 30 tons. This betatron was to be constructed by Brown Boveri and Cie A.-G. in Heidelberg. It is understood that Brown Boveri completed detailed construction drawings of this betatron about the first of March of this year.

Dr. W. Müller, of C. H. F. Müller, recently constructed a very small 2 megavolt betatron which weighed less than 100 pounds. This betatron operated on 50 cycles and had a sealed off tube but the output was only sufficient to increase a Geiger counter to about three times its normal rate.

Two betatrons had recently been constructed and were being tested at the Siemens-Reiniger plant in Erlangen. The first of these betatrons to be completed operates on 500 cycles and provides an electron acceleration of 6 megavolts. The second, most recently constructed, betatron operates on 50 cycles and provides an electron acceleration of 7 megavolts. Plans were being made at this plant to construct a 50 cycle, 15 megavolt betatron. Siemens reported that their particular interest in betatron development was in order to provide a means for experimental work with electron beam cancer therapy.

CIOS XXVIII-31

Prof. Bierman of A.E.G., in Berlin, was reported to be working on the design of a 20 megavolt betatron.

During the past two years, C. H. F. Muller has constructed and delivered five "neutron generators". Three of these were rated at 1.5 megavolts, one at 1.2 megavolts, and one at .9 megavolts. They have on order, but have not yet completed,

one additional neutron generator rated at .9 megavolts and another rated at 2.4 megavolts. These "neutron generators", or "deutron accelerators", accelerate ionized heavy hydrogen against a beryllium or a lithium target. The neutron output at .9 megavolts when using a beryllium target was estimated to be equivalent to the neutron output of 2 kilograms of radium plus beryllium; when using a lithium target, 3 kilograms; when using a beryllium target at 1.5 megavolts, 13 kilograms; when using a lithium target, 8 kilograms.

The Phillips "cascade" circuit was used for these neutron generators. Although the electrical output of these generators could be as high as 5 ma., the ion source limited this equipment to 0.8 ma. for continuous operation, regardless of voltage.

At 0.8 ma. the ripple was about 1%, at 5 ma., about 5%.

BIOS 1615

(A) Plating on Aluminium and its Alloys

Although aluminium is widely used in Germany, no actual samples of nickel plus chromium plated aluminium were seen. Samples of lead plated battery lugs were encountered at Robert Bosch, Stuttgart and direct chromium plated aluminium at Blasberg's, Solingen. Numerous references are made to the plating of aluminium and its alloys, however, and the most popular treatment for plating on this metal appears to be a primary application of a zincate dip followed by either a copper or brass deposit and then final plating.

(B) Testing of Plated Coatings, etc.

The testing of the plated coating for thickness, porosity, corrosion resistance etc., was apparently seldom done and the platers seemed to be little concerned about these points. Testing of solutions was equally haphazard. pH was rarely controlled except by litmus and pH papers; comparators were

B. CADMIUM

I. Firm: KAMPSCHULTE.

Solution:

47.5 g/litre	Cadmium Cyanide
42.5 g/litre	Sodium Cyanide
5.0 g/litre	Sodium Chloride
5.0 g/litre	Turkey Red Oil

Operating Conditions

Temperature:	25 - 30°C.
Current Density:	10 amps/dm^2
Voltage:	Not given

II. Firm: BLASBERG.

Solution:

50 - 120 g/litre	Sodium Cadmium Cyanide
20 - 60 g/litre	Sodium Cyanide
10 - 30 g/litre	Sodium Hydroxide

Nickel Salts as bright addition agents.

Operating Conditions

Temperature:	20 - 35°C.
Current Density:	0.5 - 1.2 amps/dm^2
Voltage:	Not given
Time:	10 - 60 minutes
pH:	12 - 13.5

8. Some Manufacturers of Suitable Bomb Components

D+Li fusion neutron initiator:	**C.H.F. Müller (Hamburg) and other suppliers**
Betatron ($e^- \rightarrow \gamma \rightarrow n$) initiator:	**Siemens-Reiniger (Erlangen) and other suppliers**
Uranium-235 fission pit:	**SS-controlled enrichment sites (discussed earlier)**
Unenriched uranium tamper:	**Auer/Degussa (Oranienburg and other locations)**
Cadmium-electroplated aluminum:	**Kampschulte, Blasberg, Wilhelm Meyer, etc.**
Pure TNT and RDX:	**WASAG (Allendorf and other locations)**

C. H. F. Muller A.-G., working in cooperation with, and under the direction of, the M. V. Research Association (M. V. Forschungs-Vereign), at Wrist, completed the construction of a 15 megavolt betatron about the first of this year. This betatron operates on 50 cycles. The average current of the high voltage electron beam is approximately .03 microamperes. The output of gamma radiation was reported to be approximately equivalent to one kilogram of radium. This betatron is now installed at Wrist.

In December, 1944, the M. V. Research Association completed the calculations and layouts of a 200 megavolt betatron, to operate on 50 cycles. It was estimated that the average electron beam current of this betatron would be in the order of one milliampere. The total weight was expected to be approximately 30 tons. This betatron was to be constructed by Brown Boveri and Cie A.-G. in Heidelberg. It is understood that Brown Boveri completed detailed construction drawings of this betatron about the first of March of this year.

Dr. W. Müller, of C. H. F. Müller, recently constructed a very small 2 megavolt betatron which weighed less than 100 pounds. This betatron operated on 50 cycles and had a sealed off tube but the output was only sufficient to increase a Geiger counter to about three times its normal rate.

Two betatrons had recently been constructed and were being tested at the Siemens-Reiniger plant in Erlangen. The first of these betatrons to be completed operates on 500 cycles and provides an electron acceleration of 6 megavolts. The second, most recently constructed, betatron operates on 50 cycles and provides an electron acceleration of 7 megavolts. Plans were being made at this plant to construct a 50 cycle, 15 megavolt betatron. Siemens reported that their particular interest in betatron development was in order to provide a means for experimental work with electron beam cancer therapy.

CIOS XXVIII-31

Prof. Bierman of A.E.G., in Berlin, was reported to be working on the design of a 20 megavolt betatron.

During the past two years, C. H. F. Muller has constructed and delivered five "neutron generators". Three of these were rated at 1.5 megavolts, one at 1.2 megavolts, and one at .9 megavolts. They have on order, but have not yet completed,

one additional neutron generator rated at .9 megavolts and another rated at 2.4 megavolts. These "neutron generators", or "deutron accelerators", accelerate ionized heavy hydrogen against a beryllium or a lithium target. The neutron output at .9 megavolts when using a beryllium target was estimated to be equivalent to the neutron output of 2 kilograms of radium plus beryllium; when using a lithium target, 3 kilograms; when using a beryllium target at 1.5 megavolts, 13 kilograms; when using a lithium target, 8 kilograms.

The Phillips "cascade" circuit was used for these neutron generators. Although the electrical output of these generators could be as high as 5 ma., the ion source limited this equipment to 0.8 ma. for continuous operation, regardless of voltage.

At 0.8 ma. the ripple was about 1%, at 5 ma., about 5%.

BIOS 1615

(A) Plating on Aluminium and its Alloys

Although aluminium is widely used in Germany, no actual samples of nickel plus chromium plated aluminium were seen. Samples of lead plated battery lugs were encountered at Robert Bosch, Stuttgart and direct chromium plated aluminium at Blasberg's, Solingen. Numerous references are made to the plating of aluminium and its alloys, however, and the most popular treatment for plating on this metal appears to be a primary application of a zincate dip followed by either a copper or brass deposit and then final plating.

(B) Testing of Plated Coatings, etc.

The testing of the plated coating for thickness, porosity, corrosion resistance etc., was apparently seldom done and the platers seemed to be little concerned about these points. Testing of solutions was equally haphazard. pH was rarely controlled except by litmus and pH papers; comparators were

B. CADMIUM

I. Firm: KAMPSCHULTE.

Solution:
47.5 g/litre Cadmium Cyanide
42.5 g/litre Sodium Cyanide
5.0 g/litre Sodium Chloride
5.0 g/litre Turkey Red Oil

Operating Conditions

Temperature: 25 - 30°C.
Current Density: 10 amps/dm^2
Voltage: Not given

II. Firm: BLASBERG.

Solution:
50 - 120 g/litre Sodium Cadmium Cyanide
20 - 60 g/litre Sodium Cyanide
10 - 30 g/litre Sodium Hydroxide

Nickel Salts as bright addition agents.

Operating Conditions

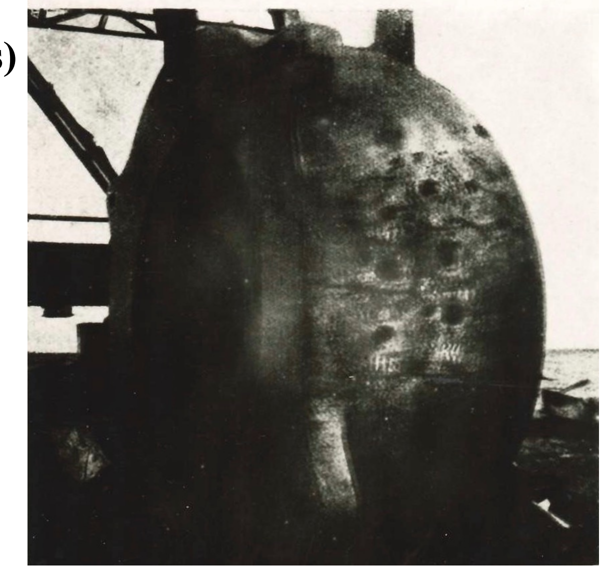
Temperature: 20 - 35°C.
Current Density: 0.5 - 1.2 amps/dm^2
Voltage: Not given
Time: 10 - 60 minutes
pH: 12 - 13.5

8. Some Manufacturers of Suitable Bomb Components

D+Li fusion neutron initiator:	**C.H.F. Müller (Hamburg) and other suppliers**
Betatron ($e^- \rightarrow \gamma \rightarrow n$) initiator:	**Siemens-Reiniger (Erlangen) and other suppliers**
Uranium-235 fission pit:	**SS-controlled enrichment sites (discussed earlier)**
Unenriched uranium tamper:	**Auer/Degussa (Oranienburg and other locations)**
Cadmium-electroplated aluminum:	**Kampschulte, Blasberg, Wilhelm Meyer, etc.**
Pure TNT and RDX:	**WASAG (Allendorf and other locations)**
Explosive lenses (TNT + RDX):	**Heereswaffenamt (Kummersdorf/Hillersleben)**

Explosive lens tests 1942-1943.

Erich Schumann and Gerd Hinrichs. 1943. HEC 2590. Imperial War Museum Duxford.



C. H. F. Muller A.-G., working in cooperation with, and under the direction of, the M. V. Research Association (M. V. Forschungs-Vereign), at Wrist, completed the construction of a 15 megavolt betatron about the first of this year. This betatron operates on 50 cycles. The average current of the high voltage electron beam is approximately .03 microamperes. The output of gamma radiation was reported to be approximately equivalent to one kilogram of radium. This betatron is now installed at Wrist.

In December, 1944, the M. V. Research Association completed the calculations and layouts of a 200 megavolt betatron, to operate on 50 cycles. It was estimated that the average electron beam current of this betatron would be in the order of one milliampere. The total weight was expected to be approximately 30 tons. This betatron was to be constructed by Brown Boveri and Cie A.-G. in Heidelberg. It is understood that Brown Boveri completed detailed construction drawings of this betatron about the first of March of this year.

Dr. W. Müller, of C. H. F. Müller, recently constructed a very small 2 megavolt betatron which weighed less than 100 pounds. This betatron operated on 50 cycles and had a sealed off tube but the output was only sufficient to increase a Geiger counter to about three times its normal rate.

Two betatrons had recently been constructed and were being tested at the Siemens-Reiniger plant in Erlangen. The first of these betatrons to be completed operates on 500 cycles and provides an electron acceleration of 6 megavolts. The second, most recently constructed, betatron operates on 50 cycles and provides an electron acceleration of 7 megavolts. Plans were being made at this plant to construct a 50 cycle, 15 megavolt betatron. Siemens reported that their particular interest in betatron development was in order to provide a means for experimental work with electron beam cancer therapy.

CIOS XXVIII-31

Prof. Bierman of A.E.G., in Berlin, was reported to be working on the design of a 20 megavolt betatron.

During the past two years, C. H. F. Muller has constructed and delivered five "neutron generators". Three of these were rated at 1.5 megavolts, one at 1.2 megavolts, and one at .9 megavolts. They have on order, but have not yet completed,

one additional neutron generator rated at .9 megavolts and another rated at 2.4 megavolts. These "neutron generators", or "deutron accelerators", accelerate ionized heavy hydrogen against a beryllium or a lithium target. The neutron output at .9 megavolts when using a beryllium target was estimated to be equivalent to the neutron output of 2 kilograms of radium plus beryllium; when using a lithium target, 3 kilograms; when using a beryllium target at 1.5 megavolts, 13 kilograms; when using a lithium target, 8 kilograms.

The Phillips "cascade" circuit was used for these neutron generators. Although the electrical output of these generators could be as high as 5 ma., the ion source limited this equipment to 0.8 ma. for continuous operation, regardless of voltage.

At 0.8 ma. the ripple was about 1%, at 5 ma., about 5%.

BIOS 1615

(A) Plating on Aluminium and its Alloys

Although aluminium is widely used in Germany, no actual samples of nickel plus chromium plated aluminium were seen. Samples of lead plated battery lugs were encountered at Robert Bosch, Stuttgart and direct chromium plated aluminium at Blasberg's, Solingen. Numerous references are made to the plating of aluminium and its alloys, however, and the most popular treatment for plating on this metal appears to be a primary application of a zincate dip followed by either a copper or brass deposit and then final plating.

(B) Testing of Plated Coatings, etc.

The testing of the plated coating for thickness, porosity, corrosion resistance etc., was apparently seldom done and the platers seemed to be little concerned about these points. Testing of solutions was equally haphazard. pH was rarely controlled except by litmus and pH papers; comparators were

B. CADMIUM

I. Firm: KAMPSCHULTE.

Solution:	47.5 g/litre	Cadmium Cyanide
	42.5 g/litre	Sodium Cyanide
	5.0 g/litre	Sodium Chloride
	5.0 g/litre	Turkey Red Oil

Operating Conditions

Temperature:	25 - 30°C.
Current Density:	10 amps/dm^2
Voltage:	Not given

II. Firm: BLASBERG.

Solution:	50 - 120 g/litre	Sodium Cadmium Cyanide
	20 - 60 g/litre	Sodium Cyanide
	10 - 30 g/litre	Sodium Hydroxide

Nickel Salts as bright addition agents.

Operating Conditions

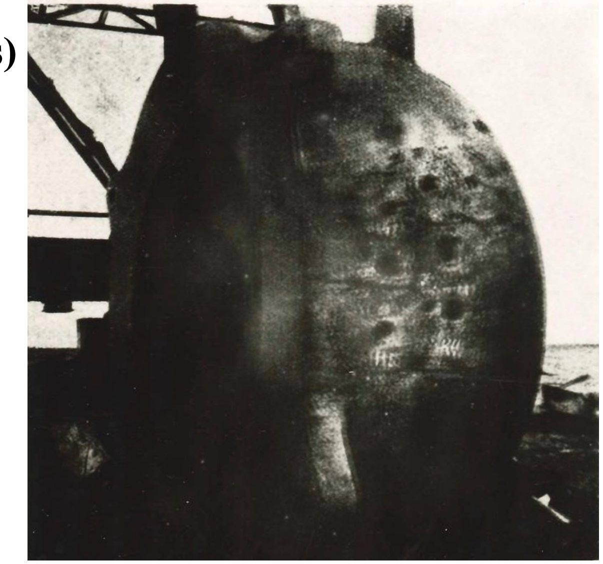
Temperature:	20 - 35°C.
Current Density:	0.5 - 1.2 amps/dm^2
Voltage:	Not given
Time:	10 - 60 minutes
pH:	12 - 13.5

8. Some Manufacturers of Suitable Bomb Components

D+Li fusion neutron initiator:	C.H.F. Müller (Hamburg) and other suppliers
Betatron ($e^- \rightarrow \gamma \rightarrow n$) initiator:	Siemens-Reiniger (Erlangen) and other suppliers
Uranium-235 fission pit:	SS-controlled enrichment sites (discussed earlier)
Unenriched uranium tamper:	Auer/Degussa (Oranienburg and other locations)
Cadmium-electroplated aluminum:	Kampschulte, Blasberg, Wilhelm Meyer, etc.
Pure TNT and RDX:	WASAG (Allendorf and other locations)
Explosive lenses (TNT + RDX):	Heereswaffenamt (Kummersdorf/Hillersleben)
Simultaneous detonators:	Heereswaffenamt (Kummersdorf/Hillersleben)

Explosive lens tests 1942-1943.

Erich Schumann and Gerd Hinrichs. 1943. HEC 2590. Imperial War Museum Duxford.



C. H. F. Muller A.-G., working in cooperation with, and under the direction of, the M. V. Research Association (M. V. Forschungs-Vereign), at Wrist, completed the construction of a 15 megavolt betatron about the first of this year. This betatron operates on 50 cycles. The average current of the high voltage electron beam is approximately .03 microamperes. The output of gamma radiation was reported to be approximately equivalent to one kilogram of radium. This betatron is now installed at Wrist.

In December, 1944, the M. V. Research Association completed the calculations and layouts of a 200 megavolt betatron, to operate on 50 cycles. It was estimated that the average electron beam current of this betatron would be in the order of one milliampere. The total weight was expected to be approximately 30 tons. This betatron was to be constructed by Brown Boveri and Cie A.-G. in Heidelberg. It is understood that Brown Boveri completed detailed construction drawings of this betatron about the first of March of this year.

Dr. W. Müller, of C. H. F. Müller, recently constructed a very small 2 megavolt betatron which weighed less than 100 pounds. This betatron operated on 50 cycles and had a sealed off tube but the output was only sufficient to increase a Geiger counter to about three times its normal rate.

Two betatrons had recently been constructed and were being tested at the Siemens-Reiniger plant in Erlangen. The first of these betatrons to be completed operates on 500 cycles and provides an electron acceleration of 6 megavolts. The second, most recently constructed, betatron operates on 50 cycles and provides an electron acceleration of 7 megavolts. Plans were being made at this plant to construct a 50 cycle, 15 megavolt betatron. Siemens reported that their particular interest in betatron development was in order to provide a means for experimental work with electron beam cancer therapy.

CIOS XXVIII-31

Prof. Bierman of A.E.G., in Berlin, was reported to be working on the design of a 20 megavolt betatron.

During the past two years, C. H. F. Muller has constructed and delivered five "neutron generators". Three of these were rated at 1.5 megavolts, one at 1.2 megavolts, and one at .9 megavolts. They have on order, but have not yet completed,

one additional neutron generator rated at .9 megavolts and another rated at 2.4 megavolts. These "neutron generators", or "deutron accelerators", accelerate ionized heavy hydrogen against a beryllium or a lithium target. The neutron output at .9 megavolts when using a beryllium target was estimated to be equivalent to the neutron output of 2 kilograms of radium plus beryllium; when using a lithium target, 3 kilograms; when using a beryllium target at 1.5 megavolts, 13 kilograms; when using a lithium target, 8 kilograms.

The Phillips "cascade" circuit was used for these neutron generators. Although the electrical output of these generators could be as high as 5 ma., the ion source limited this equipment to 0.8 ma. for continuous operation, regardless of voltage.

At 0.8 ma. the ripple was about 1%, at 5 ma., about 5%.

BIOS 1615

(A) Plating on Aluminium and its Alloys

Although aluminium is widely used in Germany, no actual samples of nickel plus chromium plated aluminium were seen. Samples of lead plated battery lugs were encountered at Robert Bosch, Stuttgart and direct chromium plated aluminium at Blasberg's, Solingen. Numerous references are made to the plating of aluminium and its alloys, however, and the most popular treatment for plating on this metal appears to be a primary application of a zincate dip followed by either a copper or brass deposit and then final plating.

(B) Testing of Plated Coatings, etc.

The testing of the plated coating for thickness, porosity, corrosion resistance etc., was apparently seldom done and the platers seemed to be little concerned about these points. Testing of solutions was equally haphazard. pH was rarely controlled except by litmus and pH papers; comparators were

B. CADMIUM

I. Firm: KAMPSCHULTE.

Solution:	47.5 g/litre	Cadmium Cyanide
	42.5 g/litre	Sodium Cyanide
	5.0 g/litre	Sodium Chloride
	5.0 g/litre	Turkey Red Oil

Operating Conditions

Temperature:	25 - 30°C.
Current Density:	10 amps/dm^2
Voltage:	Not given

II. Firm: BLASBERG.

Solution:	50 - 120 g/litre	Sodium Cadmium Cyanide
	20 - 60 g/litre	Sodium Cyanide
	10 - 30 g/litre	Sodium Hydroxide

Nickel Salts as bright addition agents.

Operating Conditions

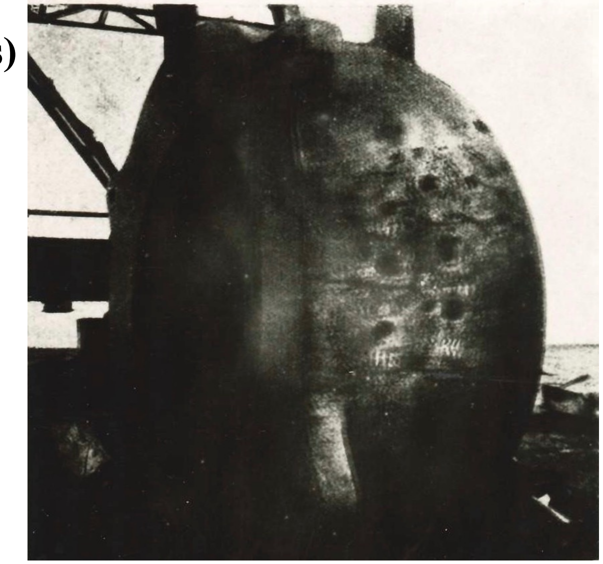
Temperature:	20 - 35°C.
Current Density:	0.5 - 1.2 amps/dm^2
Voltage:	Not given
Time:	10 - 60 minutes
pH:	12 - 13.5

8. Some Manufacturers of Suitable Bomb Components

D+Li fusion neutron initiator:	**C.H.F. Müller (Hamburg) and other suppliers**
Betatron ($e^- \rightarrow \gamma \rightarrow n$) initiator:	**Siemens-Reiniger (Erlangen) and other suppliers**
Uranium-235 fission pit:	**SS-controlled enrichment sites (discussed earlier)**
Unenriched uranium tamper:	**Auer/Degussa (Oranienburg and other locations)**
Cadmium-electroplated aluminum:	**Kampschulte, Blasberg, Wilhelm Meyer, etc.**
Pure TNT and RDX:	**WASAG (Allendorf and other locations)**
Explosive lenses (TNT + RDX):	**Heereswaffenamt (Kummersdorf/Hillersleben)**
Simultaneous detonators:	**Heereswaffenamt (Kummersdorf/Hillersleben)**
Liquid oxygen:	**V-2 rocket program (Friedrichshafen, etc.)**

Explosive lens tests 1942-1943.

Erich Schumann and Gerd Hinrichs. 1943. HEC 2590. Imperial War Museum Duxford.



C. H. F. Muller A.-G., working in cooperation with, and under the direction of, the M. V. Research Association (M. V. Forschungs-Vereign), at Wrist, completed the construction of a 15 megavolt betatron about the first of this year. This betatron operates on 50 cycles. The average current of the high voltage electron beam is approximately .03 microamperes. The output of gamma radiation was reported to be approximately equivalent to one kilogram of radium. This betatron is now installed at Wrist.

In December, 1944, the M. V. Research Association completed the calculations and layouts of a 200 megavolt betatron, to operate on 50 cycles. It was estimated that the average electron beam current of this betatron would be in the order of one milliampere. The total weight was expected to be approximately 30 tons. This betatron was to be constructed by Brown Boveri and Cie A.-G. in Heidelberg. It is understood that Brown Boveri completed detailed construction drawings of this betatron about the first of March of this year.

Dr. W. Müller, of C. H. F. Müller, recently constructed a very small 2 megavolt betatron which weighed less than 100 pounds. This betatron operated on 50 cycles and had a sealed off tube but the output was only sufficient to increase a Geiger counter to about three times its normal rate.

Two betatrons had recently been constructed and were being tested at the Siemens-Reiniger plant in Erlangen. The first of these betatrons to be completed operates on 500 cycles and provides an electron acceleration of 6 megavolts. The second, most recently constructed, betatron operates on 50 cycles and provides an electron acceleration of 7 megavolts. Plans were being made at this plant to construct a 50 cycle, 15 megavolt betatron. Siemens reported that their particular interest in betatron development was in order to provide a means for experimental work with electron beam cancer therapy.

CIOS XXVIII-31

Prof. Bierman of A.E.G., in Berlin, was reported to be working on the design of a 20 megavolt betatron.

During the past two years, C. H. F. Muller has constructed and delivered five "neutron generators". Three of these were rated at 1.5 megavolts, one at 1.2 megavolts, and one at .9 megavolts. They have on order, but have not yet completed,

one additional neutron generator rated at .9 megavolts and another rated at 2.4 megavolts. These "neutron generators", or "deutron accelerators", accelerate ionized heavy hydrogen against a beryllium or a lithium target. The neutron output at .9 megavolts when using a beryllium target was estimated to be equivalent to the neutron output of 2 kilograms of radium plus beryllium; when using a lithium target, 3 kilograms; when using a beryllium target at 1.5 megavolts, 13 kilograms; when using a lithium target, 8 kilograms.

The Phillips "cascade" circuit was used for these neutron generators. Although the electrical output of these generators could be as high as 5 ma., the ion source limited this equipment to 0.8 ma. for continuous operation, regardless of voltage.

At 0.8 ma. the ripple was about 1%, at 5 ma., about 5%.

BIOS 1615

(A) Plating on Aluminium and its Alloys

Although aluminium is widely used in Germany, no actual samples of nickel plus chromium plated aluminium were seen. Samples of lead plated battery lugs were encountered at Robert Bosch, Stuttgart and direct chromium plated aluminium at Blasberg's, Solingen. Numerous references are made to the plating of aluminium and its alloys, however, and the most popular treatment for plating on this metal appears to be a primary application of a zincate dip followed by either a copper or brass deposit and then final plating.

(B) Testing of Plated Coatings, etc.

The testing of the plated coating for thickness, porosity, corrosion resistance etc., was apparently seldom done and the platers seemed to be little concerned about these points. Testing of solutions was equally haphazard. pH was rarely controlled except by litmus and pH papers; comparators were

B. CADMIUM

I. Firm: KAMPSCHULTE.

Solution:	47.5 g/litre	Cadmium Cyanide
	42.5 g/litre	Sodium Cyanide
	5.0 g/litre	Sodium Chloride
	5.0 g/litre	Turkey Red Oil

Operating Conditions

Temperature:	25 - 30°C.
Current Density:	10 amps/dm^2
Voltage:	Not given

II. Firm: BLASBERG.

Solution:	50 - 120 g/litre	Sodium Cadmium Cyanide
	20 - 60 g/litre	Sodium Cyanide
	10 - 30 g/litre	Sodium Hydroxide

Nickel Salts as bright addition agents.

Operating Conditions

Temperature:	20 - 35°C.
Current Density:	0.5 - 1.2 amps/dm^2
Voltage:	Not given
Time:	10 - 60 minutes
pH:	12 - 13.5

9. Over 30 Sources: LiD H-Bomb with Fission Primary, Radiation Implosion, Total Mass 6000 kg, ~1.6 Megaton Yield, Expected Test 1945-46

Werner Grothmann, 2002: "The hydrogen bomb. That was also worked on… Himmler once mentioned in a small circle that the first prototype of this could come at the earliest between June and October 1946… It must have looked like a swollen bomb… By the way, what the physicists told Himmler in their private lecture on the hydrogen bomb had really electrified him, because he heard that the explosive effect would be a hundred times greater than that of the uranium bomb."

Wolfgang Ferrant, 1945: "Our purpose was to produce, within an extensive reaction area which contains a very large number of atoms capable of reacting, a temperature or an almost entirely uncoordinated heat motion, such as prevails on the stars. At the same time, the density of the reacting material should be as great as possible. Under these circumstances atomic reactions will occur... Lithium D hydride is well suited as the choice of substance… Our method, therefore, results directly in the creation of a source of neutrons of greatest intensity… If the purpose is to obtain energy alone, the neutrons formed will be utilized in splitting the uranium atom; and in that manner extraordinary amounts of energy will be liberated, as a first product, by way of the neutrons. The lithium-D-hydride, recipient, therefore, will be surrounded by a coat of uranium. Quite possibly a special advantage could be obtained by adding a quantity of uranium D compound to the ``large particles" and to the recipient mass; because in this manner a considerable amount of energy will be given off by uranium fragments located within the reaction area, and this state of affairs might possibly result in further increases of temperature within the reaction area. ... There will result an explosion of the entire LiD mass, since the external reaction zone is capable of enlarging itself on the strength of its own energy production."

Hans Thirring, 1946: "In a 'super atom bomb' it would be possible to use on the order of tons of lithium hydride compared to kilograms of plutonium [for fission], in such a way as to produce an effect several thousand times as large as before. God have mercy on the country over which a six-ton bomb of lithium hydride is made to explode! If the idea is realizable at all, the former uranium bomb or plutonium bomb would only play the role of a sparkplug in such a super atom bomb."

Heiko Petermann, discussion notes with Alfred Klemm, 5 March 2004: "Main focus of the work was the production of Li6 by separation of Li7. This was achieved very well in the electrolytic process. From 1942-43. Klemm pointed out that he was probably the first to achieve the separation by means of electrolysis… He also confirmed that the tritium problem (disintegration of Li6 into tritium) was already discussed before 1945."

Immigration of Austrian Scientists to Soviet Zone, ca. 1949: "SCHINTLMEISTER, Dr Josef Peter… During war, succeeded in isolating Transuranen to Transuranen 104… In September 1948 he reportedly contacted JOLIOT CURIE on problem of extracting plutonium. Censorship intercept indicates subject is currently interested in lithium hydride bombs, originally begun with STETTER."

U.S. Army CIC, 29 September 1953: "Karl Lintner… was Dr. Georg STETTER's assistant in the Second Physical Institute during World War II, when STETTER was working on the splitting of the lithium nucleus... All of STETTER's research material and notes fell into the hands of the Soviets in 1945..."

Assistant Chief of Staff, US Army G-2, 6 April 1954: "During the war, the nuclear physicists of the Second Institute of Physics in Vienna engaged in a research project of releasing high amounts of energy through nuclear reactions of the lithium hydride crystal *Li H*. The research was carried out mainly by Dr. Karl LINTNER under the supervision of Prof. Dr. Georg K. F. STETTER."

Air Intelligence Report, 15 June 1946: "Heavy Hydrogen Bomb. In Germany a letter was picked up by the American censors. It had been written by a German desirous of exchanging information for an opportunity to go to the United States. The writer professed knowledge of 'heavy water' research in Germany and of an 'even more deadly weapon than the atomic bomb'."

For complete quotes and sources, please see *Forgotten Creators* D.9 and D.14.

9. Over 30 Sources: LiD H-Bomb with Fission Primary, Radiation Implosion, Total Mass 6000 kg, ~1.6 Megaton Yield, Expected Test 1945-46

Edmund Tilley, 13 July 1946: "KÄSTNER told Lt. GUTMANN of a new radio-active bomb, weighing six tons. This bomb has no fins and is lowered by parachute… In July 1944 a small group of the Forschungsstaffel was sent to Northern Finland [to map a test site]…"

Eugen Sänger and Irene Bredt, 1944: "As an example of area attack with single propulsion and full turn, we use the attack on New York at a range of 6500 km. For c=4000 m/sec, the bomb load is 6 tons, and the detailed attack runs as follows…"

***New York Times*, 4 December 1946: "Wernher von Braun… revealed today that before the war ended the Nazis were building a 100-ton rocket to strike at the United States… He said it would have carried a 'pay-load' of six tons and would have traveled thousands of miles to strike the United States."**

Hermann Zumpe, 7 November, 1946: "…the maximum weight allowable for the motor, fuels, and shell was 20 tons, leaving 6 tons for the warhead."

Allen Dulles, 14 March 1944: "Length 15 to 17 meters, weight of explosive 4 to 6 tons. Rocket consists of over 1000 parts…"

Gordon Gaskill, March 1945: "The leading V-2 authority for the United States Strategic Air Forces in Europe [Donald Putt]… has calculated for me approximately what kind of rocket might hit New York. Leaving Germany, it would weigh 63 tons, mostly fuel. Its war head would be 7 tons of high explosive."

Charles Chamberlain, 9 February 1946: "Another atom scientist in the British occupation zone of Germany---Prof. Paul Harteck of the Kaiser Wilhelm institute of physics in Berlin---said that the light rays thrown out during the enormous explosion of an atomic bomb added greatly to the destructive force… This frees an amount of light which is beyond the visible spectrum. Only a few people know that the reflection of beams of light on solid bodies also exerts a mechanical pressure. This pressure is so small where our normal light is concerned that it is not noticed. The amount of light freed by an atomic bomb is so great it destroys walls."

Rodolfo Graziani, 1948: "Everybody can say what they want about the matter of secret weapons; but the fact is that secret weapons in Germany were there: they were there in the most absolute way… There was the V-1 and there was the V-2, but it went all the way up to the V-10 which destroyed within a ten-kilometer radius every element of life."

***Pittsburgh Press*, 7 August 1945: "21ST ARMY GROUP HEADQUARTERS, Germany, Aug. 7 (UP)… The bomb, it was calculated, would wipe out everything within a radius of six miles. A famous German research scientist [Wilhelm Groth, in] charge of the experiments was flown immediately to Britain at the time. He estimated his work would have been completed by October [1945]."**

***Daily Mail*, 30 October 1944: "Immense concrete works on top of a hill in Artois, near Saint Omer, were intended as a launching place for flying bombs, which, the Germans boasted, would wreck New York… German engineers told local French people that when the vast machinery was installed and ready to fire, the district would have to be evacuated for six miles around."**

Goffredo Coppola, 16 February 1945: "The Germans have found the means to disintegrate the atom… The disintegration occurs in successive cycles and covers vast areas of tens of kilometers. In the laboratories work is at full capacity."

For complete quotes and sources, please see *Forgotten Creators* D.9 and D.14.

10. Reported October 1944 Test Explosion on Baltic Coast

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*

I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*

I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).

The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*
I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

OSS London. 5 December 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.
Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*
I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

OSS London. 5 December 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.
Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

Summary of 5 October 2004 interview with Elisabeth Mestlin. Rainer Karlsch and Heiko Petermann 2007. *Für und Wider "Hitlers Bombe".* Münster: Waxmann. p. 163.
She remembered the extraordinary event because of credible circumstances. After the bombardment of Stralsund on 6 October 1944, Ms. Mestlin went to see her children in Vitte on the island of Hiddensee. On the island of Hiddensee on 12 October 1944, she heard a violent explosion and saw a large cloud of dust on the southern tip of the Bug peninsula.

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*
I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

OSS London. 5 December 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.
Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

Summary of 5 October 2004 interview with Elisabeth Mestlin. Rainer Karlsch and Heiko Petermann 2007. *Für und Wider "Hitlers Bombe".* Münster: Waxmann. p. 163.
She remembered the extraordinary event because of credible circumstances. After the bombardment of Stralsund on 6 October 1944, Ms. Mestlin went to see her children in Vitte on the island of Hiddensee. On the island of Hiddensee on 12 October 1944, she heard a violent explosion and saw a large cloud of dust on the southern tip of the Bug peninsula.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. pp. 13, 31.
When, in October 1944, it was clear that the theory of the atomic bomb was in principle correct, various circles had, of course, also been thinking about what should be done to end the war as quickly as possible… It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute... Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*
I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

OSS London. 5 December 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.
Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

Summary of 5 October 2004 interview with Elisabeth Mestlin. Rainer Karlsch and Heiko Petermann 2007. *Für und Wider "Hitlers Bombe".* Münster: Waxmann. p. 163.
She remembered the extraordinary event because of credible circumstances. After the bombardment of Stralsund on 6 October 1944, Ms. Mestlin went to see her children in Vitte on the island of Hiddensee. On the island of Hiddensee on 12 October 1944, she heard a violent explosion and saw a large cloud of dust on the southern tip of the Bug peninsula.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. pp. 13, 31.
When, in October 1944, it was clear that the theory of the atomic bomb was in principle correct, various circles had, of course, also been thinking about what should be done to end the war as quickly as possible… It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute... Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

A.P.W.I.U. (Ninth Air Force) 96/1945. 19 August 1945. Investigations, Research, Developments, and Practical Use of the German Atomic Bomb. NARA RG 38, Entry 98C, Box 9, Folder TSC # 2601--2700. Upgraded from Secret to Top Secret in October 1945.
47. A man named ZINSSER, a Flak rocket expert, mentioned what he noticed one day: In the beginning of Oct. 1944 I flew from Ludwigslust (south of Lübeck), about 12 to 15 km from an atomic bomb test station, when I noticed a strong, bright illumination of the whole atmosphere, lasting about 2 seconds. 48. The clearly visible pressure wave escaped the approaching and following cloud formed by the explosion. This wave had a diameter of about 1 km when it became visible and the color of the cloud changed frequently. It became dotted after a short period of darkness with all sorts of light spots, which were, in contrast to normal explosions, of a pale blue color. 49. After about 10 seconds the sharp outlines of the explosion cloud disappeared, then the cloud began to take on a lighter color against the sky covered with a gray overcast. The diameter of the still visible pressure wave was at least 9000 meters while remaining visible for at least 15 seconds. 50. Personal observations of the colors of the explosion cloud found an almost blue-violet shade. During this manifestation reddish-colored rims were to be seen, changing to a dirty-like shade in very rapid succession. 51. The combustion was lightly felt from my observation plane in the form of pulling and pushing. The appearance of atmospheric disturbance lasted about 10 seconds without noticeable climax. 52. About one hour later I started with an He 111 from the A/D [aerodrome] at Ludwigslust and flew in an easterly direction. Shortly after the start I passed through the almost complete overcast (between 3000 and 4000 meter altitude). A cloud shaped like a mushroom with turbulent, billowing sections (at about 7000 meter altitude) stood, without any seeming connections, over the spot where the explosion took place. Strong electrical disturbances and the impossibility to continue radio communication as by lightning, turned up. 53. Because of the P-38s operating in the area Wittenberg-Merseburg I had to turn to the north but observed a better visibility at the bottom of the cloud where the explosion occurred.

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*
I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

OSS London. 5 December 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.
Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

Summary of 5 October 2004 interview with Elisabeth Mestlin. Rainer Karlsch and Heiko Petermann 2007. *Für und Wider "Hitlers Bombe".* Münster: Waxmann. p. 163.
She remembered the extraordinary event because of credible circumstances. After the bombardment of Stralsund on 6 October 1944, Ms. Mestlin went to see her children in Vitte on the island of Hiddensee. On the island of Hiddensee on 12 October 1944, she heard a violent explosion and saw a large cloud of dust on the southern tip of the Bug peninsula.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. pp. 13, 31.
When, in October 1944, it was clear that the theory of the atomic bomb was in principle correct, various circles had, of course, also been thinking about what should be done to end the war as quickly as possible… It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute... Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

A.P.W.I.U. (Ninth Air Force) 96/1945. 19 August 1945. Investigations, Research, Developments, and Practical Use of the German Atomic Bomb. NARA RG 38, Entry 98C, Box 9, Folder TSC # 2601--2700. Upgraded from Secret to Top Secret in October 1945.
47. A man named ZINSSER, a Flak rocket expert, mentioned what he noticed one day: In the beginning of Oct. 1944 I flew from Ludwigslust (south of Lübeck), about 12 to 15 km from an atomic bomb test station, when I noticed a strong, bright illumination of the whole atmosphere, lasting about 2 seconds. 48. The clearly visible pressure wave escaped the approaching and following cloud formed by the explosion. This wave had a diameter of about 1 km when it became visible and the color of the cloud changed frequently. It became dotted after a short period of darkness with all sorts of light spots, which were, in contrast to normal explosions, of a pale blue color. 49. After about 10 seconds the sharp outlines of the explosion cloud disappeared, then the cloud began to take on a lighter color against the sky covered with a gray overcast. The diameter of the still visible pressure wave was at least 9000 meters while remaining visible for at least 15 seconds. 50. Personal observations of the colors of the explosion cloud found an almost blue-violet shade. During this manifestation reddish-colored rims were to be seen, changing to a dirty-like shade in very rapid succession. 51. The combustion was lightly felt from my observation plane in the form of pulling and pushing. The appearance of atmospheric disturbance lasted about 10 seconds without noticeable climax. 52. About one hour later I started with an He 111 from the A/D [aerodrome] at Ludwigslust and flew in an easterly direction. Shortly after the start I passed through the almost complete overcast (between 3000 and 4000 meter altitude). A cloud shaped like a mushroom with turbulent, billowing sections (at about 7000 meter altitude) stood, without any seeming connections, over the spot where the explosion took place. Strong electrical disturbances and the impossibility to continue radio communication as by lightning, turned up. 53. Because of the P-38s operating in the area Wittenberg-Merseburg I had to turn to the north but observed a better visibility at the bottom of the cloud where the explosion occurred.

Philip Morrison. 23 March 1990 interview by Thomas Powers. Karlsch & Petermann 2007, p. 160.
[In October 1944] I read the report about the interrogation of German officers who claimed to have seen a purple mushroom-shaped cloud near Peenemünde. We didn't think this was very credible, but we were still worried. I sent a memorandum to the security advisers saying that President Roosevelt should not meet Churchill in London because we feared an atomic bomb attack on the British capital.

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*
I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m…. I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

OSS London. 5 December 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.
Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

Summary of 5 October 2004 interview with Elisabeth Mestlin. Rainer Karlsch and Heiko Petermann 2007. *Für und Wider "Hitlers Bombe".* Münster: Waxmann. p. 163.
She remembered the extraordinary event because of credible circumstances. After the bombardment of Stralsund on 6 October 1944, Ms. Mestlin went to see her children in Vitte on the island of Hiddensee. On the island of Hiddensee on 12 October 1944, she heard a violent explosion and saw a large cloud of dust on the southern tip of the Bug peninsula.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. pp. 13, 31.
When, in October 1944, it was clear that the theory of the atomic bomb was in principle correct, various circles had, of course, also been thinking about what should be done to end the war as quickly as possible… It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute... Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

A.P.W.I.U. (Ninth Air Force) 96/1945. 19 August 1945. Investigations, Research, Developments, and Practical Use of the German Atomic Bomb. NARA RG 38, Entry 98C, Box 9, Folder TSC # 2601--2700. Upgraded from Secret to Top Secret in October 1945.
47. A man named ZINSSER, a Flak rocket expert, mentioned what he noticed one day: In the beginning of Oct. 1944 I flew from Ludwigslust (south of Lübeck), about 12 to 15 km from an atomic bomb test station, when I noticed a strong, bright illumination of the whole atmosphere, lasting about 2 seconds. 48. The clearly visible pressure wave escaped the approaching and following cloud formed by the explosion. This wave had a diameter of about 1 km when it became visible and the color of the cloud changed frequently. It became dotted after a short period of darkness with all sorts of light spots, which were, in contrast to normal explosions, of a pale blue color. 49. After about 10 seconds the sharp outlines of the explosion cloud disappeared, then the cloud began to take on a lighter color against the sky covered with a gray overcast. The diameter of the still visible pressure wave was at least 9000 meters while remaining visible for at least 15 seconds. 50. Personal observations of the colors of the explosion cloud found an almost blue-violet shade. During this manifestation reddish-colored rims were to be seen, changing to a dirty-like shade in very rapid succession. 51. The combustion was lightly felt from my observation plane in the form of pulling and pushing. The appearance of atmospheric disturbance lasted about 10 seconds without noticeable climax. 52. About one hour later I started with an He 111 from the A/D [aerodrome] at Ludwigslust and flew in an easterly direction. Shortly after the start I passed through the almost complete overcast (between 3000 and 4000 meter altitude). A cloud shaped like a mushroom with turbulent, billowing sections (at about 7000 meter altitude) stood, without any seeming connections, over the spot where the explosion took place. Strong electrical disturbances and the impossibility to continue radio communication as by lightning, turned up. 53. Because of the P-38s operating in the area Wittenberg-Merseburg I had to turn to the north but observed a better visibility at the bottom of the cloud where the explosion occurred.

Philip Morrison. 23 March 1990 interview by Thomas Powers. Karlsch & Petermann 2007, p. 160.
[In October 1944] I read the report about the interrogation of German officers who claimed to have seen a purple mushroom-shaped cloud near Peenemünde. We didn't think this was very credible, but we were still worried. I sent a memorandum to the security advisers saying that President Roosevelt should not meet Churchill in London because we feared an atomic bomb attack on the British capital.

Theodor Soucek. 2001. *Mein Richter, mein Henker.* Bright Rainbow.
In mid-January 1945… the general turned to me surprisingly and confidentially: "In recent days we were shown the latest developments in German secret weapons together with other allied government representatives of the Axis powers. We were flown to a Wehrmacht restricted area on the Baltic Sea and the following happened: We were shown a small island perhaps 20--25 km away as a target area and bombarded it with a new type of bomb, dropped from an airplane. This bomb had such an unprecedented effect that nothing could be seen of the island, it had disappeared into the water!"

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*
I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

OSS London. 5 December 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.
Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

Summary of 5 October 2004 interview with Elisabeth Mestlin. Rainer Karlsch and Heiko Petermann 2007. *Für und Wider "Hitlers Bombe".* Münster: Waxmann. p. 163.
She remembered the extraordinary event because of credible circumstances. After the bombardment of Stralsund on 6 October 1944, Ms. Mestlin went to see her children in Vitte on the island of Hiddensee. On the island of Hiddensee on 12 October 1944, she heard a violent explosion and saw a large cloud of dust on the southern tip of the Bug peninsula.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. pp. 13, 31.
When, in October 1944, it was clear that the theory of the atomic bomb was in principle correct, various circles had, of course, also been thinking about what should be done to end the war as quickly as possible… It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute... Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

A.P.W.I.U. (Ninth Air Force) 96/1945. 19 August 1945. Investigations, Research, Developments, and Practical Use of the German Atomic Bomb. NARA RG 38, Entry 98C, Box 9, Folder TSC # 2601--2700. Upgraded from Secret to Top Secret in October 1945.
47. A man named ZINSSER, a Flak rocket expert, mentioned what he noticed one day: In the beginning of Oct. 1944 I flew from Ludwigslust (south of Lübeck), about 12 to 15 km from an atomic bomb test station, when I noticed a strong, bright illumination of the whole atmosphere, lasting about 2 seconds. 48. The clearly visible pressure wave escaped the approaching and following cloud formed by the explosion. This wave had a diameter of about 1 km when it became visible and the color of the cloud changed frequently. It became dotted after a short period of darkness with all sorts of light spots, which were, in contrast to normal explosions, of a pale blue color. 49. After about 10 seconds the sharp outlines of the explosion cloud disappeared, then the cloud began to take on a lighter color against the sky covered with a gray overcast. The diameter of the still visible pressure wave was at least 9000 meters while remaining visible for at least 15 seconds. 50. Personal observations of the colors of the explosion cloud found an almost blue-violet shade. During this manifestation reddish-colored rims were to be seen, changing to a dirty-like shade in very rapid succession. 51. The combustion was lightly felt from my observation plane in the form of pulling and pushing. The appearance of atmospheric disturbance lasted about 10 seconds without noticeable climax. 52. About one hour later I started with an He 111 from the A/D [aerodrome] at Ludwigslust and flew in an easterly direction. Shortly after the start I passed through the almost complete overcast (between 3000 and 4000 meter altitude). A cloud shaped like a mushroom with turbulent, billowing sections (at about 7000 meter altitude) stood, without any seeming connections, over the spot where the explosion took place. Strong electrical disturbances and the impossibility to continue radio communication as by lightning, turned up. 53. Because of the P-38s operating in the area Wittenberg-Merseburg I had to turn to the north but observed a better visibility at the bottom of the cloud where the explosion occurred.

Philip Morrison. 23 March 1990 interview by Thomas Powers. Karlsch & Petermann 2007, p. 160.
[In October 1944] I read the report about the interrogation of German officers who claimed to have seen a purple mushroom-shaped cloud near Peenemünde. We didn't think this was very credible, but we were still worried. I sent a memorandum to the security advisers saying that President Roosevelt should not meet Churchill in London because we feared an atomic bomb attack on the British capital.

Theodor Soucek. 2001. *Mein Richter, mein Henker.* Bright Rainbow.
In mid-January 1945… the general turned to me surprisingly and confidentially: "In recent days we were shown the latest developments in German secret weapons together with other allied government representatives of the Axis powers. We were flown to a Wehrmacht restricted area on the Baltic Sea and the following happened: We were shown a small island perhaps 20--25 km away as a target area and bombarded it with a new type of bomb, dropped from an airplane. This bomb had such an unprecedented effect that nothing could be seen of the island, it had disappeared into the water!"

Harry K. Lennon. 23 May 1945. NARA RG 77, Entry UD-22A, Box 167, Folder 32.12-2.
The experiments with the atom-splitting bomb had almost been brought to conclusion… Laboratory experiments were conducted in DANZIG and BERLIN. Practical experiments were conducted on the Baltic coast.

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*
I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

OSS London. 5 December 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.
Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

Summary of 5 October 2004 interview with Elisabeth Mestlin. Rainer Karlsch and Heiko Petermann 2007. *Für und Wider "Hitlers Bombe"*. Münster: Waxmann. p. 163.
She remembered the extraordinary event because of credible circumstances. After the bombardment of Stralsund on 6 October 1944, Ms. Mestlin went to see her children in Vitte on the island of Hiddensee. On the island of Hiddensee on 12 October 1944, she heard a violent explosion and saw a large cloud of dust on the southern tip of the Bug peninsula.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. pp. 13, 31.
When, in October 1944, it was clear that the theory of the atomic bomb was in principle correct, various circles had, of course, also been thinking about what should be done to end the war as quickly as possible… It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute... Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

A.P.W.I.U. (Ninth Air Force) 96/1945. 19 August 1945. Investigations, Research, Developments, and Practical Use of the German Atomic Bomb. NARA RG 38, Entry 98C, Box 9, Folder TSC # 2601--2700. Upgraded from Secret to Top Secret in October 1945.
47. A man named ZINSSER, a Flak rocket expert, mentioned what he noticed one day: In the beginning of Oct. 1944 I flew from Ludwigslust (south of Lübeck), about 12 to 15 km from an atomic bomb test station, when I noticed a strong, bright illumination of the whole atmosphere, lasting about 2 seconds. 48. The clearly visible pressure wave escaped the approaching and following cloud formed by the explosion. This wave had a diameter of about 1 km when it became visible and the color of the cloud changed frequently. It became dotted after a short period of darkness with all sorts of light spots, which were, in contrast to normal explosions, of a pale blue color. 49. After about 10 seconds the sharp outlines of the explosion cloud disappeared, then the cloud began to take on a lighter color against the sky covered with a gray overcast. The diameter of the still visible pressure wave was at least 9000 meters while remaining visible for at least 15 seconds. 50. Personal observations of the colors of the explosion cloud found an almost blue-violet shade. During this manifestation reddish-colored rims were to be seen, changing to a dirty-like shade in very rapid succession. 51. The combustion was lightly felt from my observation plane in the form of pulling and pushing. The appearance of atmospheric disturbance lasted about 10 seconds without noticeable climax. 52. About one hour later I started with an He 111 from the A/D [aerodrome] at Ludwigslust and flew in an easterly direction. Shortly after the start I passed through the almost complete overcast (between 3000 and 4000 meter altitude). A cloud shaped like a mushroom with turbulent, billowing sections (at about 7000 meter altitude) stood, without any seeming connections, over the spot where the explosion took place. Strong electrical disturbances and the impossibility to continue radio communication as by lightning, turned up. 53. Because of the P-38s operating in the area Wittenberg-Merseburg I had to turn to the north but observed a better visibility at the bottom of the cloud where the explosion occurred.

Philip Morrison. 23 March 1990 interview by Thomas Powers. Karlsch & Petermann 2007, p. 160.
[In October 1944] I read the report about the interrogation of German officers who claimed to have seen a purple mushroom-shaped cloud near Peenemünde. We didn't think this was very credible, but we were still worried. I sent a memorandum to the security advisers saying that President Roosevelt should not meet Churchill in London because we feared an atomic bomb attack on the British capital.

Theodor Soucek. 2001. *Mein Richter, mein Henker.* Bright Rainbow.
In mid-January 1945… the general turned to me surprisingly and confidentially: "In recent days we were shown the latest developments in German secret weapons together with other allied government representatives of the Axis powers. We were flown to a Wehrmacht restricted area on the Baltic Sea and the following happened: We were shown a small island perhaps 20--25 km away as a target area and bombarded it with a new type of bomb, dropped from an airplane. This bomb had such an unprecedented effect that nothing could be seen of the island, it had disappeared into the water!"

Harry K. Lennon. 23 May 1945. NARA RG 77, Entry UD-22A, Box 167, Folder 32.12-2.
The experiments with the atom-splitting bomb had almost been brought to conclusion… Laboratory experiments were conducted in DANZIG and BERLIN. Practical experiments were conducted on the Baltic coast.

Manhattan Engineer District. 4 August 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.
The Germans are at present working on an extremely secret explosive. Informant knows very little about it and states that it has something to do with "Heavy Water" (Schweres Wasser). Experiments are conducted on an estate in Pomerania and it is alleged that this explosive is capable of destroying everything in a radius of several kilometers.

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*
I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

OSS London. 5 December 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.
Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

Summary of 5 October 2004 interview with Elisabeth Mestlin. Rainer Karlsch and Heiko Petermann 2007. *Für und Wider "Hitlers Bombe"*. Münster: Waxmann. p. 163.
She remembered the extraordinary event because of credible circumstances. After the bombardment of Stralsund on 6 October 1944, Ms. Mestlin went to see her children in Vitte on the island of Hiddensee. On the island of Hiddensee on 12 October 1944, she heard a violent explosion and saw a large cloud of dust on the southern tip of the Bug peninsula.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. pp. 13, 31.
When, in October 1944, it was clear that the theory of the atomic bomb was in principle correct, various circles had, of course, also been thinking about what should be done to end the war as quickly as possible… It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute... Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

A.P.W.I.U. (Ninth Air Force) 96/1945. 19 August 1945. Investigations, Research, Developments, and Practical Use of the German Atomic Bomb. NARA RG 38, Entry 98C, Box 9, Folder TSC # 2601--2700. Upgraded from Secret to Top Secret in October 1945.
47. A man named ZINSSER, a Flak rocket expert, mentioned what he noticed one day: In the beginning of Oct. 1944 I flew from Ludwigslust (south of Lübeck), about 12 to 15 km from an atomic bomb test station, when I noticed a strong, bright illumination of the whole atmosphere, lasting about 2 seconds. 48. The clearly visible pressure wave escaped the approaching and following cloud formed by the explosion. This wave had a diameter of about 1 km when it became visible and the color of the cloud changed frequently. It became dotted after a short period of darkness with all sorts of light spots, which were, in contrast to normal explosions, of a pale blue color. 49. After about 10 seconds the sharp outlines of the explosion cloud disappeared, then the cloud began to take on a lighter color against the sky covered with a gray overcast. The diameter of the still visible pressure wave was at least 9000 meters while remaining visible for at least 15 seconds. 50. Personal observations of the colors of the explosion cloud found an almost blue-violet shade. During this manifestation reddish-colored rims were to be seen, changing to a dirty-like shade in very rapid succession. 51. The combustion was lightly felt from my observation plane in the form of pulling and pushing. The appearance of atmospheric disturbance lasted about 10 seconds without noticeable climax. 52. About one hour later I started with an He 111 from the A/D [aerodrome] at Ludwigslust and flew in an easterly direction. Shortly after the start I passed through the almost complete overcast (between 3000 and 4000 meter altitude). A cloud shaped like a mushroom with turbulent, billowing sections (at about 7000 meter altitude) stood, without any seeming connections, over the spot where the explosion took place. Strong electrical disturbances and the impossibility to continue radio communication as by lightning, turned up. 53. Because of the P-38s operating in the area Wittenberg-Merseburg I had to turn to the north but observed a better visibility at the bottom of the cloud where the explosion occurred.

Philip Morrison. 23 March 1990 interview by Thomas Powers. Karlsch & Petermann 2007, p. 160.
[In October 1944] I read the report about the interrogation of German officers who claimed to have seen a purple mushroom-shaped cloud near Peenemünde. We didn't think this was very credible, but we were still worried. I sent a memorandum to the security advisers saying that President Roosevelt should not meet Churchill in London because we feared an atomic bomb attack on the British capital.

Theodor Soucek. 2001. *Mein Richter, mein Henker.* Bright Rainbow.
In mid-January 1945… the general turned to me surprisingly and confidentially: "In recent days we were shown the latest developments in German secret weapons together with other allied government representatives of the Axis powers. We were flown to a Wehrmacht restricted area on the Baltic Sea and the following happened: We were shown a small island perhaps 20--25 km away as a target area and bombarded it with a new type of bomb, dropped from an airplane. This bomb had such an unprecedented effect that nothing could be seen of the island, it had disappeared into the water!"

Harry K. Lennon. 23 May 1945. NARA RG 77, Entry UD-22A, Box 167, Folder 32.12-2.
The experiments with the atom-splitting bomb had almost been brought to conclusion… Laboratory experiments were conducted in DANZIG and BERLIN. Practical experiments were conducted on the Baltic coast.

Manhattan Engineer District. 4 August 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.
The Germans are at present working on an extremely secret explosive. Informant knows very little about it and states that it has something to do with "Heavy Water" (Schweres Wasser). Experiments are conducted on an estate in Pomerania and it is alleged that this explosive is capable of destroying everything in a radius of several kilometers.

Howard G. Bunker. 11 May 1944. G.A.F. Experimental Stations. AFHRA A5729 frame 1148.
Peenemünde: Rockets and jet propulsion… Rügen: Most secret research.

10. Reported October 1944 Test Explosion on Baltic Coast

Luigi Romersa. May-June 1955. Le armi segrete di Hitler. *Civiltà delle Macchine.*
I left Berlin on the night of the 11th [October 1944] by car; two officers accompanied me… Rügen was an experimental center where the new German weapons were tested. Special units of assault troops protected the island and restricted access. To travel to [part of] Rügen required a safe-conduct pass signed by the Wehrmacht's chief of staff. We immediately went to an area thick with trees where we found other officers and some technicians. Concrete shelters and small brick buildings had been built in the woods. We entered an armored, half-buried turret through a small metal door that was closed with every precaution. Inside there were four of us: the two officers who had accompanied me, another man dressed in a suit, and me. I waited for noon with my heart in my throat. At noon, according to what the man in the suit had said, there would be the test of the "disintegration bomb." The bomb was to explode on the ground, about two kilometers from our armored observatory… They warned that the test had been brought forward to 11:45 a.m.… I barely had time to consult the clock when I heard a tremendous roar. The floor rocked under my feet, and for an instant it seemed to me as if the walls of the shelter were falling in. In front I could see nothing but smoke, a whitish, woolly smoke that bubbled up like slime spewed from a sewer. More bursts were heard followed by blinding flashes. The sky, bleak and closed, was ripped apart by the whitest flashes of lightning. I ran a hand over my face; I was sweating. No one opened their mouth. The roar just then was followed by a chilling silence. It was the man in the suit who spoke first. He was a colonel in the "Heereswaffenamt," the body in charge of developing weapons. "What we witness today--he said--is of paramount importance. When we can drop our bomb on invading troops or on an enemy city, the Anglo-Americans will be forced to decide whether it is worth continuing the war or ending it reasonably. We have been working for years. We have finally achieved our objective." … We left the bunker around 5:00 p.m., after some men dressed in monstrous suits had arrived; on their heads they wore a helmet like that of a diving suit, only it was floppy and had no screws. We, too, wore a strange smock of rough, off-white cloth and pants of the same fabric. We walked ahead of the soldiers. As we advanced, the land appeared to have been shocked, plowed, torn apart by fearful chasms. It was cold and yet everything was scorched as if a blast of fire had passed over the island. The trees no longer had foliage or branches; they were reduced to burnt trunks. My foot bumped into something; I bent down and saw a charred goat. You could tell it was a goat because tufts of hair could be seen on the streaked flesh; its head was crushed, as if it had been pounded with a hammer. The little stone buildings were piles of rubble… In late October I saw Goebbels... I learned that there were two types of rockets, the "A-4" and the "A-9,"… equipped with atomic warheads, with a fantastic range.

OSS Report FF-83. 21 Oct. 1944. Atom Smashing Secret Weapon. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44).
The Germans have completed a weapon which is founded on the principle of the disintegration of matter (Atomzertruemmerung). Experiments have been performed which have proved conclusive. The effect of this weapon is like that of a thunderbolt, naturally much magnified. The radius of action is supposed to be about three kilometers.

OSS London. 5 December 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-3.
Heavy water experiments are being carried out at the Dräger Werke, Lübeck, which is reported to be the largest gas factory in Germany.

Summary of 5 October 2004 interview with Elisabeth Mestlin. Rainer Karlsch and Heiko Petermann 2007. *Für und Wider "Hitlers Bombe".* Münster: Waxmann. p. 163.
She remembered the extraordinary event because of credible circumstances. After the bombardment of Stralsund on 6 October 1944, Ms. Mestlin went to see her children in Vitte on the island of Hiddensee. On the island of Hiddensee on 12 October 1944, she heard a violent explosion and saw a large cloud of dust on the southern tip of the Bug peninsula.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. pp. 13, 31.
When, in October 1944, it was clear that the theory of the atomic bomb was in principle correct, various circles had, of course, also been thinking about what should be done to end the war as quickly as possible… It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute... Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

A.P.W.I.U. (Ninth Air Force) 96/1945. 19 August 1945. Investigations, Research, Developments, and Practical Use of the German Atomic Bomb. NARA RG 38, Entry 98C, Box 9, Folder TSC # 2601--2700. Upgraded from Secret to Top Secret in October 1945.
47. A man named ZINSSER, a Flak rocket expert, mentioned what he noticed one day: In the beginning of Oct. 1944 I flew from Ludwigslust (south of Lübeck), about 12 to 15 km from an atomic bomb test station, when I noticed a strong, bright illumination of the whole atmosphere, lasting about 2 seconds. 48. The clearly visible pressure wave escaped the approaching and following cloud formed by the explosion. This wave had a diameter of about 1 km when it became visible and the color of the cloud changed frequently. It became dotted after a short period of darkness with all sorts of light spots, which were, in contrast to normal explosions, of a pale blue color. 49. After about 10 seconds the sharp outlines of the explosion cloud disappeared, then the cloud began to take on a lighter color against the sky covered with a gray overcast. The diameter of the still visible pressure wave was at least 9000 meters while remaining visible for at least 15 seconds. 50. Personal observations of the colors of the explosion cloud found an almost blue-violet shade. During this manifestation reddish-colored rims were to be seen, changing to a dirty-like shade in very rapid succession. 51. The combustion was lightly felt from my observation plane in the form of pulling and pushing. The appearance of atmospheric disturbance lasted about 10 seconds without noticeable climax. 52. About one hour later I started with an He 111 from the A/D [aerodrome] at Ludwigslust and flew in an easterly direction. Shortly after the start I passed through the almost complete overcast (between 3000 and 4000 meter altitude). A cloud shaped like a mushroom with turbulent, billowing sections (at about 7000 meter altitude) stood, without any seeming connections, over the spot where the explosion took place. Strong electrical disturbances and the impossibility to continue radio communication as by lightning, turned up. 53. Because of the P-38s operating in the area Wittenberg-Merseburg I had to turn to the north but observed a better visibility at the bottom of the cloud where the explosion occurred.

Philip Morrison. 23 March 1990 interview by Thomas Powers. Karlsch & Petermann 2007, p. 160.
[In October 1944] I read the report about the interrogation of German officers who claimed to have seen a purple mushroom-shaped cloud near Peenemünde. We didn't think this was very credible, but we were still worried. I sent a memorandum to the security advisers saying that President Roosevelt should not meet Churchill in London because we feared an atomic bomb attack on the British capital.

Theodor Soucek. 2001. *Mein Richter, mein Henker.* Bright Rainbow.
In mid-January 1945… the general turned to me surprisingly and confidentially: "In recent days we were shown the latest developments in German secret weapons together with other allied government representatives of the Axis powers. We were flown to a Wehrmacht restricted area on the Baltic Sea and the following happened: We were shown a small island perhaps 20--25 km away as a target area and bombarded it with a new type of bomb, dropped from an airplane. This bomb had such an unprecedented effect that nothing could be seen of the island, it had disappeared into the water!"

Harry K. Lennon. 23 May 1945. NARA RG 77, Entry UD-22A, Box 167, Folder 32.12-2.
The experiments with the atom-splitting bomb had almost been brought to conclusion… Laboratory experiments were conducted in DANZIG and BERLIN. Practical experiments were conducted on the Baltic coast.

Manhattan Engineer District. 4 August 1944. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2.
The Germans are at present working on an extremely secret explosive. Informant knows very little about it and states that it has something to do with "Heavy Water" (Schweres Wasser). Experiments are conducted on an estate in Pomerania and it is alleged that this explosive is capable of destroying everything in a radius of several kilometers.

Howard G. Bunker. 11 May 1944. G.A.F. Experimental Stations. AFHRA A5729 frame 1148.
Peenemünde: Rockets and jet propulsion… Rügen: Most secret research.

Headquarters, U.S. Strategic Air Forces in Europe. 19 Jan. 1945. AFHRA A5729 p. 255 ff. In the following paragraphs are listed the actual or potential weapons which the Germans may use against USSTAF operations in 1945… No consideration is given to those for which there is lacking evidence of possible use for some time to come… ATOMIC BOMB: Close check of every report, and close surveillance of the area in which tests are alleged to have taken place lead to the conclusion that such bombs are not a likelihood in 1945.

[For more information see *Forgotten Creators* D.10.]

11. Reported ~November 1944 Test Explosion in Poland

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp

And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp

And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.

Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to “try out” the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp

And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.

Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to "try out" the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

Wilhelm Wulff. 1973. *Zodiac and Swastika*. Coward McCann & Geoghegan. pp. 160-161.

[Himmler] went on to talk about a quite different missile, one of incredible power. Cities like New York and London, he said, could be wiped off the face of the earth with the help of this new weapon… What he had told me was basically true, for work was already being done on the German atom bomb at the time. Franz Göring also told me that the new missiles had been tested. According to him, a large town was especially built near Auschwitz concentration camp and some 20,000 Jews, mostly women and children, were sent to live in it. A single missile was then fired into the settlement. In the ensuing explosion, which developed a heat output of 6,000º C at its center, the whole town and the entire population were burned to cinders in a flash.

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp

And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.

Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to “try out” the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

Wilhelm Wulff. 1973. *Zodiac and Swastika*. Coward McCann & Geoghegan. pp. 160-161.

[Himmler] went on to talk about a quite different missile, one of incredible power. Cities like New York and London, he said, could be wiped off the face of the earth with the help of this new weapon… What he had told me was basically true, for work was already being done on the German atom bomb at the time. Franz Göring also told me that the new missiles had been tested. According to him, a large town was especially built near Auschwitz concentration camp and some 20,000 Jews, mostly women and children, were sent to live in it. A single missile was then fired into the settlement. In the ensuing explosion, which developed a heat output of 6,000º C at its center, the whole town and the entire population were burned to cinders in a flash.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. p. 31.

Well, it is so: It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute. That one in winter 1944 in the air was highly explosive and the charge [fuel] was also larger. That could have been in November. The last test was then again with a small charge in March 1945. Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp
And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.
Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to “try out” the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

Wilhelm Wulff. 1973. *Zodiac and Swastika*. Coward McCann & Geoghegan. pp. 160-161.
[Himmler] went on to talk about a quite different missile, one of incredible power. Cities like New York and London, he said, could be wiped off the face of the earth with the help of this new weapon… What he had told me was basically true, for work was already being done on the German atom bomb at the time. Franz Göring also told me that the new missiles had been tested. According to him, a large town was especially built near Auschwitz concentration camp and some 20,000 Jews, mostly women and children, were sent to live in it. A single missile was then fired into the settlement. In the ensuing explosion, which developed a heat output of 6,000º C at its center, the whole town and the entire population were burned to cinders in a flash.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. p. 31.
Well, it is so: It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute. That one in winter 1944 in the air was highly explosive and the charge [fuel] was also larger. That could have been in November. The last test was then again with a small charge in March 1945. Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

DI 092.-76 FIAT. Periodic Intelligence Report 1. 2 August 1946. TNA FO 1031/59.
Completely unreliable source described the following: ARDENNE made experiments with an atom gun (Atomkanone). About Christmas 1944, successful experiments were conducted in Pomerania with V-1 and atomic warheads, radio directed. The ensuing crater was 2 km in diameter. Because the time for developments was too short nothing more came of it. Source has heard this from a man who participated in experiments but inconsiderately died in winter of 1945. It has not been possible to verify this statement from any other source although rumours to this effect, although with different names, have been persistent.

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp
And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.
Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to “try out” the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

Wilhelm Wulff. 1973. *Zodiac and Swastika*. Coward McCann & Geoghegan. pp. 160-161.
[Himmler] went on to talk about a quite different missile, one of incredible power. Cities like New York and London, he said, could be wiped off the face of the earth with the help of this new weapon… What he had told me was basically true, for work was already being done on the German atom bomb at the time. Franz Göring also told me that the new missiles had been tested. According to him, a large town was especially built near Auschwitz concentration camp and some 20,000 Jews, mostly women and children, were sent to live in it. A single missile was then fired into the settlement. In the ensuing explosion, which developed a heat output of 6,000º C at its center, the whole town and the entire population were burned to cinders in a flash.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. p. 31.
Well, it is so: It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute. That one in winter 1944 in the air was highly explosive and the charge [fuel] was also larger. That could have been in November. The last test was then again with a small charge in March 1945. Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

DI 092.-76 FIAT. Periodic Intelligence Report 1. 2 August 1946. TNA FO 1031/59.
Completely unreliable source described the following: ARDENNE made experiments with an atom gun (Atomkanone). About Christmas 1944, successful experiments were conducted in Pomerania with V-1 and atomic warheads, radio directed. The ensuing crater was 2 km in diameter. Because the time for developments was too short nothing more came of it. Source has heard this from a man who participated in experiments but inconsiderately died in winter of 1945. It has not been possible to verify this statement from any other source although rumours to this effect, although with different names, have been persistent.

Gezo Mansfeldt to Hans Münch. 5 December 1946. US Holocaust Memorial Museum, RG-15.169M (1998.A.0247) microfilm reel 8.
The next day was uneventful, and on 27 January [1945], 4:00 in the afternoon the first Russian vanguard marched through the Auschwitz camp. Thus we approximately 3,000 men—physicians, nurses, and patients—were free… I was the only living witness who knew about the Hygiene Institute information and so I was at least 2–3 times weekly interviewed and had to drive to Raisko several times, but now in the fine car, and show everything there. The various scientific commissions were difficult to convince that poison gas and the like was not produced there, and what was actually suspected was clear to me only much later, when I learned of the atomic bomb tests.

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp
And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.
Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to "try out" the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

Wilhelm Wulff. 1973. *Zodiac and Swastika*. Coward McCann & Geoghegan. pp. 160-161.
[Himmler] went on to talk about a quite different missile, one of incredible power. Cities like New York and London, he said, could be wiped off the face of the earth with the help of this new weapon… What he had told me was basically true, for work was already being done on the German atom bomb at the time. Franz Göring also told me that the new missiles had been tested. According to him, a large town was especially built near Auschwitz concentration camp and some 20,000 Jews, mostly women and children, were sent to live in it. A single missile was then fired into the settlement. In the ensuing explosion, which developed a heat output of 6,000º C at its center, the whole town and the entire population were burned to cinders in a flash.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. p. 31.
Well, it is so: It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute. That one in winter 1944 in the air was highly explosive and the charge [fuel] was also larger. That could have been in November. The last test was then again with a small charge in March 1945. Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

DI 092.-76 FIAT. Periodic Intelligence Report 1. 2 August 1946. TNA FO 1031/59.
Completely unreliable source described the following: ARDENNE made experiments with an atom gun (Atomkanone). About Christmas 1944, successful experiments were conducted in Pomerania with V-1 and atomic warheads, radio directed. The ensuing crater was 2 km in diameter. Because the time for developments was too short nothing more came of it. Source has heard this from a man who participated in experiments but inconsiderately died in winter of 1945. It has not been possible to verify this statement from any other source although rumours to this effect, although with different names, have been persistent.

Gezo Mansfeldt to Hans Münch. 5 December 1946. US Holocaust Memorial Museum, RG-15.169M (1998.A.0247) microfilm reel 8.
The next day was uneventful, and on 27 January [1945], 4:00 in the afternoon the first Russian vanguard marched through the Auschwitz camp. Thus we approximately 3,000 men—physicians, nurses, and patients—were free… I was the only living witness who knew about the Hygiene Institute information and so I was at least 2–3 times weekly interviewed and had to drive to Raisko several times, but now in the fine car, and show everything there. The various scientific commissions were difficult to convince that poison gas and the like was not produced there, and what was actually suspected was clear to me only much later, when I learned of the atomic bomb tests.

U.S. Embassy Warsaw. 12 Aug. 1947. MIS-390731. Subject: Plants producing heavy water. NARA RG 319, Entry 85A, Box 2534, Folder 390731–390740.
It is believed that no plants designed specially for the production of heavy water exist in Poland [in 1947]. It is reliably reported that the Germans built one such plant near OSWIECIM (Auschwitz) but that it was destroyed or moved out by the SOVIETS in 1945.

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp
And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.
Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to "try out" the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

Wilhelm Wulff. 1973. *Zodiac and Swastika*. Coward McCann & Geoghegan. pp. 160-161.
[Himmler] went on to talk about a quite different missile, one of incredible power. Cities like New York and London, he said, could be wiped off the face of the earth with the help of this new weapon… What he had told me was basically true, for work was already being done on the German atom bomb at the time. Franz Göring also told me that the new missiles had been tested. According to him, a large town was especially built near Auschwitz concentration camp and some 20,000 Jews, mostly women and children, were sent to live in it. A single missile was then fired into the settlement. In the ensuing explosion, which developed a heat output of 6,000º C at its center, the whole town and the entire population were burned to cinders in a flash.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. p. 31.
Well, it is so: It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute. That one in winter 1944 in the air was highly explosive and the charge [fuel] was also larger. That could have been in November. The last test was then again with a small charge in March 1945. Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

DI 092.-76 FIAT. Periodic Intelligence Report 1. 2 August 1946. TNA FO 1031/59.
Completely unreliable source described the following: ARDENNE made experiments with an atom gun (Atomkanone). About Christmas 1944, successful experiments were conducted in Pomerania with V-1 and atomic warheads, radio directed. The ensuing crater was 2 km in diameter. Because the time for developments was too short nothing more came of it. Source has heard this from a man who participated in experiments but inconsiderately died in winter of 1945. It has not been possible to verify this statement from any other source although rumours to this effect, although with different names, have been persistent.

Gezo Mansfeldt to Hans Münch. 5 December 1946. US Holocaust Memorial Museum, RG-15.169M (1998.A.0247) microfilm reel 8.
The next day was uneventful, and on 27 January [1945], 4:00 in the afternoon the first Russian vanguard marched through the Auschwitz camp. Thus we approximately 3,000 men—physicians, nurses, and patients—were free… I was the only living witness who knew about the Hygiene Institute information and so I was at least 2–3 times weekly interviewed and had to drive to Raisko several times, but now in the fine car, and show everything there. The various scientific commissions were difficult to convince that poison gas and the like was not produced there, and what was actually suspected was clear to me only much later, when I learned of the atomic bomb tests.

U.S. Embassy Warsaw. 12 Aug. 1947. MIS-390731. Subject: Plants producing heavy water. NARA RG 319, Entry 85A, Box 2534, Folder 390731–390740.
It is believed that no plants designed specially for the production of heavy water exist in Poland [in 1947]. It is reliably reported that the Germans built one such plant near OSWIECIM (Auschwitz) but that it was destroyed or moved out by the SOVIETS in 1945.

PW Intelligence Bulletin No. 2/25. 9 January 1945. AFHRA A5186, frames 0023-0027.
Location. The factory, commonly known as Bunawerke MONOWITZ, houses the two firms BUNA and IG FARBEN. Completely underground, it can nevertheless be located easily by six large wooden barracks, used as quarters for foremen and head mechanics, and situated atop a hill. Personnel. Employed in the factory are appr 30,000 workers, all political prisoners whose work is supervised by SS guards. The workers--Poles, Russians, Czechs, and Jews--march to and from the factory from the nearby concentration camp at AUSCHWITZ, where a total of 680,000 prisoners are detained.

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp
And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.
Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to “try out” the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

Wilhelm Wulff. 1973. *Zodiac and Swastika*. Coward McCann & Geoghegan. pp. 160-161.
[Himmler] went on to talk about a quite different missile, one of incredible power. Cities like New York and London, he said, could be wiped off the face of the earth with the help of this new weapon… What he had told me was basically true, for work was already being done on the German atom bomb at the time. Franz Göring also told me that the new missiles had been tested. According to him, a large town was especially built near Auschwitz concentration camp and some 20,000 Jews, mostly women and children, were sent to live in it. A single missile was then fired into the settlement. In the ensuing explosion, which developed a heat output of 6,000º C at its center, the whole town and the entire population were burned to cinders in a flash.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. p. 31.
Well, it is so: It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute. That one in winter 1944 in the air was highly explosive and the charge [fuel] was also larger. That could have been in November. The last test was then again with a small charge in March 1945. Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

DI 092.-76 FIAT. Periodic Intelligence Report 1. 2 August 1946. TNA FO 1031/59.
Completely unreliable source described the following: ARDENNE made experiments with an atom gun (Atomkanone). About Christmas 1944, successful experiments were conducted in Pomerania with V-1 and atomic warheads, radio directed. The ensuing crater was 2 km in diameter. Because the time for developments was too short nothing more came of it. Source has heard this from a man who participated in experiments but inconsiderately died in winter of 1945. It has not been possible to verify this statement from any other source although rumours to this effect, although with different names, have been persistent.

Gezo Mansfeldt to Hans Münch. 5 December 1946. US Holocaust Memorial Museum, RG-15.169M (1998.A.0247) microfilm reel 8.
The next day was uneventful, and on 27 January [1945], 4:00 in the afternoon the first Russian vanguard marched through the Auschwitz camp. Thus we approximately 3,000 men—physicians, nurses, and patients—were free… I was the only living witness who knew about the Hygiene Institute information and so I was at least 2–3 times weekly interviewed and had to drive to Raisko several times, but now in the fine car, and show everything there. The various scientific commissions were difficult to convince that poison gas and the like was not produced there, and what was actually suspected was clear to me only much later, when I learned of the atomic bomb tests.

U.S. Embassy Warsaw. 12 Aug. 1947. MIS-390731. Subject: Plants producing heavy water. NARA RG 319, Entry 85A, Box 2534, Folder 390731–390740.
It is believed that no plants designed specially for the production of heavy water exist in Poland [in 1947]. It is reliably reported that the Germans built one such plant near OSWIECIM (Auschwitz) but that it was destroyed or moved out by the SOVIETS in 1945.

PW Intelligence Bulletin No. 2/25. 9 January 1945. AFHRA A5186, frames 0023-0027.
Location. The factory, commonly known as Bunawerke MONOWITZ, houses the two firms BUNA and IG FARBEN. Completely underground, it can nevertheless be located easily by six large wooden barracks, used as quarters for foremen and head mechanics, and situated atop a hill. Personnel. Employed in the factory are appr 30,000 workers, all political prisoners whose work is supervised by SS guards. The workers--Poles, Russians, Czechs, and Jews--march to and from the factory from the nearby concentration camp at AUSCHWITZ, where a total of 680,000 prisoners are detained.

Joseph Borkin. 1978. *The Crime and Punishment of I. G. Farben.* Free Press. p. 127.
From the bare records available, 300,000 concentration camp workers passed through I.G. Auschwitz of whom at least 25,000 were worked to death. The plants when completed were so enormous that they used more electricity than the entire city of Berlin… Despite the investment of almost 900 million Reichsmarks and thousands of lives, only a modest stream of fuel and not a single pound of Buna rubber was ever produced.

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp
And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.
Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to “try out” the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

Wilhelm Wulff. 1973. *Zodiac and Swastika*. Coward McCann & Geoghegan. pp. 160-161.
[Himmler] went on to talk about a quite different missile, one of incredible power. Cities like New York and London, he said, could be wiped off the face of the earth with the help of this new weapon… What he had told me was basically true, for work was already being done on the German atom bomb at the time. Franz Göring also told me that the new missiles had been tested. According to him, a large town was especially built near Auschwitz concentration camp and some 20,000 Jews, mostly women and children, were sent to live in it. A single missile was then fired into the settlement. In the ensuing explosion, which developed a heat output of 6,000º C at its center, the whole town and the entire population were burned to cinders in a flash.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. p. 31.
Well, it is so: It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute. That one in winter 1944 in the air was highly explosive and the charge [fuel] was also larger. That could have been in November. The last test was then again with a small charge in March 1945. Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

DI 092.-76 FIAT. Periodic Intelligence Report 1. 2 August 1946. TNA FO 1031/59.
Completely unreliable source described the following: ARDENNE made experiments with an atom gun (Atomkanone). About Christmas 1944, successful experiments were conducted in Pomerania with V-1 and atomic warheads, radio directed. The ensuing crater was 2 km in diameter. Because the time for developments was too short nothing more came of it. Source has heard this from a man who participated in experiments but inconsiderately died in winter of 1945. It has not been possible to verify this statement from any other source although rumours to this effect, although with different names, have been persistent.

Gezo Mansfeldt to Hans Münch. 5 December 1946. US Holocaust Memorial Museum, RG-15.169M (1998.A.0247) microfilm reel 8.
The next day was uneventful, and on 27 January [1945], 4:00 in the afternoon the first Russian vanguard marched through the Auschwitz camp. Thus we approximately 3,000 men—physicians, nurses, and patients—were free… I was the only living witness who knew about the Hygiene Institute information and so I was at least 2–3 times weekly interviewed and had to drive to Raisko several times, but now in the fine car, and show everything there. The various scientific commissions were difficult to convince that poison gas and the like was not produced there, and what was actually suspected was clear to me only much later, when I learned of the atomic bomb tests.

U.S. Embassy Warsaw. 12 Aug. 1947. MIS-390731. Subject: Plants producing heavy water. NARA RG 319, Entry 85A, Box 2534, Folder 390731–390740.
It is believed that no plants designed specially for the production of heavy water exist in Poland [in 1947]. It is reliably reported that the Germans built one such plant near OSWIECIM (Auschwitz) but that it was destroyed or moved out by the SOVIETS in 1945.

PW Intelligence Bulletin No. 2/25. 9 January 1945. AFHRA A5186, frames 0023-0027.
Location. The factory, commonly known as Bunawerke MONOWITZ, houses the two firms BUNA and IG FARBEN. Completely underground, it can nevertheless be located easily by six large wooden barracks, used as quarters for foremen and head mechanics, and situated atop a hill. Personnel. Employed in the factory are appr 30,000 workers, all political prisoners whose work is supervised by SS guards. The workers--Poles, Russians, Czechs, and Jews--march to and from the factory from the nearby concentration camp at AUSCHWITZ, where a total of 680,000 prisoners are detained.

Joseph Borkin. 1978. *The Crime and Punishment of I. G. Farben.* Free Press. p. 127.
From the bare records available, 300,000 concentration camp workers passed through I.G. Auschwitz of whom at least 25,000 were worked to death. The plants when completed were so enormous that they used more electricity than the entire city of Berlin… Despite the investment of almost 900 million Reichsmarks and thousands of lives, only a modest stream of fuel and not a single pound of Buna rubber was ever produced.

Edmund Tilley. 19 Aug. 1947. NARA RG 319, Entry A1-134A, Box 29, Operation Oberjoch
Prof. Dr. NIELS [Walter Nielsch?], now said to be in the United States, was, according to [censored,] concerned with chemical and atomic problems at TUCHELER HEIDE and produced a number of atomic bombs, weighing from 1 to 5 kilograms. NIELS should be traced and questioned in detail.

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp
And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.
Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to "try out" the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

Wilhelm Wulff. 1973. *Zodiac and Swastika*. Coward McCann & Geoghegan. pp. 160-161.
[Himmler] went on to talk about a quite different missile, one of incredible power. Cities like New York and London, he said, could be wiped off the face of the earth with the help of this new weapon… What he had told me was basically true, for work was already being done on the German atom bomb at the time. Franz Göring also told me that the new missiles had been tested. According to him, a large town was especially built near Auschwitz concentration camp and some 20,000 Jews, mostly women and children, were sent to live in it. A single missile was then fired into the settlement. In the ensuing explosion, which developed a heat output of 6,000º C at its center, the whole town and the entire population were burned to cinders in a flash.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. p. 31.
Well, it is so: It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute. That one in winter 1944 in the air was highly explosive and the charge [fuel] was also larger. That could have been in November. The last test was then again with a small charge in March 1945. Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

DI 092.-76 FIAT. Periodic Intelligence Report 1. 2 August 1946. TNA FO 1031/59.
Completely unreliable source described the following: ARDENNE made experiments with an atom gun (Atomkanone). About Christmas 1944, successful experiments were conducted in Pomerania with V-1 and atomic warheads, radio directed. The ensuing crater was 2 km in diameter. Because the time for developments was too short nothing more came of it. Source has heard this from a man who participated in experiments but inconsiderately died in winter of 1945. It has not been possible to verify this statement from any other source although rumours to this effect, although with different names, have been persistent.

Gezo Mansfeldt to Hans Münch. 5 December 1946. US Holocaust Memorial Museum, RG-15.169M (1998.A.0247) microfilm reel 8.
The next day was uneventful, and on 27 January [1945], 4:00 in the afternoon the first Russian vanguard marched through the Auschwitz camp. Thus we approximately 3,000 men—physicians, nurses, and patients—were free… I was the only living witness who knew about the Hygiene Institute information and so I was at least 2–3 times weekly interviewed and had to drive to Raisko several times, but now in the fine car, and show everything there. The various scientific commissions were difficult to convince that poison gas and the like was not produced there, and what was actually suspected was clear to me only much later, when I learned of the atomic bomb tests.

U.S. Embassy Warsaw. 12 Aug. 1947. MIS-390731. Subject: Plants producing heavy water. NARA RG 319, Entry 85A, Box 2534, Folder 390731–390740.
It is believed that no plants designed specially for the production of heavy water exist in Poland [in 1947]. It is reliably reported that the Germans built one such plant near OSWIECIM (Auschwitz) but that it was destroyed or moved out by the SOVIETS in 1945.

PW Intelligence Bulletin No. 2/25. 9 January 1945. AFHRA A5186, frames 0023-0027.
Location. The factory, commonly known as Bunawerke MONOWITZ, houses the two firms BUNA and IG FARBEN. Completely underground, it can nevertheless be located easily by six large wooden barracks, used as quarters for foremen and head mechanics, and situated atop a hill. Personnel. Employed in the factory are appr 30,000 workers, all political prisoners whose work is supervised by SS guards. The workers--Poles, Russians, Czechs, and Jews--march to and from the factory from the nearby concentration camp at AUSCHWITZ, where a total of 680,000 prisoners are detained.

Joseph Borkin. 1978. *The Crime and Punishment of I. G. Farben.* Free Press. p. 127.
From the bare records available, 300,000 concentration camp workers passed through I.G. Auschwitz of whom at least 25,000 were worked to death. The plants when completed were so enormous that they used more electricity than the entire city of Berlin… Despite the investment of almost 900 million Reichsmarks and thousands of lives, only a modest stream of fuel and not a single pound of Buna rubber was ever produced.

Edmund Tilley. 19 Aug. 1947. NARA RG 319, Entry A1-134A, Box 29, Operation Oberjoch
Prof. Dr. NIELS [Walter Nielsch?], now said to be in the United States, was, according to [censored,] concerned with chemical and atomic problems at TUCHELER HEIDE and produced a number of atomic bombs, weighing from 1 to 5 kilograms. NIELS should be traced and questioned in detail.

Top Secret Cable from Warsaw to Secretary of State. 7 March 1946. NARA RG 77, Entry UD-22A, Box 160, Folder 205.2 Cables Incoming, Top Secret.
Information has been given this Embassy by a capable young engineer working in the zinc industry, that one of the best if not the only material for atomic bomb containers is cadmium. According to the informant the cadmium output of Poland in 1945 amounted to 49.15 tons, and in January of 1946 to 10.9 tons. In 1945 there was exported to Russia the total Polish cadmium output. End ACTION: General Groves

11. Reported ~November 1944 Test Explosion in Poland

Robert Jackson to Albert Speer. 21 June 1946. avalon.law.yale.edu/imt/06-21-46.asp

And certain experiments were also conducted and certain researches conducted in atomic energy, were they not?... Now, I have certain information, which was placed in my hands, of an experiment which was carried out near Auschwitz and I would like to ask you if you heard about it or knew about it. The purpose of the experiment was to find a quick and complete way of destroying people without the delay and trouble of shooting and gassing and burning, as it had been carried out, and this is the experiment, as I am advised. A village, a small village was provisionally erected, with temporary structures, and in it approximately 20,000 Jews were put. By means of this newly invented weapon of destruction, these 20,000 people were eradicated almost instantaneously, and in such a way that there was no trace left of them; that it developed, the explosive developed, temperatures of from 400[0] to 500[0] centigrade and destroyed them without leaving any trace at all. Do you know about that experiment?

Felix Kersten. 1947. *Memoirs of Doctor Felix Kersten*. Doubleday. pp. 256-258.

Kriminalrat Obersturmfuehrer Göring… said that a village had been built near Auschwitz for experimental purposes. They wanted to "try out" the new weapon. For the purpose, twenty thousand Jewish men, women, and children had been brought to live in this village. A single shell had been fired on the settlement. It had caused six thousand degrees of heat, and the whole village--houses, human beings, and animals included--was burnt to ashes. Obviously, as I see it now in retrospect, the Germans had nearly completed their atomic bomb and were almost ready to use it on the enemy when the encirclement of Berlin was complete.

Wilhelm Wulff. 1973. *Zodiac and Swastika*. Coward McCann & Geoghegan. pp. 160-161.

[Himmler] went on to talk about a quite different missile, one of incredible power. Cities like New York and London, he said, could be wiped off the face of the earth with the help of this new weapon… What he had told me was basically true, for work was already being done on the German atom bomb at the time. Franz Göring also told me that the new missiles had been tested. According to him, a large town was especially built near Auschwitz concentration camp and some 20,000 Jews, mostly women and children, were sent to live in it. A single missile was then fired into the settlement. In the ensuing explosion, which developed a heat output of 6,000º C at its center, the whole town and the entire population were burned to cinders in a flash.

Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt. p. 31.

Well, it is so: It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute. That one in winter 1944 in the air was highly explosive and the charge [fuel] was also larger. That could have been in November. The last test was then again with a small charge in March 1945. Where the tests were I would like to not say now, because otherwise the population would be unnecessarily upset.

DI 092.-76 FIAT. Periodic Intelligence Report 1. 2 August 1946. TNA FO 1031/59.

Completely unreliable source described the following: ARDENNE made experiments with an atom gun (Atomkanone). About Christmas 1944, successful experiments were conducted in Pomerania with V-1 and atomic warheads, radio directed. The ensuing crater was 2 km in diameter. Because the time for developments was too short nothing more came of it. Source has heard this from a man who participated in experiments but inconsiderately died in winter of 1945. It has not been possible to verify this statement from any other source although rumours to this effect, although with different names, have been persistent.

Gezo Mansfeldt to Hans Münch. 5 December 1946. US Holocaust Memorial Museum, RG-15.169M (1998.A.0247) microfilm reel 8.

The next day was uneventful, and on 27 January [1945], 4:00 in the afternoon the first Russian vanguard marched through the Auschwitz camp. Thus we approximately 3,000 men—physicians, nurses, and patients—were free… I was the only living witness who knew about the Hygiene Institute information and so I was at least 2–3 times weekly interviewed and had to drive to Raisko several times, but now in the fine car, and show everything there. The various scientific commissions were difficult to convince that poison gas and the like was not produced there, and what was actually suspected was clear to me only much later, when I learned of the atomic bomb tests.

U.S. Embassy Warsaw. 12 Aug. 1947. MIS-390731. Subject: Plants producing heavy water. NARA RG 319, Entry 85A, Box 2534, Folder 390731–390740.

It is believed that no plants designed specially for the production of heavy water exist in Poland [in 1947]. It is reliably reported that the Germans built one such plant near OSWIECIM (Auschwitz) but that it was destroyed or moved out by the SOVIETS in 1945.

PW Intelligence Bulletin No. 2/25. 9 January 1945. AFHRA A5186, frames 0023-0027.

Location. The factory, commonly known as Bunawerke MONOWITZ, houses the two firms BUNA and IG FARBEN. Completely underground, it can nevertheless be located easily by six large wooden barracks, used as quarters for foremen and head mechanics, and situated atop a hill. Personnel. Employed in the factory are appr 30,000 workers, all political prisoners whose work is supervised by SS guards. The workers--Poles, Russians, Czechs, and Jews--march to and from the factory from the nearby concentration camp at AUSCHWITZ, where a total of 680,000 prisoners are detained.

Joseph Borkin. 1978. *The Crime and Punishment of I. G. Farben.* Free Press. p. 127.

From the bare records available, 300,000 concentration camp workers passed through I.G. Auschwitz of whom at least 25,000 were worked to death. The plants when completed were so enormous that they used more electricity than the entire city of Berlin… Despite the investment of almost 900 million Reichsmarks and thousands of lives, only a modest stream of fuel and not a single pound of Buna rubber was ever produced.

Edmund Tilley. 19 Aug. 1947. NARA RG 319, Entry A1-134A, Box 29, Operation Oberjoch

Prof. Dr. NIELS [Walter Nielsch?], now said to be in the United States, was, according to [censored,] concerned with chemical and atomic problems at TUCHELER HEIDE and produced a number of atomic bombs, weighing from 1 to 5 kilograms. NIELS should be traced and questioned in detail.

Top Secret Cable from Warsaw to Secretary of State. 7 March 1946. NARA RG 77, Entry UD-22A, Box 160, Folder 205.2 Cables Incoming, Top Secret.

Information has been given this Embassy by a capable young engineer working in the zinc industry, that one of the best if not the only material for atomic bomb containers is cadmium. According to the informant the cadmium output of Poland in 1945 amounted to 49.15 tons, and in January of 1946 to 10.9 tons. In 1945 there was exported to Russia the total Polish cadmium output. End ACTION: General Groves

R. W. Shaw to L. E. Seeman. 5 December 1946. NARA RG 77, Entry UD-22A, Box 171, Folder 32.60-2 Germany: Summary Reports (1945-1946).

[Otto] Hahn said that a rumour which went the rounds in Germany about six months before the capitulation was equally untrue. According to this rumour, atom bomb tests had been carried out in Poland during the last year of the war which were supposed to have had an effect similar to the first atom bomb dropped on Hiroshima though on a considerably smaller scale.

[For more information see *Forgotten Creators* D.11.]

12. Reported March 1945 Test Explosions in Thuringia

12. Reported March 1945 Test Explosions in Thuringia

Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.

Our trustworthy source in Germany reports: "The Germans are preparing to conduct tests of a new secret weapon, which has a large destructive power. The test explosion of a bomb of unusual construction is being prepared under highest secrecy in Thuringia. For the preparations of the tests the local residents are supposed to be transported away by an SS detail; the whole operation is reported to be undertaken in strictest secrecy. The explosions are supposed to take place in a wooded area. For that, special roads to the presumptive test site are being created. The bomb to be tested has a diameter of one and a half meters. It consists of several hollow spheres that nest inside each other. It will be brought to the explosion place with a transporter specially constructed for it. It is still unclear when the test is supposed to take place, but the preparations are going at the maximum fastest pace. CONCLUSION. In the last months our source has reported more and more often about the feverish efforts of the Germans to test ever more powerful weapons and their means of delivery. Probably these experiments lead directly to an attempt of the Germans to actually carry out tests of atom bombs, about whose existence we have only incomplete, scanty information."

12. Reported March 1945 Test Explosions in Thuringia

Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.

Our trustworthy source in Germany reports: "The Germans are preparing to conduct tests of a new secret weapon, which has a large destructive power. The test explosion of a bomb of unusual construction is being prepared under highest secrecy in Thuringia. For the preparations of the tests the local residents are supposed to be transported away by an SS detail; the whole operation is reported to be undertaken in strictest secrecy. The explosions are supposed to take place in a wooded area. For that, special roads to the presumptive test site are being created. The bomb to be tested has a diameter of one and a half meters. It consists of several hollow spheres that nest inside each other. It will be brought to the explosion place with a transporter specially constructed for it. It is still unclear when the test is supposed to take place, but the preparations are going at the maximum fastest pace. CONCLUSION. In the last months our source has reported more and more often about the feverish efforts of the Germans to test ever more powerful weapons and their means of delivery. Probably these experiments lead directly to an attempt of the Germans to actually carry out tests of atom bombs, about whose existence we have only incomplete, scanty information."

Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.

Our trustworthy source from Germany reports: The Germans have in recent times carried out two large-capacity bomb explosions in Thuringia. The explosions took place in a forest area, under conditions of strictest secrecy. Trees fell at a distance of 500–600 meters from the center of the explosion. Buildings and fortifications specially constructed for the tests have been destroyed. Prisoners of war who were near the epicenter of the explosion died, often without leaving a trace. Prisoners of war who were in the area beyond the center of the explosion have burns on their face and body, the strength of which depends on their position in relation to the epicenter of the explosion. The tests were carried out in a remote deserted area. The regime of secrecy at the test site was at maximum level. Entrance and exit from the territory are by special pass only. SS soldiers have surrounded the area of tests and interrogated any person approaching the area. The bomb, supposedly filled with uranium 235 and weighing approximately two tons, was brought to the test site on a specially constructed truck. Dewars of liquid oxygen were delivered together with it. The bomb was permanently guarded by 20 guards with dogs. The bomb explosion was accompanied by a large explosive wave and high temperature. In addition, a massive radioactive effect was observed. The bomb is a sphere with a diameter of 130 cm. The bomb consists of: 1. High-voltage discharge tube, which is charged by special generators 2. A sphere made of metal uranium 235 3. A delay mechanism [tamper] 4. Protective casing 5. Explosive substance 6. Detonating mechanism 7. Steel casing All parts of the bomb fit inside each other.

12. Reported March 1945 Test Explosions in Thuringia

Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.

Our trustworthy source in Germany reports: "The Germans are preparing to conduct tests of a new secret weapon, which has a large destructive power. The test explosion of a bomb of unusual construction is being prepared under highest secrecy in Thuringia. For the preparations of the tests the local residents are supposed to be transported away by an SS detail; the whole operation is reported to be undertaken in strictest secrecy. The explosions are supposed to take place in a wooded area. For that, special roads to the presumptive test site are being created. The bomb to be tested has a diameter of one and a half meters. It consists of several hollow spheres that nest inside each other. It will be brought to the explosion place with a transporter specially constructed for it. It is still unclear when the test is supposed to take place, but the preparations are going at the maximum fastest pace. CONCLUSION. In the last months our source has reported more and more often about the feverish efforts of the Germans to test ever more powerful weapons and their means of delivery. Probably these experiments lead directly to an attempt of the Germans to actually carry out tests of atom bombs, about whose existence we have only incomplete, scanty information."

Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.

Our trustworthy source from Germany reports: The Germans have in recent times carried out two large-capacity bomb explosions in Thuringia. The explosions took place in a forest area, under conditions of strictest secrecy. Trees fell at a distance of 500–600 meters from the center of the explosion. Buildings and fortifications specially constructed for the tests have been destroyed. Prisoners of war who were near the epicenter of the explosion died, often without leaving a trace. Prisoners of war who were in the area beyond the center of the explosion have burns on their face and body, the strength of which depends on their position in relation to the epicenter of the explosion. The tests were carried out in a remote deserted area. The regime of secrecy at the test site was at maximum level. Entrance and exit from the territory are by special pass only. SS soldiers have surrounded the area of tests and interrogated any person approaching the area. The bomb, supposedly filled with uranium 235 and weighing approximately two tons, was brought to the test site on a specially constructed truck. Dewars of liquid oxygen were delivered together with it. The bomb was permanently guarded by 20 guards with dogs. The bomb explosion was accompanied by a large explosive wave and high temperature. In addition, a massive radioactive effect was observed. The bomb is a sphere with a diameter of 130 cm. The bomb consists of: 1. High-voltage discharge tube, which is charged by special generators 2. A sphere made of metal uranium 235 3. A delay mechanism [tamper] 4. Protective casing 5. Explosive substance 6. Detonating mechanism 7. Steel casing All parts of the bomb fit inside each other.

Igor Kurchatov to Joseph Stalin. 30 March 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945.* Vol. 1, Part 2. Moscow. pp. 260--261.

The material is extremely interesting. It contains a description of the construction of a German atomic bomb, which is intended to be transported by a carrier rocket of the type "V." ... All of these design details are very credible ~~and agree overall with those according to us that underlie the project of an atomic bomb~~. It should be noted that I am not totally convinced on the basis of the reviewed material that the Germans have actually made experiments with an atomic bomb. The level of destruction of a nuclear bomb would be greater than stated, and spread over several kilometers and not just a few hundred meters. The events mentioned in the documents may be preparatory tests with nuclear weapon designs, but conducted without U235 explosive. It would be desirable to obtain additional information about the course of the experiments, in order to get a more precise location and to obtain a sample of the uranium 235.

12. Reported March 1945 Test Explosions in Thuringia

Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source in Germany reports: "The Germans are preparing to conduct tests of a new secret weapon, which has a large destructive power. The test explosion of a bomb of unusual construction is being prepared under highest secrecy in Thuringia. For the preparations of the tests the local residents are supposed to be transported away by an SS detail; the whole operation is reported to be undertaken in strictest secrecy. The explosions are supposed to take place in a wooded area. For that, special roads to the presumptive test site are being created. The bomb to be tested has a diameter of one and a half meters. It consists of several hollow spheres that nest inside each other. It will be brought to the explosion place with a transporter specially constructed for it. It is still unclear when the test is supposed to take place, but the preparations are going at the maximum fastest pace. CONCLUSION. In the last months our source has reported more and more often about the feverish efforts of the Germans to test ever more powerful weapons and their means of delivery. Probably these experiments lead directly to an attempt of the Germans to actually carry out tests of atom bombs, about whose existence we have only incomplete, scanty information."

Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source from Germany reports: The Germans have in recent times carried out two large-capacity bomb explosions in Thuringia. The explosions took place in a forest area, under conditions of strictest secrecy. Trees fell at a distance of 500–600 meters from the center of the explosion. Buildings and fortifications specially constructed for the tests have been destroyed. Prisoners of war who were near the epicenter of the explosion died, often without leaving a trace. Prisoners of war who were in the area beyond the center of the explosion have burns on their face and body, the strength of which depends on their position in relation to the epicenter of the explosion. The tests were carried out in a remote deserted area. The regime of secrecy at the test site was at maximum level. Entrance and exit from the territory are by special pass only. SS soldiers have surrounded the area of tests and interrogated any person approaching the area. The bomb, supposedly filled with uranium 235 and weighing approximately two tons, was brought to the test site on a specially constructed truck. Dewars of liquid oxygen were delivered together with it. The bomb was permanently guarded by 20 guards with dogs. The bomb explosion was accompanied by a large explosive wave and high temperature. In addition, a massive radioactive effect was observed. The bomb is a sphere with a diameter of 130 cm. The bomb consists of: 1. High-voltage discharge tube, which is charged by special generators 2. A sphere made of metal uranium 235 3. A delay mechanism [tamper] 4. Protective casing 5. Explosive substance 6. Detonating mechanism 7. Steel casing All parts of the bomb fit inside each other.

Igor Kurchatov to Joseph Stalin. 30 March 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945.* Vol. 1, Part 2. Moscow. pp. 260--261.
The material is extremely interesting. It contains a description of the construction of a German atomic bomb, which is intended to be transported by a carrier rocket of the type "V." ... All of these design details are very credible ~~and agree overall with those according to us that underlie the project of an atomic bomb~~. It should be noted that I am not totally convinced on the basis of the reviewed material that the Germans have actually made experiments with an atomic bomb. The level of destruction of a nuclear bomb would be greater than stated, and spread over several kilometers and not just a few hundred meters. The events mentioned in the documents may be preparatory tests with nuclear weapon designs, but conducted without U235 explosive. It would be desirable to obtain additional information about the course of the experiments, in order to get a more precise location and to obtain a sample of the uranium 235.

Summary of interrogation of Robert Döpel. 1946. GARF, courtesy of Rainer Karlsch & Matthias Uhl.
Some information related to materials of Prof. Döpel about extremely powerful atomic bombs and an atomic heat source for energy-generating machines… It is noted that the problem of a uranium bomb has been developed to the point of testing on a [military] base.

12. Reported March 1945 Test Explosions in Thuringia

Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source in Germany reports: "The Germans are preparing to conduct tests of a new secret weapon, which has a large destructive power. The test explosion of a bomb of unusual construction is being prepared under highest secrecy in Thuringia. For the preparations of the tests the local residents are supposed to be transported away by an SS detail; the whole operation is reported to be undertaken in strictest secrecy. The explosions are supposed to take place in a wooded area. For that, special roads to the presumptive test site are being created. The bomb to be tested has a diameter of one and a half meters. It consists of several hollow spheres that nest inside each other. It will be brought to the explosion place with a transporter specially constructed for it. It is still unclear when the test is supposed to take place, but the preparations are going at the maximum fastest pace. CONCLUSION. In the last months our source has reported more and more often about the feverish efforts of the Germans to test ever more powerful weapons and their means of delivery. Probably these experiments lead directly to an attempt of the Germans to actually carry out tests of atom bombs, about whose existence we have only incomplete, scanty information."

Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source from Germany reports: The Germans have in recent times carried out two large-capacity bomb explosions in Thuringia. The explosions took place in a forest area, under conditions of strictest secrecy. Trees fell at a distance of 500–600 meters from the center of the explosion. Buildings and fortifications specially constructed for the tests have been destroyed. Prisoners of war who were near the epicenter of the explosion died, often without leaving a trace. Prisoners of war who were in the area beyond the center of the explosion have burns on their face and body, the strength of which depends on their position in relation to the epicenter of the explosion. The tests were carried out in a remote deserted area. The regime of secrecy at the test site was at maximum level. Entrance and exit from the territory are by special pass only. SS soldiers have surrounded the area of tests and interrogated any person approaching the area. The bomb, supposedly filled with uranium 235 and weighing approximately two tons, was brought to the test site on a specially constructed truck. Dewars of liquid oxygen were delivered together with it. The bomb was permanently guarded by 20 guards with dogs. The bomb explosion was accompanied by a large explosive wave and high temperature. In addition, a massive radioactive effect was observed. The bomb is a sphere with a diameter of 130 cm. The bomb consists of: 1. High-voltage discharge tube, which is charged by special generators 2. A sphere made of metal uranium 235 3. A delay mechanism [tamper] 4. Protective casing 5. Explosive substance 6. Detonating mechanism 7. Steel casing All parts of the bomb fit inside each other.

Igor Kurchatov to Joseph Stalin. 30 March 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 260--261.
The material is extremely interesting. It contains a description of the construction of a German atomic bomb, which is intended to be transported by a carrier rocket of the type "V." ... All of these design details are very credible ~~and agree overall with those according to us that underlie the project of an atomic bomb~~. It should be noted that I am not totally convinced on the basis of the reviewed material that the Germans have actually made experiments with an atomic bomb. The level of destruction of a nuclear bomb would be greater than stated, and spread over several kilometers and not just a few hundred meters. The events mentioned in the documents may be preparatory tests with nuclear weapon designs, but conducted without U235 explosive. It would be desirable to obtain additional information about the course of the experiments, in order to get a more precise location and to obtain a sample of the uranium 235.

Summary of interrogation of Robert Döpel. 1946. GARF, courtesy of Rainer Karlsch & Matthias Uhl.
Some information related to materials of Prof. Döpel about extremely powerful atomic bombs and an atomic heat source for energy-generating machines… It is noted that the problem of a uranium bomb has been developed to the point of testing on a [military] base.

Georgy Flerov to Igor Kurchatov. Ca 21 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 310--311.
Today or tomorrow we are going to fly in the direction that you know. I am taking with me Dubovsky's [Geiger] instrument, but its sensitivity is probably too low. If we determine on site that there are objects of interest for examination and sensitivity of the instrument is the issue, I'll send you a cable. You will have to assign Stoljarenko or Davidenko (if he gets back by then) to this work. Instruct them to assemble the instrument in the lightweight option: powered from the mains by 220 volts... Along with the instrument, let them pack the tables for finding the appropriate half lives...

12. Reported March 1945 Test Explosions in Thuringia

Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source in Germany reports: "The Germans are preparing to conduct tests of a new secret weapon, which has a large destructive power. The test explosion of a bomb of unusual construction is being prepared under highest secrecy in Thuringia. For the preparations of the tests the local residents are supposed to be transported away by an SS detail; the whole operation is reported to be undertaken in strictest secrecy. The explosions are supposed to take place in a wooded area. For that, special roads to the presumptive test site are being created. The bomb to be tested has a diameter of one and a half meters. It consists of several hollow spheres that nest inside each other. It will be brought to the explosion place with a transporter specially constructed for it. It is still unclear when the test is supposed to take place, but the preparations are going at the maximum fastest pace. CONCLUSION. In the last months our source has reported more and more often about the feverish efforts of the Germans to test ever more powerful weapons and their means of delivery. Probably these experiments lead directly to an attempt of the Germans to actually carry out tests of atom bombs, about whose existence we have only incomplete, scanty information."

Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source from Germany reports: The Germans have in recent times carried out two large-capacity bomb explosions in Thuringia. The explosions took place in a forest area, under conditions of strictest secrecy. Trees fell at a distance of 500–600 meters from the center of the explosion. Buildings and fortifications specially constructed for the tests have been destroyed. Prisoners of war who were near the epicenter of the explosion died, often without leaving a trace. Prisoners of war who were in the area beyond the center of the explosion have burns on their face and body, the strength of which depends on their position in relation to the epicenter of the explosion. The tests were carried out in a remote deserted area. The regime of secrecy at the test site was at maximum level. Entrance and exit from the territory are by special pass only. SS soldiers have surrounded the area of tests and interrogated any person approaching the area. The bomb, supposedly filled with uranium 235 and weighing approximately two tons, was brought to the test site on a specially constructed truck. Dewars of liquid oxygen were delivered together with it. The bomb was permanently guarded by 20 guards with dogs. The bomb explosion was accompanied by a large explosive wave and high temperature. In addition, a massive radioactive effect was observed. The bomb is a sphere with a diameter of 130 cm. The bomb consists of: 1. High-voltage discharge tube, which is charged by special generators 2. A sphere made of metal uranium 235 3. A delay mechanism [tamper] 4. Protective casing 5. Explosive substance 6. Detonating mechanism 7. Steel casing All parts of the bomb fit inside each other.

Igor Kurchatov to Joseph Stalin. 30 March 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 260--261.
The material is extremely interesting. It contains a description of the construction of a German atomic bomb, which is intended to be transported by a carrier rocket of the type "V." ... All of these design details are very credible ~~and agree overall with those according to us that underlie the project of an atomic bomb~~. It should be noted that I am not totally convinced on the basis of the reviewed material that the Germans have actually made experiments with an atomic bomb. The level of destruction of a nuclear bomb would be greater than stated, and spread over several kilometers and not just a few hundred meters. The events mentioned in the documents may be preparatory tests with nuclear weapon designs, but conducted without U235 explosive. It would be desirable to obtain additional information about the course of the experiments, in order to get a more precise location and to obtain a sample of the uranium 235.

Summary of interrogation of Robert Döpel. 1946. GARF, courtesy of Rainer Karlsch & Matthias Uhl.
Some information related to materials of Prof. Döpel about extremely powerful atomic bombs and an atomic heat source for energy-generating machines… It is noted that the problem of a uranium bomb has been developed to the point of testing on a [military] base.

Georgy Flerov to Igor Kurchatov. Ca 21 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 310--311.
Today or tomorrow we are going to fly in the direction that you know. I am taking with me Dubovsky's [Geiger] instrument, but its sensitivity is probably too low. If we determine on site that there are objects of interest for examination and sensitivity of the instrument is the issue, I'll send you a cable. You will have to assign Stoljarenko or Davidenko (if he gets back by then) to this work. Instruct them to assemble the instrument in the lightweight option: powered from the mains by 220 volts... Along with the instrument, let them pack the tables for finding the appropriate half lives...

Georgy Flerov to Igor Kurchatov. 29 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 312-315.
Possibly, you can send somebody from the staff to help me. I think that as a result of such search we will be able to find what we need--a person who happened to be there nearby, as there were a lot of escapees wandering through forests at the time. If successful, we will get objective confirmation of the fact, tantamount to as if we personally had been at that site. This must be done right here and right now, because afterwards all people crossing the border are dispersed through camps in Germany and then are transferred to the Soviet Union, and then even such an enthusiast as myself would question our ability to catch the right people… The second direction is connected to what I wrote you in the previous letter. In order to determine finally what was really tested there, we shall of course look after artificial, not natural radioactivity. Unfortunately, a lot of time has passed since, but I think that with [our instruments] we will be able to attain the required sensitivity.

12. Reported March 1945 Test Explosions in Thuringia

Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source in Germany reports: "The Germans are preparing to conduct tests of a new secret weapon, which has a large destructive power. The test explosion of a bomb of unusual construction is being prepared under highest secrecy in Thuringia. For the preparations of the tests the local residents are supposed to be transported away by an SS detail; the whole operation is reported to be undertaken in strictest secrecy. The explosions are supposed to take place in a wooded area. For that, special roads to the presumptive test site are being created. The bomb to be tested has a diameter of one and a half meters. It consists of several hollow spheres that nest inside each other. It will be brought to the explosion place with a transporter specially constructed for it. It is still unclear when the test is supposed to take place, but the preparations are going at the maximum fastest pace. CONCLUSION. In the last months our source has reported more and more often about the feverish efforts of the Germans to test ever more powerful weapons and their means of delivery. Probably these experiments lead directly to an attempt of the Germans to actually carry out tests of atom bombs, about whose existence we have only incomplete, scanty information."

Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source from Germany reports: The Germans have in recent times carried out two large-capacity bomb explosions in Thuringia. The explosions took place in a forest area, under conditions of strictest secrecy. Trees fell at a distance of 500–600 meters from the center of the explosion. Buildings and fortifications specially constructed for the tests have been destroyed. Prisoners of war who were near the epicenter of the explosion died, often without leaving a trace. Prisoners of war who were in the area beyond the center of the explosion have burns on their face and body, the strength of which depends on their position in relation to the epicenter of the explosion. The tests were carried out in a remote deserted area. The regime of secrecy at the test site was at maximum level. Entrance and exit from the territory are by special pass only. SS soldiers have surrounded the area of tests and interrogated any person approaching the area. The bomb, supposedly filled with uranium 235 and weighing approximately two tons, was brought to the test site on a specially constructed truck. Dewars of liquid oxygen were delivered together with it. The bomb was permanently guarded by 20 guards with dogs. The bomb explosion was accompanied by a large explosive wave and high temperature. In addition, a massive radioactive effect was observed. The bomb is a sphere with a diameter of 130 cm. The bomb consists of: 1. High-voltage discharge tube, which is charged by special generators 2. A sphere made of metal uranium 235 3. A delay mechanism [tamper] 4. Protective casing 5. Explosive substance 6. Detonating mechanism 7. Steel casing All parts of the bomb fit inside each other.

Igor Kurchatov to Joseph Stalin. 30 March 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 260--261.
The material is extremely interesting. It contains a description of the construction of a German atomic bomb, which is intended to be transported by a carrier rocket of the type "V." ... All of these design details are very credible ~~and agree overall with those according to us that underlie the project of an atomic bomb~~. It should be noted that I am not totally convinced on the basis of the reviewed material that the Germans have actually made experiments with an atomic bomb. The level of destruction of a nuclear bomb would be greater than stated, and spread over several kilometers and not just a few hundred meters. The events mentioned in the documents may be preparatory tests with nuclear weapon designs, but conducted without U235 explosive. It would be desirable to obtain additional information about the course of the experiments, in order to get a more precise location and to obtain a sample of the uranium 235.

Summary of interrogation of Robert Döpel. 1946. GARF, courtesy of Rainer Karlsch & Matthias Uhl.
Some information related to materials of Prof. Döpel about extremely powerful atomic bombs and an atomic heat source for energy-generating machines… It is noted that the problem of a uranium bomb has been developed to the point of testing on a [military] base.

Georgy Flerov to Igor Kurchatov. Ca 21 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 310--311.
Today or tomorrow we are going to fly in the direction that you know. I am taking with me Dubovsky's [Geiger] instrument, but its sensitivity is probably too low. If we determine on site that there are objects of interest for examination and sensitivity of the instrument is the issue, I'll send you a cable. You will have to assign Stoljarenko or Davidenko (if he gets back by then) to this work. Instruct them to assemble the instrument in the lightweight option: powered from the mains by 220 volts... Along with the instrument, let them pack the tables for finding the appropriate half lives...

Georgy Flerov to Igor Kurchatov. 29 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 312-315.
Possibly, you can send somebody from the staff to help me. I think that as a result of such search we will be able to find what we need--a person who happened to be there nearby, as there were a lot of escapees wandering through forests at the time. If successful, we will get objective confirmation of the fact, tantamount to as if we personally had been at that site. This must be done right here and right now, because afterwards all people crossing the border are dispersed through camps in Germany and then are transferred to the Soviet Union, and then even such an enthusiast as myself would question our ability to catch the right people… The second direction is connected to what I wrote you in the previous letter. In order to determine finally what was really tested there, we shall of course look after artificial, not natural radioactivity. Unfortunately, a lot of time has passed since, but I think that with [our instruments] we will be able to attain the required sensitivity.

Georgy Zhukov to Joseph Stalin. 2 October 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. II, Part 6. Moscow. pp. 60-64.
Based on the collected materials, it can be concluded that the German scientists in the field of theoretical and practical research and application of atomic energy have achieved good results up to the creation of the atomic bomb.

12. Reported March 1945 Test Explosions in Thuringia

Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source in Germany reports: "The Germans are preparing to conduct tests of a new secret weapon, which has a large destructive power. The test explosion of a bomb of unusual construction is being prepared under highest secrecy in Thuringia. For the preparations of the tests the local residents are supposed to be transported away by an SS detail; the whole operation is reported to be undertaken in strictest secrecy. The explosions are supposed to take place in a wooded area. For that, special roads to the presumptive test site are being created. The bomb to be tested has a diameter of one and a half meters. It consists of several hollow spheres that nest inside each other. It will be brought to the explosion place with a transporter specially constructed for it. It is still unclear when the test is supposed to take place, but the preparations are going at the maximum fastest pace. CONCLUSION. In the last months our source has reported more and more often about the feverish efforts of the Germans to test ever more powerful weapons and their means of delivery. Probably these experiments lead directly to an attempt of the Germans to actually carry out tests of atom bombs, about whose existence we have only incomplete, scanty information."

Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source from Germany reports: The Germans have in recent times carried out two large-capacity bomb explosions in Thuringia. The explosions took place in a forest area, under conditions of strictest secrecy. Trees fell at a distance of 500–600 meters from the center of the explosion. Buildings and fortifications specially constructed for the tests have been destroyed. Prisoners of war who were near the epicenter of the explosion died, often without leaving a trace. Prisoners of war who were in the area beyond the center of the explosion have burns on their face and body, the strength of which depends on their position in relation to the epicenter of the explosion. The tests were carried out in a remote deserted area. The regime of secrecy at the test site was at maximum level. Entrance and exit from the territory are by special pass only. SS soldiers have surrounded the area of tests and interrogated any person approaching the area. The bomb, supposedly filled with uranium 235 and weighing approximately two tons, was brought to the test site on a specially constructed truck. Dewars of liquid oxygen were delivered together with it. The bomb was permanently guarded by 20 guards with dogs. The bomb explosion was accompanied by a large explosive wave and high temperature. In addition, a massive radioactive effect was observed. The bomb is a sphere with a diameter of 130 cm. The bomb consists of: 1. High-voltage discharge tube, which is charged by special generators 2. A sphere made of metal uranium 235 3. A delay mechanism [tamper] 4. Protective casing 5. Explosive substance 6. Detonating mechanism 7. Steel casing All parts of the bomb fit inside each other.

Igor Kurchatov to Joseph Stalin. 30 March 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 260--261.
The material is extremely interesting. It contains a description of the construction of a German atomic bomb, which is intended to be transported by a carrier rocket of the type "V." ... All of these design details are very credible ~~and agree overall with those according to us that underlie the project of an atomic bomb~~. It should be noted that I am not totally convinced on the basis of the reviewed material that the Germans have actually made experiments with an atomic bomb. The level of destruction of a nuclear bomb would be greater than stated, and spread over several kilometers and not just a few hundred meters. The events mentioned in the documents may be preparatory tests with nuclear weapon designs, but conducted without U235 explosive. It would be desirable to obtain additional information about the course of the experiments, in order to get a more precise location and to obtain a sample of the uranium 235.

Summary of interrogation of Robert Döpel. 1946. GARF, courtesy of Rainer Karlsch & Matthias Uhl.
Some information related to materials of Prof. Döpel about extremely powerful atomic bombs and an atomic heat source for energy-generating machines… It is noted that the problem of a uranium bomb has been developed to the point of testing on a [military] base.

Georgy Flerov to Igor Kurchatov. Ca 21 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 310--311.
Today or tomorrow we are going to fly in the direction that you know. I am taking with me Dubovsky's [Geiger] instrument, but its sensitivity is probably too low. If we determine on site that there are objects of interest for examination and sensitivity of the instrument is the issue, I'll send you a cable. You will have to assign Stoljarenko or Davidenko (if he gets back by then) to this work. Instruct them to assemble the instrument in the lightweight option: powered from the mains by 220 volts... Along with the instrument, let them pack the tables for finding the appropriate half lives...

Georgy Flerov to Igor Kurchatov. 29 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 312-315.
Possibly, you can send somebody from the staff to help me. I think that as a result of such search we will be able to find what we need--a person who happened to be there nearby, as there were a lot of escapees wandering through forests at the time. If successful, we will get objective confirmation of the fact, tantamount to as if we personally had been at that site. This must be done right here and right now, because afterwards all people crossing the border are dispersed through camps in Germany and then are transferred to the Soviet Union, and then even such an enthusiast as myself would question our ability to catch the right people… The second direction is connected to what I wrote you in the previous letter. In order to determine finally what was really tested there, we shall of course look after artificial, not natural radioactivity. Unfortunately, a lot of time has passed since, but I think that with [our instruments] we will be able to attain the required sensitivity.

Georgy Zhukov to Joseph Stalin. 2 October 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. II, Part 6. Moscow. pp. 60-64.
Based on the collected materials, it can be concluded that the German scientists in the field of theoretical and practical research and application of atomic energy have achieved good results up to the creation of the atomic bomb.

G-2 Periodic Report No. 177. 7 April 1945. NARA RG 407, Entry NM3-427, Box 12342, Folder 604-2.1.
PW was told by an ordnance man stationed at OHRDRUF that from here a new secret wpn will shortly rise (wird steigen). It is believed that the entire area should be very thoroughly examined for new material.

12. Reported March 1945 Test Explosions in Thuringia

Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source in Germany reports: "The Germans are preparing to conduct tests of a new secret weapon, which has a large destructive power. The test explosion of a bomb of unusual construction is being prepared under highest secrecy in Thuringia. For the preparations of the tests the local residents are supposed to be transported away by an SS detail; the whole operation is reported to be undertaken in strictest secrecy. The explosions are supposed to take place in a wooded area. For that, special roads to the presumptive test site are being created. The bomb to be tested has a diameter of one and a half meters. It consists of several hollow spheres that nest inside each other. It will be brought to the explosion place with a transporter specially constructed for it. It is still unclear when the test is supposed to take place, but the preparations are going at the maximum fastest pace. CONCLUSION. In the last months our source has reported more and more often about the feverish efforts of the Germans to test ever more powerful weapons and their means of delivery. Probably these experiments lead directly to an attempt of the Germans to actually carry out tests of atom bombs, about whose existence we have only incomplete, scanty information."

Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source from Germany reports: The Germans have in recent times carried out two large-capacity bomb explosions in Thuringia. The explosions took place in a forest area, under conditions of strictest secrecy. Trees fell at a distance of 500–600 meters from the center of the explosion. Buildings and fortifications specially constructed for the tests have been destroyed. Prisoners of war who were near the epicenter of the explosion died, often without leaving a trace. Prisoners of war who were in the area beyond the center of the explosion have burns on their face and body, the strength of which depends on their position in relation to the epicenter of the explosion. The tests were carried out in a remote deserted area. The regime of secrecy at the test site was at maximum level. Entrance and exit from the territory are by special pass only. SS soldiers have surrounded the area of tests and interrogated any person approaching the area. The bomb, supposedly filled with uranium 235 and weighing approximately two tons, was brought to the test site on a specially constructed truck. Dewars of liquid oxygen were delivered together with it. The bomb was permanently guarded by 20 guards with dogs. The bomb explosion was accompanied by a large explosive wave and high temperature. In addition, a massive radioactive effect was observed. The bomb is a sphere with a diameter of 130 cm. The bomb consists of: 1. High-voltage discharge tube, which is charged by special generators 2. A sphere made of metal uranium 235 3. A delay mechanism [tamper] 4. Protective casing 5. Explosive substance 6. Detonating mechanism 7. Steel casing All parts of the bomb fit inside each other.

Igor Kurchatov to Joseph Stalin. 30 March 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945.* Vol. 1, Part 2. Moscow. pp. 260--261.
The material is extremely interesting. It contains a description of the construction of a German atomic bomb, which is intended to be transported by a carrier rocket of the type "V." ... All of these design details are very credible ~~and agree overall with those according to us that underlie the project of an atomic bomb~~. It should be noted that I am not totally convinced on the basis of the reviewed material that the Germans have actually made experiments with an atomic bomb. The level of destruction of a nuclear bomb would be greater than stated, and spread over several kilometers and not just a few hundred meters. The events mentioned in the documents may be preparatory tests with nuclear weapon designs, but conducted without U235 explosive. It would be desirable to obtain additional information about the course of the experiments, in order to get a more precise location and to obtain a sample of the uranium 235.

Summary of interrogation of Robert Döpel. 1946. GARF, courtesy of Rainer Karlsch & Matthias Uhl.
Some information related to materials of Prof. Döpel about extremely powerful atomic bombs and an atomic heat source for energy-generating machines… It is noted that the problem of a uranium bomb has been developed to the point of testing on a [military] base.

Georgy Flerov to Igor Kurchatov. Ca 21 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 310--311.
Today or tomorrow we are going to fly in the direction that you know. I am taking with me Dubovsky's [Geiger] instrument, but its sensitivity is probably too low. If we determine on site that there are objects of interest for examination and sensitivity of the instrument is the issue, I'll send you a cable. You will have to assign Stoljarenko or Davidenko (if he gets back by then) to this work. Instruct them to assemble the instrument in the lightweight option: powered from the mains by 220 volts... Along with the instrument, let them pack the tables for finding the appropriate half lives...

Georgy Flerov to Igor Kurchatov. 29 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 312-315.
Possibly, you can send somebody from the staff to help me. I think that as a result of such search we will be able to find what we need--a person who happened to be there nearby, as there were a lot of escapees wandering through forests at the time. If successful, we will get objective confirmation of the fact, tantamount to as if we personally had been at that site. This must be done right here and right now, because afterwards all people crossing the border are dispersed through camps in Germany and then are transferred to the Soviet Union, and then even such an enthusiast as myself would question our ability to catch the right people… The second direction is connected to what I wrote you in the previous letter. In order to determine finally what was really tested there, we shall of course look after artificial, not natural radioactivity. Unfortunately, a lot of time has passed since, but I think that with [our instruments] we will be able to attain the required sensitivity.

Georgy Zhukov to Joseph Stalin. 2 October 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. II, Part 6. Moscow. pp. 60-64.
Based on the collected materials, it can be concluded that the German scientists in the field of theoretical and practical research and application of atomic energy have achieved good results up to the creation of the atomic bomb.

G-2 Periodic Report No. 177. 7 April 1945. NARA RG 407, Entry NM3-427, Box 12342, Folder 604-2.1.
PW was told by an ordnance man stationed at OHRDRUF that from here a new secret wpn will shortly rise (wird steigen). It is believed that the entire area should be very thoroughly examined for new material.

Oscar W. Koch with Robert G. Hays. 1999. *G-2: Intelligence for Patton.* Schiffer. pp. 115-118.
The Third Army intelligence staff would never forget one particular prisoner captured sometime earlier who had told us a convincing story. His unit had been working on a new and unusual weapon, the PW told interrogators. Then, he said, while he was temporarily away from his post, there had been a terrific explosion. Everything at the site was a shambles and trees in a wide area of the surrounding forest had been laid low. No aircraft had been near and the blast--the most forceful he ever had witnessed--could not possibly have resulted from a bomb. To add even more intrigue, the soldier was unable to say just what kind of weapon he had been working on. It was so secret that the individuals in his unit never knew the complete story. He knew only enough to be able to carry on his own duties. The prisoner knew precisely where he was at the time of the blast. He readily pinpointed the exact location on a map. His story aroused great interest in the intelligence section. The Germans had already launched V-1 and V-2 rockets, and Hitler had promised a "secret weapon" which would one day make its appearance and bring the Allies to their knees.

12. Reported March 1945 Test Explosions in Thuringia

Ivan Ilyichev. 15 November 1944. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source in Germany reports: "The Germans are preparing to conduct tests of a new secret weapon, which has a large destructive power. The test explosion of a bomb of unusual construction is being prepared under highest secrecy in Thuringia. For the preparations of the tests the local residents are supposed to be transported away by an SS detail; the whole operation is reported to be undertaken in strictest secrecy. The explosions are supposed to take place in a wooded area. For that, special roads to the presumptive test site are being created. The bomb to be tested has a diameter of one and a half meters. It consists of several hollow spheres that nest inside each other. It will be brought to the explosion place with a transporter specially constructed for it. It is still unclear when the test is supposed to take place, but the preparations are going at the maximum fastest pace. CONCLUSION. In the last months our source has reported more and more often about the feverish efforts of the Germans to test ever more powerful weapons and their means of delivery. Probably these experiments lead directly to an attempt of the Germans to actually carry out tests of atom bombs, about whose existence we have only incomplete, scanty information."

Ivan Ilyichev. 23 March 1945. APRF, Fund 93, Division 81 (45), List 37.
Our trustworthy source from Germany reports: The Germans have in recent times carried out two large-capacity bomb explosions in Thuringia. The explosions took place in a forest area, under conditions of strictest secrecy. Trees fell at a distance of 500–600 meters from the center of the explosion. Buildings and fortifications specially constructed for the tests have been destroyed. Prisoners of war who were near the epicenter of the explosion died, often without leaving a trace. Prisoners of war who were in the area beyond the center of the explosion have burns on their face and body, the strength of which depends on their position in relation to the epicenter of the explosion. The tests were carried out in a remote deserted area. The regime of secrecy at the test site was at maximum level. Entrance and exit from the territory are by special pass only. SS soldiers have surrounded the area of tests and interrogated any person approaching the area. The bomb, supposedly filled with uranium 235 and weighing approximately two tons, was brought to the test site on a specially constructed truck. Dewars of liquid oxygen were delivered together with it. The bomb was permanently guarded by 20 guards with dogs. The bomb explosion was accompanied by a large explosive wave and high temperature. In addition, a massive radioactive effect was observed. The bomb is a sphere with a diameter of 130 cm. The bomb consists of: 1. High-voltage discharge tube, which is charged by special generators 2. A sphere made of metal uranium 235 3. A delay mechanism [tamper] 4. Protective casing 5. Explosive substance 6. Detonating mechanism 7. Steel casing All parts of the bomb fit inside each other.

Igor Kurchatov to Joseph Stalin. 30 March 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 260--261.
The material is extremely interesting. It contains a description of the construction of a German atomic bomb, which is intended to be transported by a carrier rocket of the type "V." ... All of these design details are very credible ~~and agree overall with those according to us that underlie the project of an atomic bomb~~. It should be noted that I am not totally convinced on the basis of the reviewed material that the Germans have actually made experiments with an atomic bomb. The level of destruction of a nuclear bomb would be greater than stated, and spread over several kilometers and not just a few hundred meters. The events mentioned in the documents may be preparatory tests with nuclear weapon designs, but conducted without U235 explosive. It would be desirable to obtain additional information about the course of the experiments, in order to get a more precise location and to obtain a sample of the uranium 235.

Summary of interrogation of Robert Döpel. 1946. GARF, courtesy of Rainer Karlsch & Matthias Uhl.
Some information related to materials of Prof. Döpel about extremely powerful atomic bombs and an atomic heat source for energy-generating machines… It is noted that the problem of a uranium bomb has been developed to the point of testing on a [military] base.

Georgy Flerov to Igor Kurchatov. Ca 21 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 310--311.
Today or tomorrow we are going to fly in the direction that you know. I am taking with me Dubovsky's [Geiger] instrument, but its sensitivity is probably too low. If we determine on site that there are objects of interest for examination and sensitivity of the instrument is the issue, I'll send you a cable. You will have to assign Stoljarenko or Davidenko (if he gets back by then) to this work. Instruct them to assemble the instrument in the lightweight option: powered from the mains by 220 volts... Along with the instrument, let them pack the tables for finding the appropriate half lives...

Georgy Flerov to Igor Kurchatov. 29 May 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. 1, Part 2. Moscow. pp. 312-315.
Possibly, you can send somebody from the staff to help me. I think that as a result of such search we will be able to find what we need--a person who happened to be there nearby, as there were a lot of escapees wandering through forests at the time. If successful, we will get objective confirmation of the fact, tantamount to as if we personally had been at that site. This must be done right here and right now, because afterwards all people crossing the border are dispersed through camps in Germany and then are transferred to the Soviet Union, and then even such an enthusiast as myself would question our ability to catch the right people… The second direction is connected to what I wrote you in the previous letter. In order to determine finally what was really tested there, we shall of course look after artificial, not natural radioactivity. Unfortunately, a lot of time has passed since, but I think that with [our instruments] we will be able to attain the required sensitivity.

Georgy Zhukov to Joseph Stalin. 2 October 1945. In L. D. Riabev. 2002. *Atomnii Projekt SSR 1938--1945*. Vol. II, Part 6. Moscow. pp. 60-64.
Based on the collected materials, it can be concluded that the German scientists in the field of theoretical and practical research and application of atomic energy have achieved good results up to the creation of the atomic bomb.

G-2 Periodic Report No. 177. 7 April 1945. NARA RG 407, Entry NM3-427, Box 12342, Folder 604-2.1.
PW was told by an ordnance man stationed at OHRDRUF that from here a new secret wpn will shortly rise (wird steigen). It is believed that the entire area should be very thoroughly examined for new material.

Oscar W. Koch with Robert G. Hays. 1999. *G-2: Intelligence for Patton.* Schiffer. pp. 115-118.
The Third Army intelligence staff would never forget one particular prisoner captured sometime earlier who had told us a convincing story. His unit had been working on a new and unusual weapon, the PW told interrogators. Then, he said, while he was temporarily away from his post, there had been a terrific explosion. Everything at the site was a shambles and trees in a wide area of the surrounding forest had been laid low. No aircraft had been near and the blast--the most forceful he ever had witnessed--could not possibly have resulted from a bomb. To add even more intrigue, the soldier was unable to say just what kind of weapon he had been working on. It was so secret that the individuals in his unit never knew the complete story. He knew only enough to be able to carry on his own duties. The prisoner knew precisely where he was at the time of the blast. He readily pinpointed the exact location on a map. His story aroused great interest in the intelligence section. The Germans had already launched V-1 and V-2 rockets, and Hitler had promised a "secret weapon" which would one day make its appearance and bring the Allies to their knees.

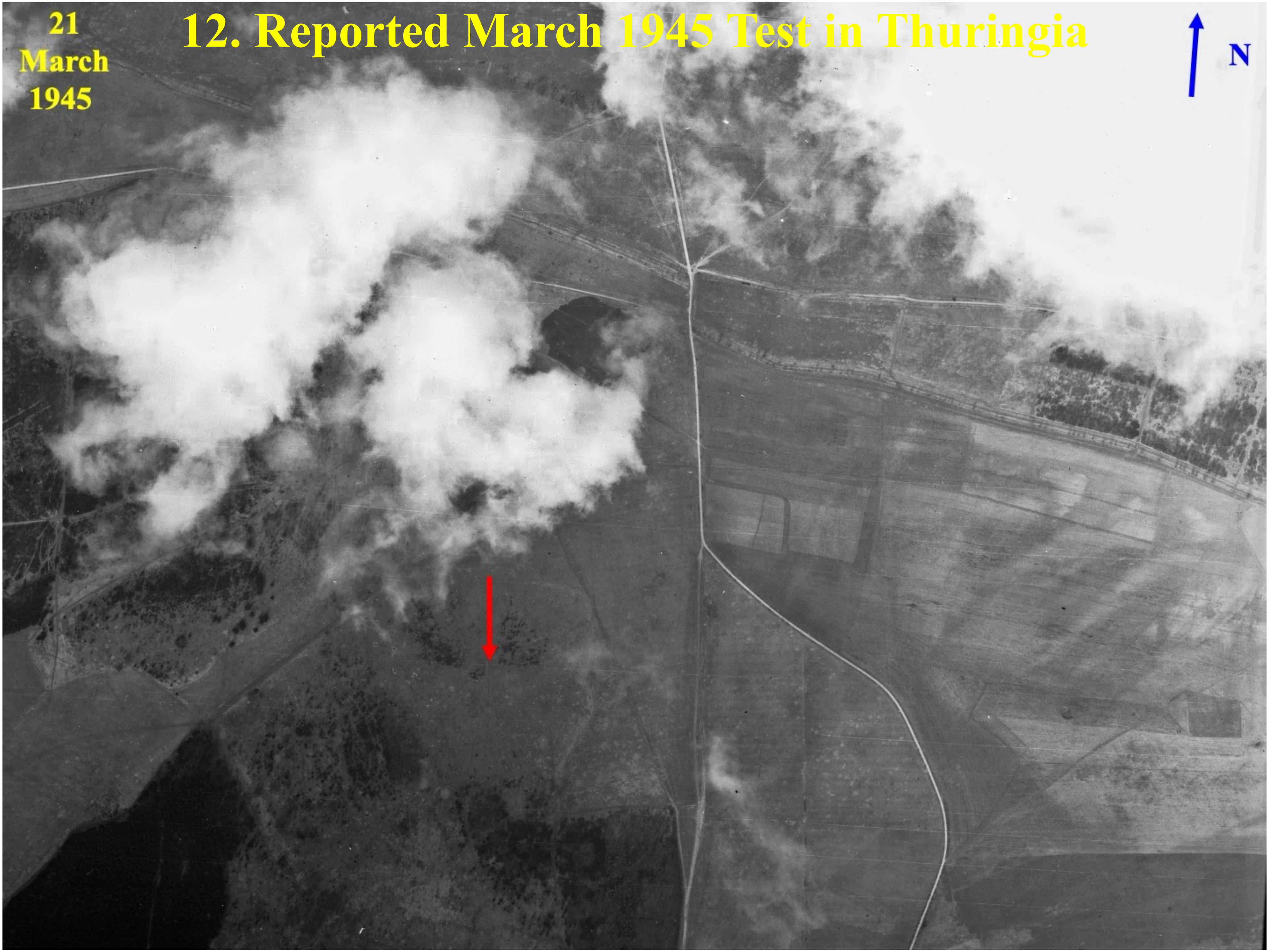
Werner Grothmann. 2002 interview. Jonastalverein Archive, Arnstadt.
[p. 31:] It is known to me that there were four atomic tests... The last test was then again with a small charge [fuel] in March 1945. [p. 17:] But I would like to say something about the background, why Himmler did not come to Thuringia for the atomic bomb test on the fourth of March. [p. 40:] This test was to provide proof that the ignition system worked stably and to serve as preparation for a corresponding attack that was supposed to be flown with a rocket… You see, that went so far that the stand for our atom test in Thuringia was manufactured by a metalworking shop in Thuringia. I know it because when meeting there, Diebner explained, in response to someone's question about whether our people had built it, it was from a metalworking shop from the area. They would not have known what it was meant for. The test was carried out directly there, even though that was in an inhabited area, because due to the course of the war we did not have a lot of choice and, of course, because time was also critical. So we just stayed where the necessary material was produced and stored. In addition, our people and those of Diebner's other group had their laboratories and the development department. And here close by, too, the mass production of uranium bombs had been planned. In addition, at the beginning of January, the ignition [system] production or at least the development of an ignition system intended for the uranium bomb was likewise supposed to be relocated here, according to my memory... Diebner allegedly assured that the explosive effect would be quite small for the small amount [of fuel] that the test would require. Unfortunately his prediction was not confirmed. What happened there was horrible. In addition, there were other consequences in the surrounding area, of which I only heard, that doctors, who were under contract with us, had to be deployed there. [p. 13:] After the third attempt, which was the one from March in Thuringia, Hitler was informed… It was like this: when the test in Thuringia succeeded, according to my understanding, workers from a camp died accidentally.

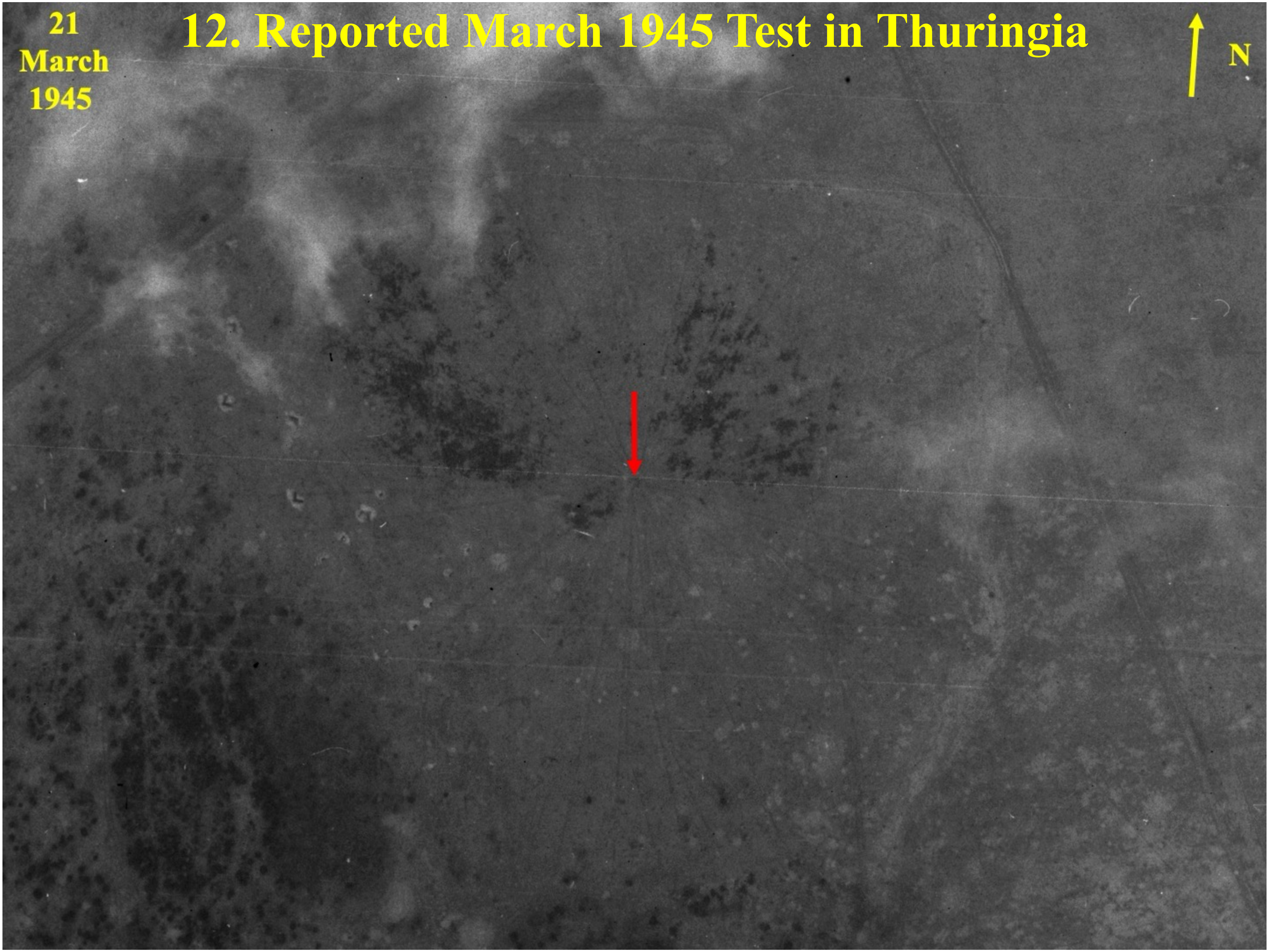
[For more information see *Forgotten Creators* D.12.]

12
August
1944

12. Reported March 1945 Test in Thuringia

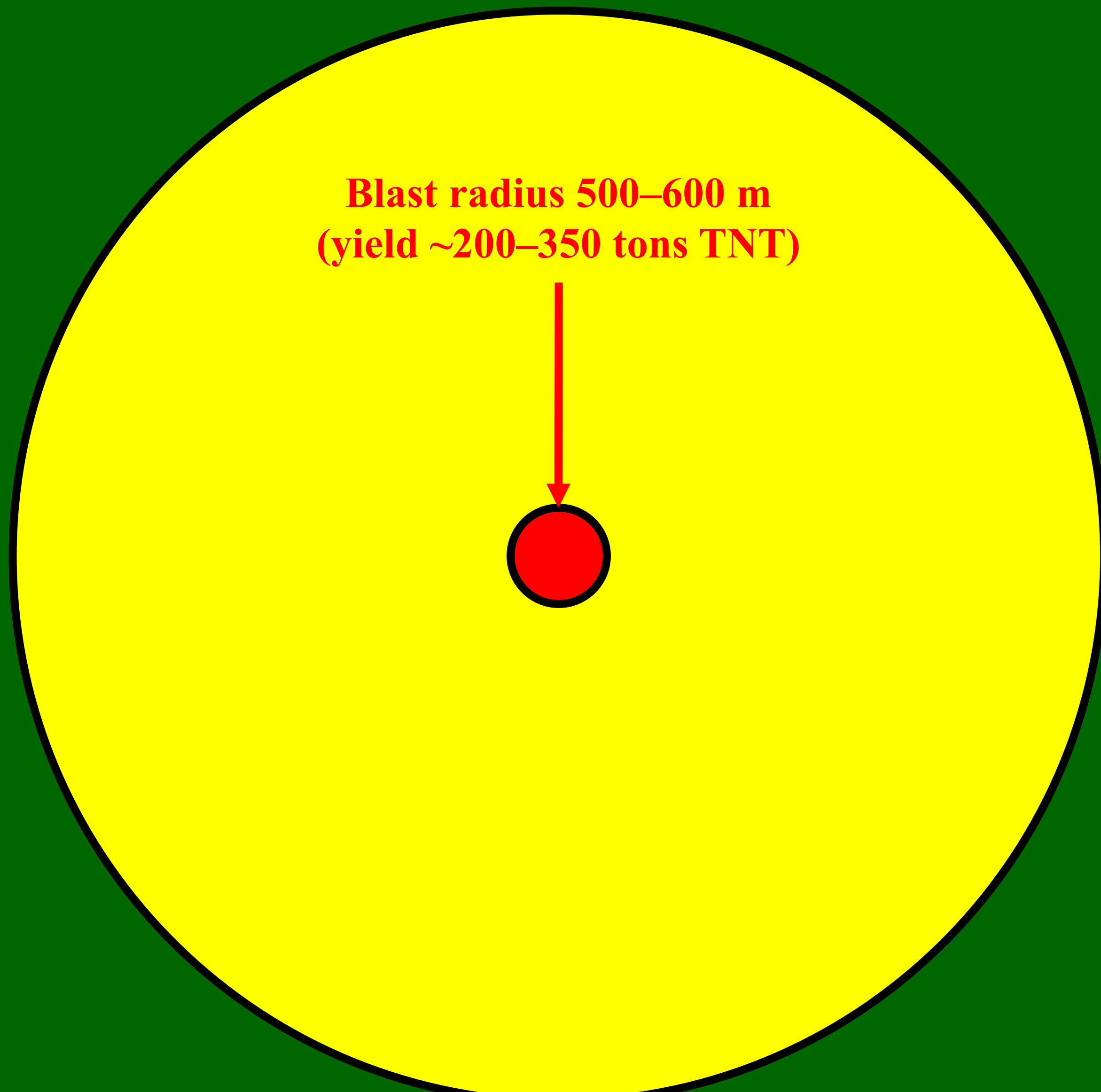
N


21
March
1945
12. Reported March 1945 Test in Thuringia
N


21
March
1945
12. Reported March 1945 Test in Thuringia
N

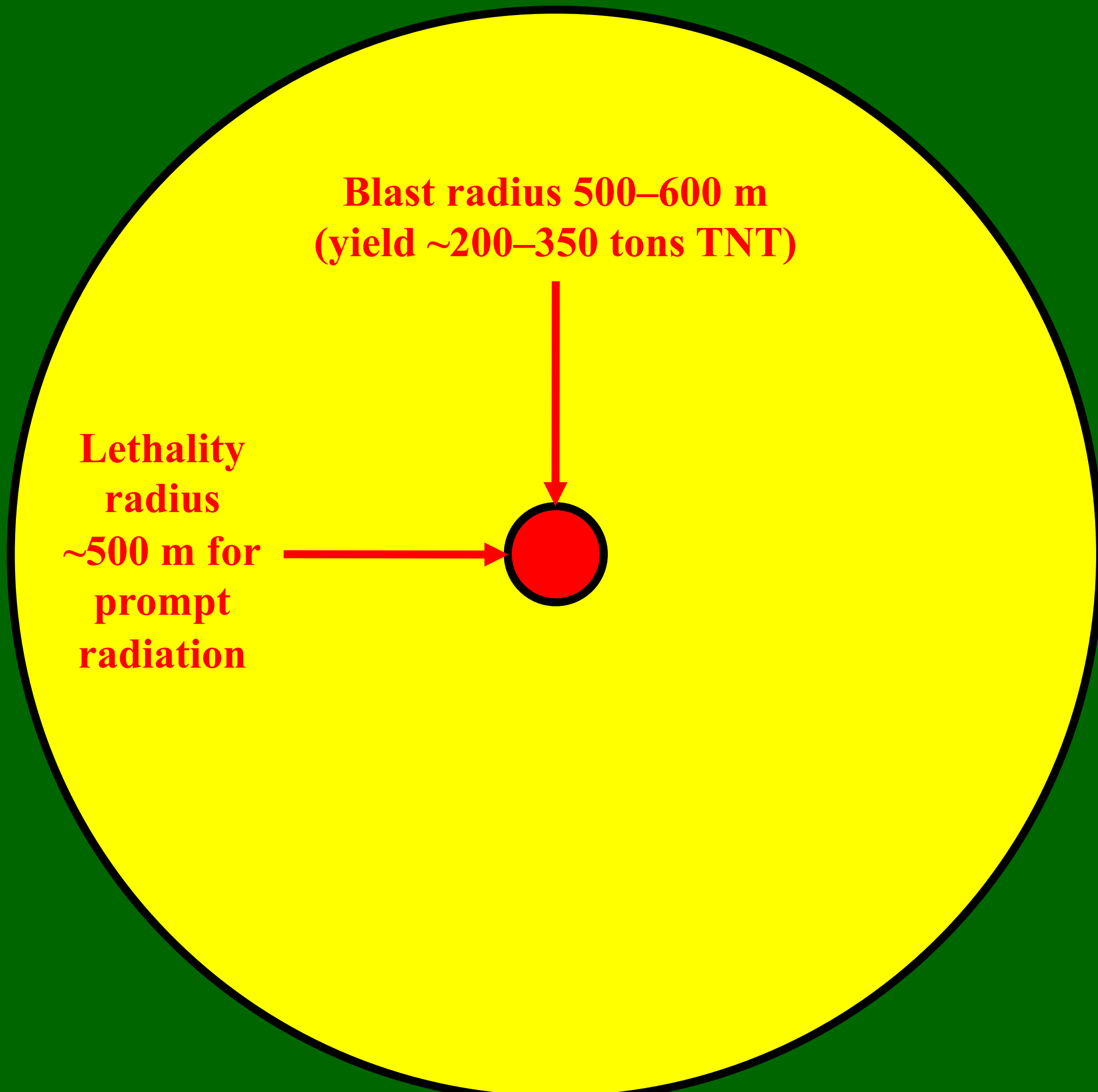
12. Reported March 1945 Test Explosions: Radioactivity Then

12. Reported March 1945 Test Explosions: Radioactivity Then



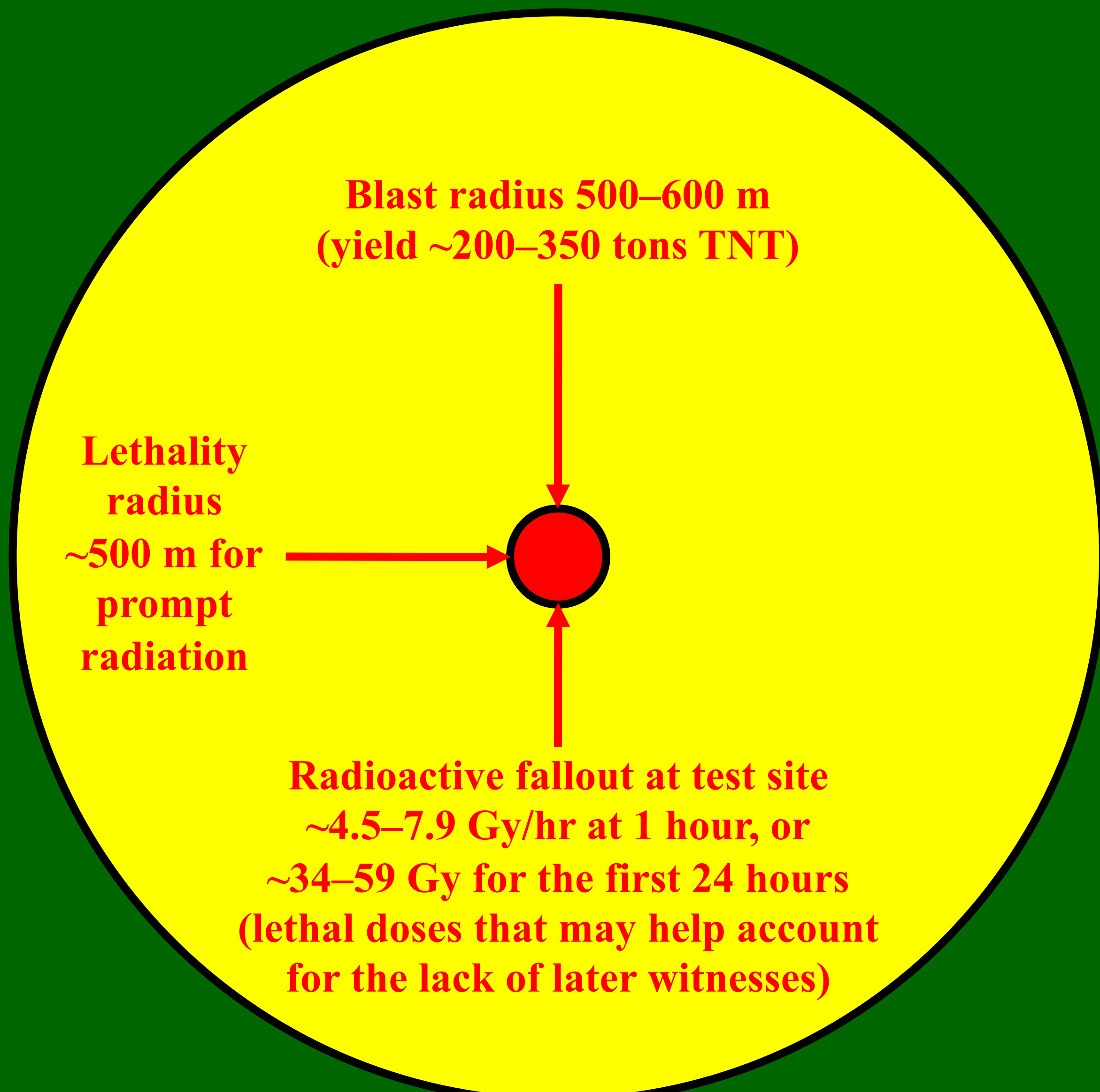
For more information, see: *Forgotten Creators* D.15;
Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977.

12. Reported March 1945 Test Explosions: Radioactivity Then



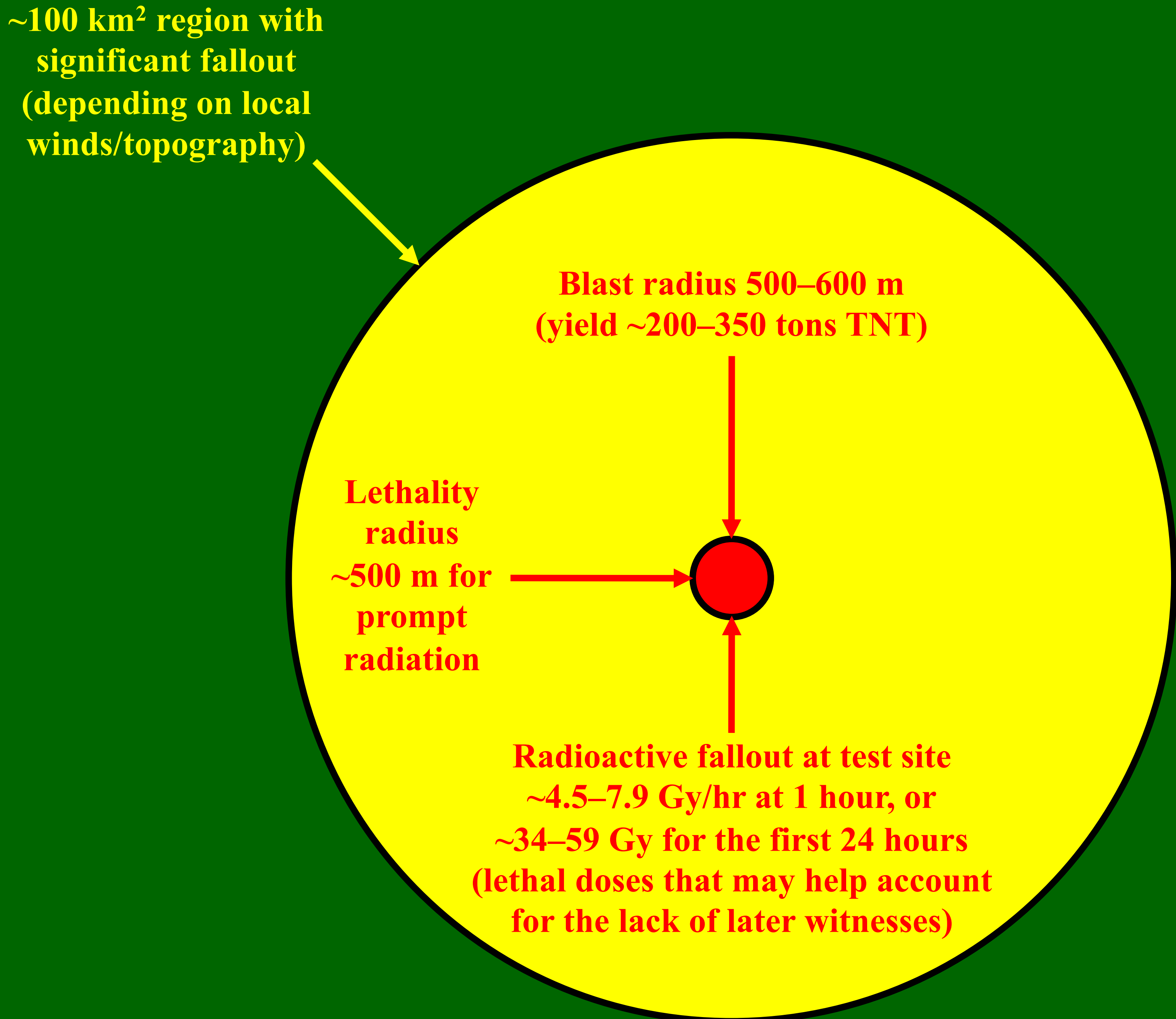
For more information, see: *Forgotten Creators* D.15;
Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977.

12. Reported March 1945 Test Explosions: Radioactivity Then



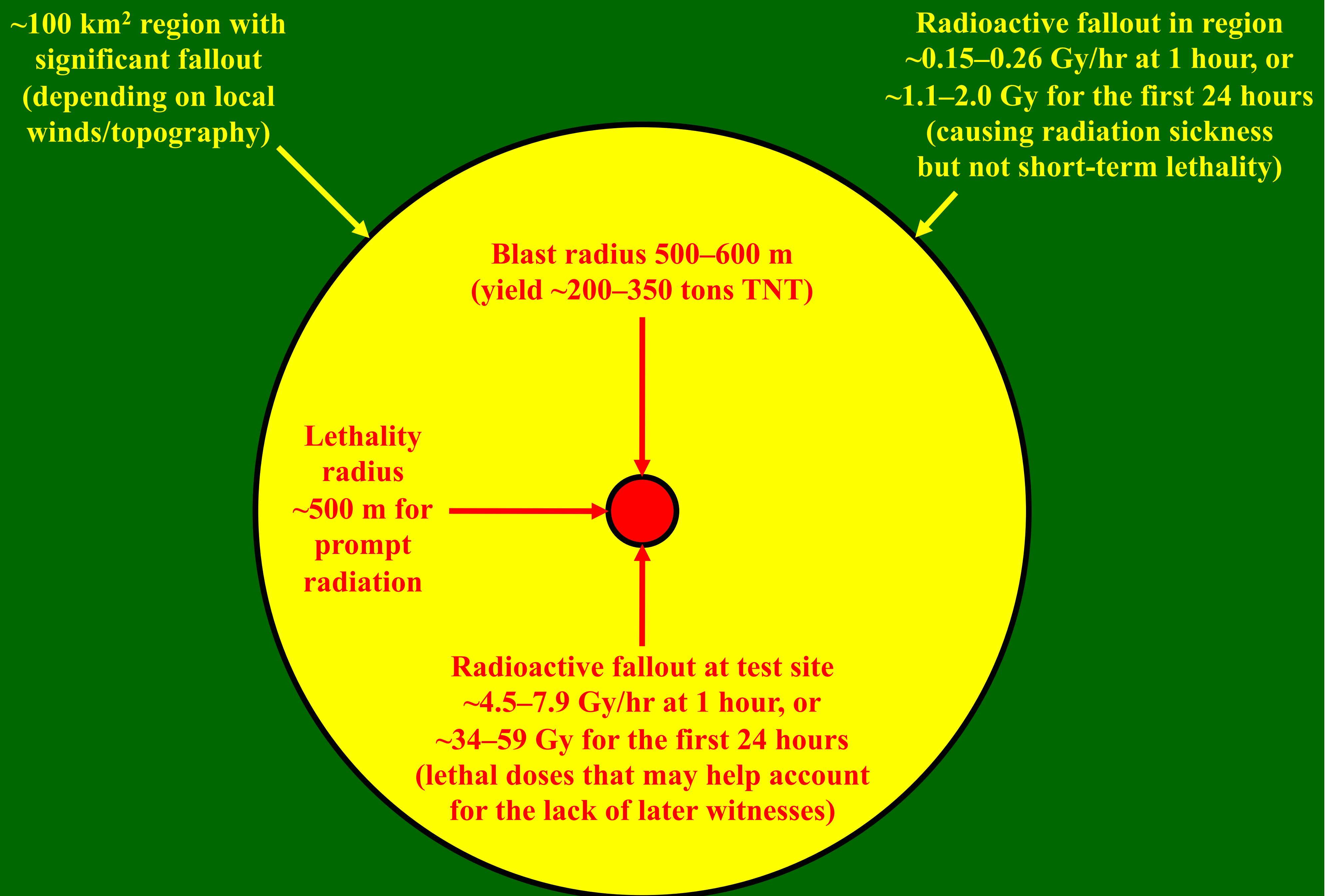
For more information, see: ***Forgotten Creators*** **D.15;**
Glasstone and Dolan, ***The Effects of Nuclear Weapons*****, 1977.**

12. Reported March 1945 Test Explosions: Radioactivity Then



For more information, see: *Forgotten Creators* D.15;
Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977.

12. Reported March 1945 Test Explosions: Radioactivity Then

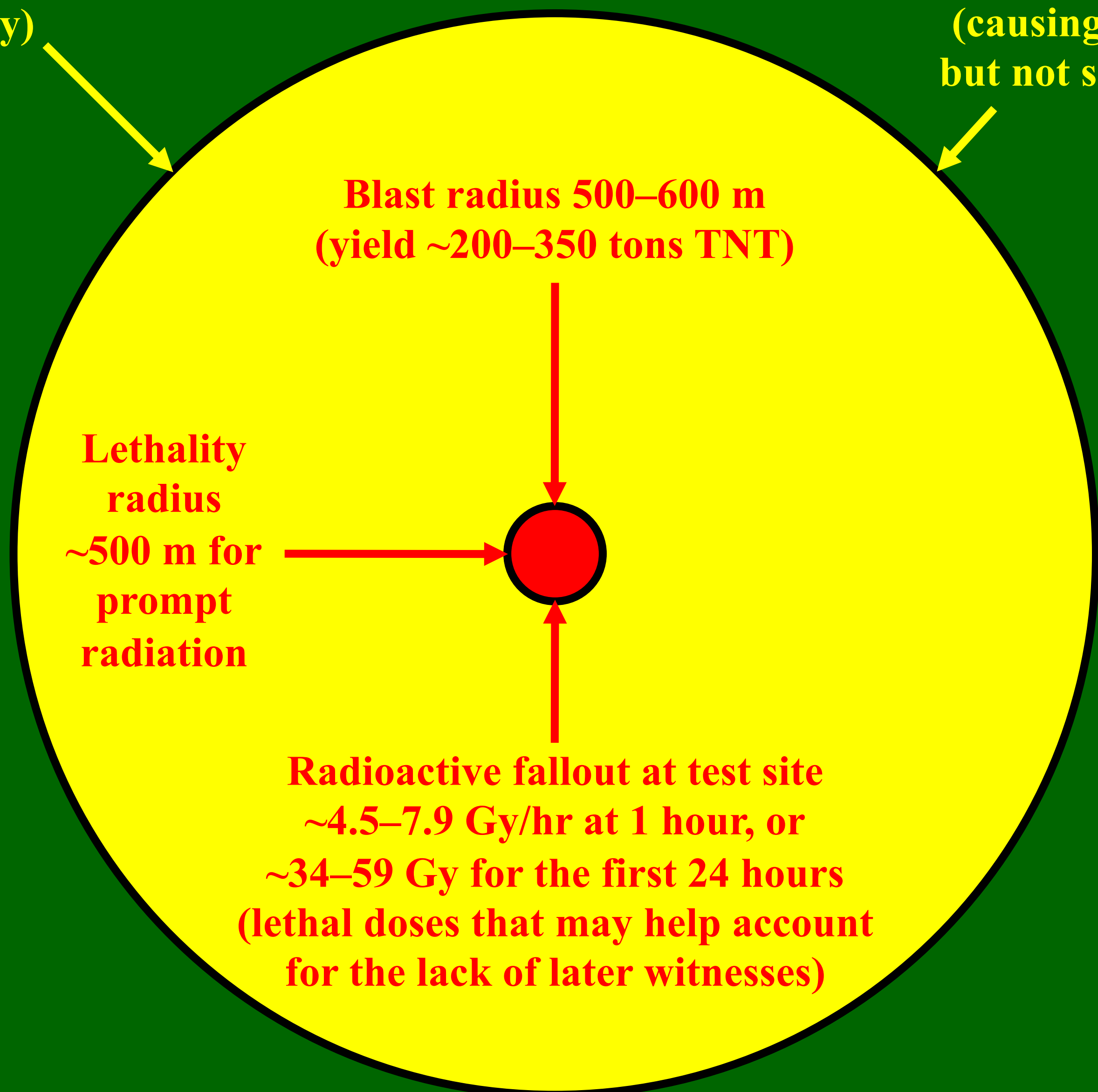


For more information, see: *Forgotten Creators* D.15;
Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977.

12. Reported March 1945 Test Explosions: Radioactivity Then

~100 km^2 region with significant fallout (depending on local winds/topography)

Radioactive fallout in region ~0.15–0.26 Gy/hr at 1 hour, or ~1.1–2.0 Gy for the first 24 hours (causing radiation sickness but not short-term lethality)



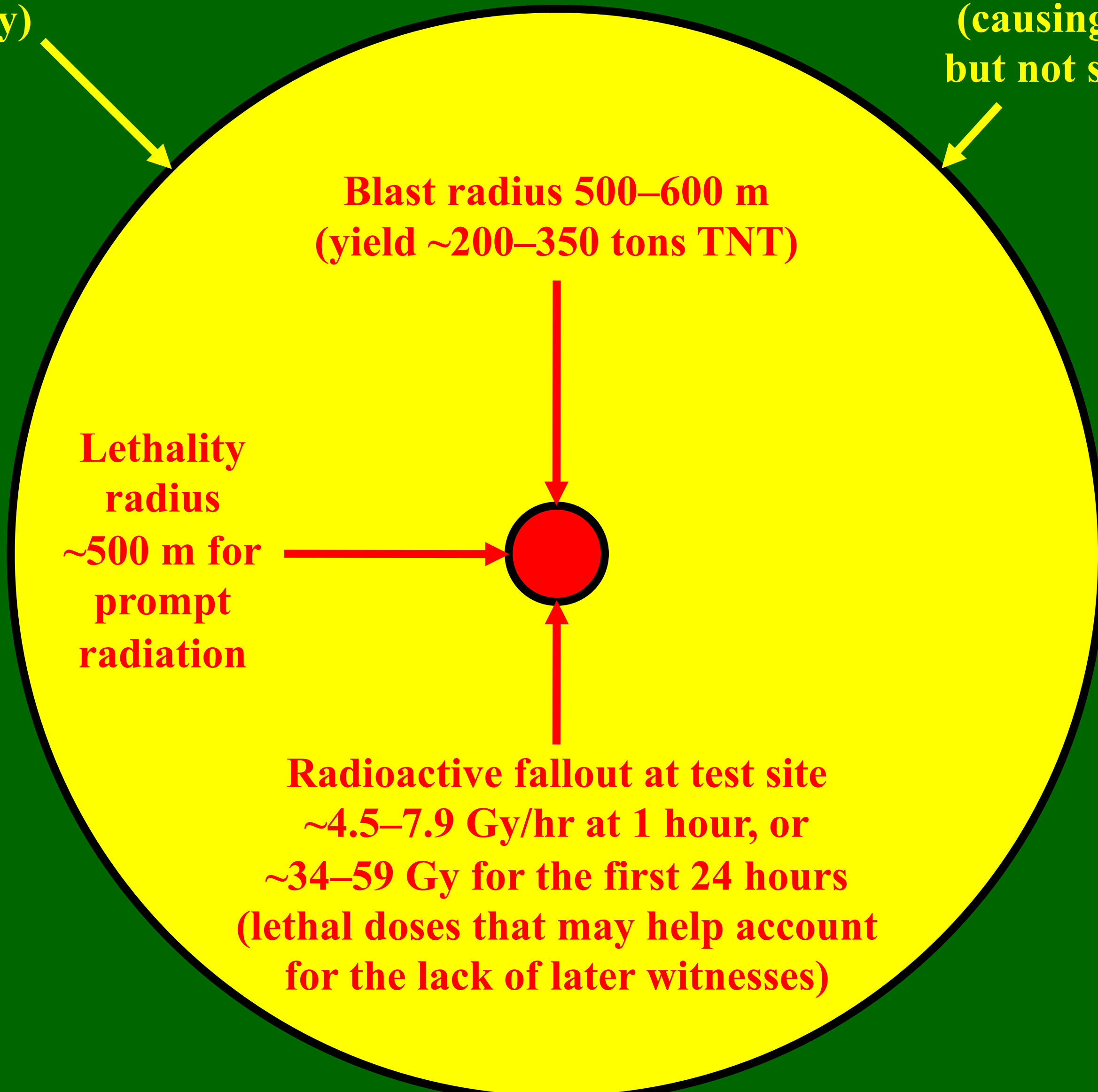
Radioactive fallout from the test would emit 80% of its total radiation within the first 24 hours

For more information, see: *Forgotten Creators* D.15; Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977.

12. Reported March 1945 Test Explosions: Radioactivity Then

~100 km² region with significant fallout (depending on local winds/topography)

Radioactive fallout in region ~0.15–0.26 Gy/hr at 1 hour, or ~1.1–2.0 Gy for the first 24 hours (causing radiation sickness but not short-term lethality)



Radioactive fallout from the test would emit 80% of its total radiation within the first 24 hours

Prompt radiation at the test site and the radioactive fallout at the test site and in nearby towns within 24 hours fit Ilyichev's description that a "massive radioactive effect was observed"

For more information, see: *Forgotten Creators* D.15; Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977.

12. Reported March 1945 Test Explosions: Radioactivity Now

12. Reported March 1945 Test Explosions: Radioactivity Now

After 80 years, the radioactivity of the fallout would have dropped to ~2×10^{-9} of its radioactivity 1 hour after the explosion [Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977, p. 393], or ~2.6–4.6×10^{-6} Gy/yr averaged over the region and ~7–14×10^{-5} Gy/year right at the test site.

12. Reported March 1945 Test Explosions: Radioactivity Now

After 80 years, the radioactivity of the fallout would have dropped to ~2×10^{-9} of its radioactivity 1 hour after the explosion [Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977, p. 393], or ~$2.6–4.6 \times 10^{-6}$ Gy/yr averaged over the region and ~$7–14 \times 10^{-5}$ Gy/year right at the test site.

The residual radioactivity at the test site would be at least ~10–30 times smaller than the natural background radiation (~$1–2 \times 10^{-3}$ Gy/yr) and hence extremely difficult to detect.

12. Reported March 1945 Test Explosions: Radioactivity Now

After 80 years, the radioactivity of the fallout would have dropped to ~2×10^{-9} of its radioactivity 1 hour after the explosion [Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977, p. 393], or ~$2.6–4.6 \times 10^{-6}$ Gy/yr averaged over the region and ~$7–14 \times 10^{-5}$ Gy/year right at the test site.

The residual radioactivity at the test site would be at least ~10–30 times smaller than the natural background radiation (~$1–2 \times 10^{-3}$ Gy/yr) and hence extremely difficult to detect.

After 80 years of water, wind, and human activity, the fallout could easily have become scattered over a significantly larger area than the 100 km^2 assumed here, and/or become buried to varying depths in the ground, making it even harder to detect.

12. Reported March 1945 Test Explosions: Radioactivity Now

After 80 years, the radioactivity of the fallout would have dropped to ~2×10^{-9} of its radioactivity 1 hour after the explosion [Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977, p. 393], or ~$2.6–4.6 \times 10^{-6}$ Gy/yr averaged over the region and ~$7–14 \times 10^{-5}$ Gy/year right at the test site.

The residual radioactivity at the test site would be at least ~10–30 times smaller than the natural background radiation (~$1–2 \times 10^{-3}$ Gy/yr) and hence extremely difficult to detect.

After 80 years of water, wind, and human activity, the fallout could easily have become scattered over a significantly larger area than the 100 km^2 assumed here, and/or become buried to varying depths in the ground, making it even harder to detect.

Therefore modern measurements of residual radioactivity cannot prove or disprove whether the March 1945 Thuringian nuclear tests (or other possible tests) occurred.

12. Reported March 1945 Test Explosions: Radioactivity Now

After 80 years, the radioactivity of the fallout would have dropped to ~2×10^{-9} of its radioactivity 1 hour after the explosion [Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977, p. 393], or ~2.6–4.6×10^{-6} Gy/yr averaged over the region and ~7–14×10^{-5} Gy/year right at the test site.

The residual radioactivity at the test site would be at least ~10–30 times smaller than the natural background radiation (~1–2×10^{-3} Gy/yr) and hence extremely difficult to detect.

After 80 years of water, wind, and human activity, the fallout could easily have become scattered over a significantly larger area than the 100 km^2 assumed here, and/or become buried to varying depths in the ground, making it even harder to detect.

Therefore modern measurements of residual radioactivity cannot prove or disprove whether the March 1945 Thuringian nuclear tests (or other possible tests) occurred.

Other scientific methods may or may not be able to detect signs of the tests:

12. Reported March 1945 Test Explosions: Radioactivity Now

After 80 years, the radioactivity of the fallout would have dropped to ~2x10^{-9} of its radioactivity 1 hour after the explosion [Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977, p. 393], or ~2.6–4.6x10^{-6} Gy/yr averaged over the region and ~7–14x10^{-5} Gy/year right at the test site.

The residual radioactivity at the test site would be at least ~10–30 times smaller than the natural background radiation (~1–2x10^{-3} Gy/yr) and hence extremely difficult to detect.

After 80 years of water, wind, and human activity, the fallout could easily have become scattered over a significantly larger area than the 100 km^2 assumed here, and/or become buried to varying depths in the ground, making it even harder to detect.

Therefore modern measurements of residual radioactivity cannot prove or disprove whether the March 1945 Thuringian nuclear tests (or other possible tests) occurred.

Other scientific methods may or may not be able to detect signs of the tests:

- **Using mass spectrometry, particle-induced X-ray emission, neutron activation analysis, or other highly sensitive methods.**

12. Reported March 1945 Test Explosions: Radioactivity Now

After 80 years, the radioactivity of the fallout would have dropped to ~2×10^{-9} of its radioactivity 1 hour after the explosion [Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977, p. 393], or ~2.6–4.6×10^{-6} Gy/yr averaged over the region and ~7–14×10^{-5} Gy/year right at the test site.

The residual radioactivity at the test site would be at least ~10–30 times smaller than the natural background radiation (~1–2×10^{-3} Gy/yr) and hence extremely difficult to detect.

After 80 years of water, wind, and human activity, the fallout could easily have become scattered over a significantly larger area than the 100 km^2 assumed here, and/or become buried to varying depths in the ground, making it even harder to detect.

Therefore modern measurements of residual radioactivity cannot prove or disprove whether the March 1945 Thuringian nuclear tests (or other possible tests) occurred.

Other scientific methods may or may not be able to detect signs of the tests:

- **Using mass spectrometry, particle-induced X-ray emission, neutron activation analysis, or other highly sensitive methods.**

- **Looking for ^{238}U from the tamper.**

12. Reported March 1945 Test Explosions: Radioactivity Now

After 80 years, the radioactivity of the fallout would have dropped to ~2×10^{-9} of its radioactivity 1 hour after the explosion [Glasstone and Dolan, *The Effects of Nuclear Weapons*, 1977, p. 393], or ~2.6–4.6×10^{-6} Gy/yr averaged over the region and ~7–14×10^{-5} Gy/year right at the test site.

The residual radioactivity at the test site would be at least ~10–30 times smaller than the natural background radiation (~1–2×10^{-3} Gy/yr) and hence extremely difficult to detect.

After 80 years of water, wind, and human activity, the fallout could easily have become scattered over a significantly larger area than the 100 km^2 assumed here, and/or become buried to varying depths in the ground, making it even harder to detect.

Therefore modern measurements of residual radioactivity cannot prove or disprove whether the March 1945 Thuringian nuclear tests (or other possible tests) occurred.

Other scientific methods may or may not be able to detect signs of the tests:

- **Using mass spectrometry, particle-induced X-ray emission, neutron activation analysis, or other highly sensitive methods.**
- **Looking for ^{238}U from the tamper.**
- **Comparing data at and away from the test sites to eliminate background signals.**

For more information, see *Forgotten Creators* D.15.

13. Hitler Strongly Supported Nuclear Weapons Development

13. Hitler Strongly Supported Nuclear Weapons Development

Adolf Hitler. 19 September 1939 in Danzig: "Let them make no mistake here, however. The moment could come very suddenly in which we could use a weapon with which we cannot be attacked. I hope then they do not suddenly begin to think of humaneness and of the impossibility of waging war against women and children."

13. Hitler Strongly Supported Nuclear Weapons Development

Adolf Hitler. 19 September 1939 in Danzig: "Let them make no mistake here, however. The moment could come very suddenly in which we could use a weapon with which we cannot be attacked. I hope then they do not suddenly begin to think of humaneness and of the impossibility of waging war against women and children."

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. p. 683: "Up to early 1945, [Hitler] also wanted the A-9 long-range rocket, intended against the USA, to be ready for series production and completely operational. He hoped that this intercontinental rocket would make the USA 'amenable to peace,' especially if he could have equipped the rocket warhead with several small uranium bombs. As early as 1943, he had a weather station built for this purpose [trans-Atlantic guidance] at the northern tip of the eastern Canadian peninsula of Labrador by submarine U-537."

13. Hitler Strongly Supported Nuclear Weapons Development

Adolf Hitler. 19 September 1939 in Danzig: "Let them make no mistake here, however. The moment could come very suddenly in which we could use a weapon with which we cannot be attacked. I hope then they do not suddenly begin to think of humaneness and of the impossibility of waging war against women and children."

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. p. 683: "Up to early 1945, [Hitler] also wanted the A-9 long-range rocket, intended against the USA, to be ready for series production and completely operational. He hoped that this intercontinental rocket would make the USA 'amenable to peace,' especially if he could have equipped the rocket warhead with several small uranium bombs. As early as 1943, he had a weather station built for this purpose [trans-Atlantic guidance] at the northern tip of the eastern Canadian peninsula of Labrador by submarine U-537."

Hans Ulrich Rudel. 1958. *Stuka Pilot*. Ch. 13: "In March 1944… I stand in the presence of the Führer… He specially explains to me the V weapons which have recently been tried out… Later on we should not rely as at present on the normal high explosives, but on something quite different which will be so powerful that once we begin to use them they should end the war decisively. He tells me that their development is already well advanced and that their final completion may be expected very soon… Later I learn that the explosive effect of these new rockets is supposed to be based on atomic energy."

13. Hitler Strongly Supported Nuclear Weapons Development

Adolf Hitler. 19 September 1939 in Danzig: "Let them make no mistake here, however. The moment could come very suddenly in which we could use a weapon with which we cannot be attacked. I hope then they do not suddenly begin to think of humaneness and of the impossibility of waging war against women and children."

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier*. 2nd ed. p. 683: "Up to early 1945, [Hitler] also wanted the A-9 long-range rocket, intended against the USA, to be ready for series production and completely operational. He hoped that this intercontinental rocket would make the USA 'amenable to peace,' especially if he could have equipped the rocket warhead with several small uranium bombs. As early as 1943, he had a weather station built for this purpose [trans-Atlantic guidance] at the northern tip of the eastern Canadian peninsula of Labrador by submarine U-537."

Hans Ulrich Rudel. 1958. *Stuka Pilot*. Ch. 13: "In March 1944… I stand in the presence of the Führer… He specially explains to me the V weapons which have recently been tried out… Later on we should not rely as at present on the normal high explosives, but on something quite different which will be so powerful that once we begin to use them they should end the war decisively. He tells me that their development is already well advanced and that their final completion may be expected very soon… Later I learn that the explosive effect of these new rockets is supposed to be based on atomic energy."

Andreas Hillgruber, ed. 1970. *Staatsmänner und Diplomaten bei Hitler*. Vol. 2. pp. 482-484, 5 August 1944: "In this context the Führer gave technical explanations about further new explosives, whose development had been brought to the experimental stage. He had the impression that the leap from the currently used explosives to these new explosive materials was greater than that from black powder to the explosive materials used at the beginning of the war… V1 is only one of four weapons that Germany would use. Another of these weapons has for example such a tremendous effect that all human life would be destroyed within a radius of three to four kilometers from the impact point."

13. Hitler Strongly Supported Nuclear Weapons Development

Adolf Hitler. 19 September 1939 in Danzig: "Let them make no mistake here, however. The moment could come very suddenly in which we could use a weapon with which we cannot be attacked. I hope then they do not suddenly begin to think of humaneness and of the impossibility of waging war against women and children."

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. p. 683: "Up to early 1945, [Hitler] also wanted the A-9 long-range rocket, intended against the USA, to be ready for series production and completely operational. He hoped that this intercontinental rocket would make the USA 'amenable to peace,' especially if he could have equipped the rocket warhead with several small uranium bombs. As early as 1943, he had a weather station built for this purpose [trans-Atlantic guidance] at the northern tip of the eastern Canadian peninsula of Labrador by submarine U-537."

Hans Ulrich Rudel. 1958. *Stuka Pilot*. Ch. 13: "In March 1944… I stand in the presence of the Führer… He specially explains to me the V weapons which have recently been tried out… Later on we should not rely as at present on the normal high explosives, but on something quite different which will be so powerful that once we begin to use them they should end the war decisively. He tells me that their development is already well advanced and that their final completion may be expected very soon… Later I learn that the explosive effect of these new rockets is supposed to be based on atomic energy."

Andreas Hillgruber, ed. 1970. *Staatsmänner und Diplomaten bei Hitler.* Vol. 2. pp. 482-484, 5 August 1944: "In this context the Führer gave technical explanations about further new explosives, whose development had been brought to the experimental stage. He had the impression that the leap from the currently used explosives to these new explosive materials was greater than that from black powder to the explosive materials used at the beginning of the war… V1 is only one of four weapons that Germany would use. Another of these weapons has for example such a tremendous effect that all human life would be destroyed within a radius of three to four kilometers from the impact point."

Erwin Giesing. 1944-1945. Diary. Institut für Zeitgeschichte, p. 176, 13-15 February 1945: Hitler… said, "…I'm going to commit my V-weapons soon, and then the war will be brought to a glorious end. The problem of atom splitting has been solved a long time ago, and it has been so far developed that we can make use of this energy for weapons. These people are going to see something. This is the weapon of the future, and with it Germany's future is secured too. Providence has already shown me this last and victorious road, and I know that the final turn of fortune is about to come… Our V-weapon will decide the war in no time at all."

13. Hitler Strongly Supported Nuclear Weapons Development

Adolf Hitler. 19 September 1939 in Danzig: "Let them make no mistake here, however. The moment could come very suddenly in which we could use a weapon with which we cannot be attacked. I hope then they do not suddenly begin to think of humaneness and of the impossibility of waging war against women and children."

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. p. 683: "Up to early 1945, [Hitler] also wanted the A-9 long-range rocket, intended against the USA, to be ready for series production and completely operational. He hoped that this intercontinental rocket would make the USA 'amenable to peace,' especially if he could have equipped the rocket warhead with several small uranium bombs. As early as 1943, he had a weather station built for this purpose [trans-Atlantic guidance] at the northern tip of the eastern Canadian peninsula of Labrador by submarine U-537."

Hans Ulrich Rudel. 1958. *Stuka Pilot*. Ch. 13: "In March 1944… I stand in the presence of the Führer… He specially explains to me the V weapons which have recently been tried out… Later on we should not rely as at present on the normal high explosives, but on something quite different which will be so powerful that once we begin to use them they should end the war decisively. He tells me that their development is already well advanced and that their final completion may be expected very soon… Later I learn that the explosive effect of these new rockets is supposed to be based on atomic energy."

Andreas Hillgruber, ed. 1970. *Staatsmänner und Diplomaten bei Hitler.* Vol. 2. pp. 482-484, 5 August 1944: "In this context the Führer gave technical explanations about further new explosives, whose development had been brought to the experimental stage. He had the impression that the leap from the currently used explosives to these new explosive materials was greater than that from black powder to the explosive materials used at the beginning of the war… V1 is only one of four weapons that Germany would use. Another of these weapons has for example such a tremendous effect that all human life would be destroyed within a radius of three to four kilometers from the impact point."

Erwin Giesing. 1944-1945. Diary. Institut für Zeitgeschichte, p. 176, 13-15 February 1945: Hitler… said, "…I'm going to commit my V-weapons soon, and then the war will be brought to a glorious end. The problem of atom splitting has been solved a long time ago, and it has been so far developed that we can make use of this energy for weapons. These people are going to see something. This is the weapon of the future, and with it Germany's future is secured too. Providence has already shown me this last and victorious road, and I know that the final turn of fortune is about to come… Our V-weapon will decide the war in no time at all."

Monthly Intelligence Summary. March 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.3-1 LONDON OFFICE: Combined Intell Rpts.: "Hitler once said: 'May God forgive me for the last ten minutes of the war!'" [*FC* D.5, D.13]

13. Hitler Strongly Supported Nuclear Weapons Development

Reichswerke Hermann Göring, Linz, 4 April 1943

Bildarchiv Preussischer Kulturbesitz 50042721, Bayerische Staatsbibliothek


Kurt Diebner


Werner Heisenberg


Fritz Strassmann


Rolf Wideröe

Adolf Hitler. 19 September 1939 in Danzig: “Let them make no mistake here, however. The moment could come very suddenly in which we could use a weapon with which we cannot be attacked. I hope then they do not suddenly begin to think of humaneness and of the impossibility of waging war against women and children.”

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. p. 683: “Up to early 1945, [Hitler] also wanted the A-9 long-range rocket, intended against the USA, to be ready for series production and completely operational. He hoped that this intercontinental rocket would make the USA ‘amenable to peace,’ especially if he could have equipped the rocket warhead with several small uranium bombs. As early as 1943, he had a weather station built for this purpose [trans-Atlantic guidance] at the northern tip of the eastern Canadian peninsula of Labrador by submarine U-537.”

Hans Ulrich Rudel. 1958. *Stuka Pilot*. Ch. 13: “In March 1944… I stand in the presence of the Führer… He specially explains to me the V weapons which have recently been tried out… Later on we should not rely as at present on the normal high explosives, but on something quite different which will be so powerful that once we begin to use them they should end the war decisively. He tells me that their development is already well advanced and that their final completion may be expected very soon… Later I learn that the explosive effect of these new rockets is supposed to be based on atomic energy.”

Andreas Hillgruber, ed. 1970. *Staatsmänner und Diplomaten bei Hitler.* Vol. 2. pp. 482-484, 5 August 1944: “In this context the Führer gave technical explanations about further new explosives, whose development had been brought to the experimental stage. He had the impression that the leap from the currently used explosives to these new explosive materials was greater than that from black powder to the explosive materials used at the beginning of the war… V1 is only one of four weapons that Germany would use. Another of these weapons has for example such a tremendous effect that all human life would be destroyed within a radius of three to four kilometers from the impact point.”

Erwin Giesing. 1944-1945. Diary. Institut für Zeitgeschichte, p. 176, 13-15 February 1945: Hitler… said, “…I'm going to commit my V-weapons soon, and then the war will be brought to a glorious end. The problem of atom splitting has been solved a long time ago, and it has been so far developed that we can make use of this energy for weapons. These people are going to see something. This is the weapon of the future, and with it Germany’s future is secured too. Providence has already shown me this last and victorious road, and I know that the final turn of fortune is about to come… Our V-weapon will decide the war in no time at all.”

Monthly Intelligence Summary. March 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.3-1 LONDON OFFICE: Combined Intell Rpts.: “Hitler once said: ‘May God forgive me for the last ten minutes of the war!’”

[*FC* D.5, D.13]

13. Hitler Strongly Supported Nuclear Weapons Development

Reichswerke Hermann Göring, Linz, 4 April 1943

Bildarchiv Preussischer Kulturbesitz 50042721, Bayerische Staatsbibliothek

Kurt Diebner

Werner Heisenberg

Fritz Strassmann

Rolf Wideröe

Leslie Groves's Foreign Intelligence Unit files. 14 September 1944. Special Interrogation Report 2. NARA RG 77, Entry UD-22A, Box 171, Folder 32.7003-2 GERMANY: US Wartime Positive Int. (July-Oct. 44): "Linz's Hermann Goering Works, which were in production, were pretty well bombed out."

Adolf Hitler. 19 September 1939 in Danzig: "Let them make no mistake here, however. The moment could come very suddenly in which we could use a weapon with which we cannot be attacked. I hope then they do not suddenly begin to think of humaneness and of the impossibility of waging war against women and children."

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. p. 683: "Up to early 1945, [Hitler] also wanted the A-9 long-range rocket, intended against the USA, to be ready for series production and completely operational. He hoped that this intercontinental rocket would make the USA 'amenable to peace,' especially if he could have equipped the rocket warhead with several small uranium bombs. As early as 1943, he had a weather station built for this purpose [trans-Atlantic guidance] at the northern tip of the eastern Canadian peninsula of Labrador by submarine U-537."

Hans Ulrich Rudel. 1958. *Stuka Pilot*. Ch. 13: "In March 1944… I stand in the presence of the Führer… He specially explains to me the V weapons which have recently been tried out… Later on we should not rely as at present on the normal high explosives, but on something quite different which will be so powerful that once we begin to use them they should end the war decisively. He tells me that their development is already well advanced and that their final completion may be expected very soon… Later I learn that the explosive effect of these new rockets is supposed to be based on atomic energy."

Andreas Hillgruber, ed. 1970. *Staatsmänner und Diplomaten bei Hitler.* Vol. 2. pp. 482-484, 5 August 1944: "In this context the Führer gave technical explanations about further new explosives, whose development had been brought to the experimental stage. He had the impression that the leap from the currently used explosives to these new explosive materials was greater than that from black powder to the explosive materials used at the beginning of the war… V1 is only one of four weapons that Germany would use. Another of these weapons has for example such a tremendous effect that all human life would be destroyed within a radius of three to four kilometers from the impact point."

Erwin Giesing. 1944-1945. Diary. Institut für Zeitgeschichte, p. 176, 13-15 February 1945: Hitler… said, "…I'm going to commit my V-weapons soon, and then the war will be brought to a glorious end. The problem of atom splitting has been solved a long time ago, and it has been so far developed that we can make use of this energy for weapons. These people are going to see something. This is the weapon of the future, and with it Germany's future is secured too. Providence has already shown me this last and victorious road, and I know that the final turn of fortune is about to come… Our V-weapon will decide the war in no time at all."

Monthly Intelligence Summary. March 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.3-1 LONDON OFFICE: Combined Intell Rpts.: "Hitler once said: 'May God forgive me for the last ten minutes of the war!'"

[*FC* D.5, D.13]

13. Multiple Sources: Several Nuclear Weapons Were Completed

13. Multiple Sources: Several Nuclear Weapons Were Completed

Otto Hahn. 1968. *Mein Leben.* p. 200.

Professor Staudinger wrote me that an officer had given him his word of honor that three German nuclear bombs had been ready for deployment in the Lüneburg Heath shortly before the end of the war.

13. Multiple Sources: Several Nuclear Weapons Were Completed

Otto Hahn. 1968. *Mein Leben.* p. 200.

Professor Staudinger wrote me that an officer had given him his word of honor that three German nuclear bombs had been ready for deployment in the Lüneburg Heath shortly before the end of the war.

Benito Mussolini. 20 April 1945 interview. Gian Gaetano Cabella. 1948. *Testamento politico di Mussolini.* p. 45.

The famous destroyer bombs are going to be prepared. I have, still a few days ago, received very precise news. Perhaps Hitler does not want to strike the blow except in the absolute certainty that it is decisive. It seems that there are three of them, these bombs, and of astounding effectiveness. The construction of each is tremendously complicated and time-consuming.

13. Multiple Sources: Several Nuclear Weapons Were Completed

Otto Hahn. 1968. *Mein Leben.* p. 200.

Professor Staudinger wrote me that an officer had given him his word of honor that three German nuclear bombs had been ready for deployment in the Lüneburg Heath shortly before the end of the war.

Benito Mussolini. 20 April 1945 interview. Gian Gaetano Cabella. 1948. *Testamento politico di Mussolini.* p. 45.

The famous destroyer bombs are going to be prepared. I have, still a few days ago, received very precise news. Perhaps Hitler does not want to strike the blow except in the absolute certainty that it is decisive. It seems that there are three of them, these bombs, and of astounding effectiveness. The construction of each is tremendously complicated and time-consuming.

Erwin Bartmann. 2013. *Für Volk und Führer.* pp. 160–161, 231.

'As you know, I am responsible for making the telephone connections when calls are made to and from the Air Ministry. Listen to this—the other day I made a connection between Göring and the *Führer*. […] Göring asked the *Führer* for permission to use three special bombs but he refused. "If I use them in the east they will get us from the west," said the *Führer*.' […]

After the war, I became friends with Rochus Misch, a fellow *Leibstandarte* veteran and communications officer in the *Führerbunker* until the final days of the *Reich*. The topic of the special bombs came up in conversation. 'Three bombs,' he said, 'where did you hear that? There were nine.'

13. Multiple Sources: Several Nuclear Weapons Were Completed

Otto Hahn. 1968. *Mein Leben.* p. 200.

Professor Staudinger wrote me that an officer had given him his word of honor that three German nuclear bombs had been ready for deployment in the Lüneburg Heath shortly before the end of the war.

Benito Mussolini. 20 April 1945 interview. Gian Gaetano Cabella. 1948. *Testamento politico di Mussolini.* p. 45.

The famous destroyer bombs are going to be prepared. I have, still a few days ago, received very precise news. Perhaps Hitler does not want to strike the blow except in the absolute certainty that it is decisive. It seems that there are three of them, these bombs, and of astounding effectiveness. The construction of each is tremendously complicated and time-consuming.

Erwin Bartmann. 2013. *Für Volk und Führer.* pp. 160–161, 231.

'As you know, I am responsible for making the telephone connections when calls are made to and from the Air Ministry. Listen to this—the other day I made a connection between Göring and the *Führer*. […] Göring asked the *Führer* for permission to use three special bombs but he refused. "If I use them in the east they will get us from the west," said the *Führer*.' […]

After the war, I became friends with Rochus Misch, a fellow *Leibstandarte* veteran and communications officer in the *Führerbunker* until the final days of the *Reich*. The topic of the special bombs came up in conversation. 'Three bombs,' he said, 'where did you hear that? There were nine.'

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. pp. 42, 493.

[…] the small-pumpkin-sized "uranium bombs" (with their full destructive energy in a 3-km radius), which according to Schaub's information had been developed to ready prototypes at the Reichspost's research office in Lichterfeld […] According to Schaub, the "terrible weapons" meant above all the "uranium bomb" with the size of a small pumpkin which was to be produced in an underground SS plant in the southern Harz region (with a production capacity of 30,000 workers). The plant was relocated to the USSR by the Red Army in 1945 after Germany's unconditional surrender.

13. Multiple Sources: Several Nuclear Weapons Were Completed

Otto Hahn. 1968. *Mein Leben.* p. 200.

Professor Staudinger wrote me that an officer had given him his word of honor that three German nuclear bombs had been ready for deployment in the Lüneburg Heath shortly before the end of the war.

Benito Mussolini. 20 April 1945 interview. Gian Gaetano Cabella. 1948. *Testamento politico di Mussolini.* p. 45.

The famous destroyer bombs are going to be prepared. I have, still a few days ago, received very precise news. Perhaps Hitler does not want to strike the blow except in the absolute certainty that it is decisive. It seems that there are three of them, these bombs, and of astounding effectiveness. The construction of each is tremendously complicated and time-consuming.

Erwin Bartmann. 2013. *Für Volk und Führer.* pp. 160–161, 231.

‘As you know, I am responsible for making the telephone connections when calls are made to and from the Air Ministry. Listen to this—the other day I made a connection between Göring and the *Führer*. […] Göring asked the *Führer* for permission to use three special bombs but he refused. “If I use them in the east they will get us from the west,” said the *Führer*.’ […]

After the war, I became friends with Rochus Misch, a fellow *Leibstandarte* veteran and communications officer in the *Führerbunker* until the final days of the *Reich*. The topic of the special bombs came up in conversation. ‘Three bombs,’ he said, ‘where did you hear that? There were nine.’

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. pp. 42, 493.

[…] the small-pumpkin-sized “uranium bombs” (with their full destructive energy in a 3-km radius), which according to Schaub’s information had been developed to ready prototypes at the Reichspost’s research office in Lichterfeld […] According to Schaub, the “terrible weapons” meant above all the “uranium bomb” with the size of a small pumpkin which was to be produced in an underground SS plant in the southern Harz region (with a production capacity of 30,000 workers). The plant was relocated to the USSR by the Red Army in 1945 after Germany’s unconditional surrender.

Edmund Tilley. Brief Operational Report on [censored] and Other Germans and Italians Connected with Project Abstract. 19 August 1947. NARA RG 319, Entry A1-134A, Box 29, Folder Operation Oberjoch.

25. Prof. Dr. NIELS [Walter Nielsch?], now said to be in the United States, was, according to [censored,] concerned with chemical and atomic problems at TUCHELER HEIDE and produced a number of atomic bombs, weighing from 1 to 5 kilograms. NIELS should be traced and questioned in detail.

13. Multiple Sources: Several Nuclear Weapons Were Completed

Otto Hahn. 1968. *Mein Leben.* p. 200.

Professor Staudinger wrote me that an officer had given him his word of honor that three German nuclear bombs had been ready for deployment in the Lüneburg Heath shortly before the end of the war.

Benito Mussolini. 20 April 1945 interview. Gian Gaetano Cabella. 1948. *Testamento politico di Mussolini.* p. 45.

The famous destroyer bombs are going to be prepared. I have, still a few days ago, received very precise news. Perhaps Hitler does not want to strike the blow except in the absolute certainty that it is decisive. It seems that there are three of them, these bombs, and of astounding effectiveness. The construction of each is tremendously complicated and time-consuming.

Erwin Bartmann. 2013. *Für Volk und Führer.* pp. 160–161, 231.

'As you know, I am responsible for making the telephone connections when calls are made to and from the Air Ministry. Listen to this—the other day I made a connection between Göring and the *Führer*. […] Göring asked the *Führer* for permission to use three special bombs but he refused. "If I use them in the east they will get us from the west," said the *Führer*.' […]

After the war, I became friends with Rochus Misch, a fellow *Leibstandarte* veteran and communications officer in the *Führerbunker* until the final days of the *Reich*. The topic of the special bombs came up in conversation. 'Three bombs,' he said, 'where did you hear that? There were nine.'

Henry Picker. 2009. *Hitlers Tischgespräche im Führerhauptquartier.* 2nd ed. pp. 42, 493.

[…] the small-pumpkin-sized "uranium bombs" (with their full destructive energy in a 3-km radius), which according to Schaub's information had been developed to ready prototypes at the Reichspost's research office in Lichterfeld […] According to Schaub, the "terrible weapons" meant above all the "uranium bomb" with the size of a small pumpkin which was to be produced in an underground SS plant in the southern Harz region (with a production capacity of 30,000 workers). The plant was relocated to the USSR by the Red Army in 1945 after Germany's unconditional surrender.

Edmund Tilley. Brief Operational Report on [censored] and Other Germans and Italians Connected with Project Abstract. 19 August 1947. NARA RG 319, Entry A1-134A, Box 29, Folder Operation Oberjoch.

25. Prof. Dr. NIELS [Walter Nielsch?], now said to be in the United States, was, according to [censored,] concerned with chemical and atomic problems at TUCHELER HEIDE and produced a number of atomic bombs, weighing from 1 to 5 kilograms. NIELS should be traced and questioned in detail.

Werner Grothmann. 2002 interview. Jonastalverein Archive. pp. 31–32.

It is known to me that there were four atomic tests. The first still in 1943 in the autumn in the North Sea, which failed. Then two in 1944 in the autumn and the late autumn. One of them on the ground, that is on a small stand, the later one in the atmosphere on a parachute. That one in winter 1944 in the air was highly explosive and the charge [fuel] was also larger. That could have been in November. The last test was then again with a small charge in March 1945. […] I can definitely declare that I was told of six atomic bombs that came from three different research installations. All were prototypes. In addition, there were some very small devices that were intended for laboratory experiments.

13. Multiple Sources: Why Germany Did Not Use Its Nuclear Weapons

13. Multiple Sources: Why Germany Did Not Use Its Nuclear Weapons

Franklin D. Roosevelt. 8 June 1943. Statement Warning the Axis.

From time to time since the present war began there have been reports that one or more of the Axis powers were seriously contemplating use of poisonous or noxious gases or other inhumane devices of warfare. […] I feel obliged now to warn the Axis armies and the Axis peoples, in Europe and in Asia, that the terrible consequences of any use of these inhumane methods on their part will be brought down swiftly and surely upon their own heads. Any use of gas by any Axis power, therefore, will immediately be followed by the fullest possible retaliation upon munition centers, seaports, and other military objectives throughout the whole extent of the territory of such Axis country.

13. Multiple Sources: Why Germany Did Not Use Its Nuclear Weapons

Franklin D. Roosevelt. 8 June 1943. Statement Warning the Axis.

From time to time since the present war began there have been reports that one or more of the Axis powers were seriously contemplating use of poisonous or noxious gases or other inhumane devices of warfare. […] I feel obliged now to warn the Axis armies and the Axis peoples, in Europe and in Asia, that the terrible consequences of any use of these inhumane methods on their part will be brought down swiftly and surely upon their own heads. Any use of gas by any Axis power, therefore, will immediately be followed by the fullest possible retaliation upon munition centers, seaports, and other military objectives throughout the whole extent of the territory of such Axis country.

Dwight D. Eisenhower. 1948. *Crusade in Europe.* New York: Doubleday. Ch. 12.

On December 2, 1943, a most regrettable and disturbing incident took place at the port of Bari. […] One of the ships was loaded with a quantity of mustard gas, which we were always forced to carry with us because of uncertainty of German intentions in the use of this weapon. […W]e manufactured and carried this material only for reprisal purposes in case of surprise action on the part of the enemy.

13. Multiple Sources: Why Germany Did Not Use Its Nuclear Weapons

Franklin D. Roosevelt. 8 June 1943. Statement Warning the Axis.

From time to time since the present war began there have been reports that one or more of the Axis powers were seriously contemplating use of poisonous or noxious gases or other inhumane devices of warfare. […] I feel obliged now to warn the Axis armies and the Axis peoples, in Europe and in Asia, that the terrible consequences of any use of these inhumane methods on their part will be brought down swiftly and surely upon their own heads. Any use of gas by any Axis power, therefore, will immediately be followed by the fullest possible retaliation upon munition centers, seaports, and other military objectives throughout the whole extent of the territory of such Axis country.

Dwight D. Eisenhower. 1948. *Crusade in Europe.* New York: Doubleday. Ch. 12.

On December 2, 1943, a most regrettable and disturbing incident took place at the port of Bari. […] One of the ships was loaded with a quantity of mustard gas, which we were always forced to carry with us because of uncertainty of German intentions in the use of this weapon. […W]e manufactured and carried this material only for reprisal purposes in case of surprise action on the part of the enemy.

Winston S. Churchill to General Hastings Ismay. 6 July 1944.

I WANT you to think very seriously over this question of poison gas. I would not use it unless it could be shown either that (a) it was life or death for us, or (b) that it would shorten the war by a year. […] I want a cold-blooded calculation made as to how it would pay us to use poison gas, by which I mean principally mustard. […] If the bombardment of London really became a serious nuisance and great rockets with far-reaching and devastating effect fell on many centres of Government and labour, I should be prepared to do anything that would hit the enemy in a murderous place. […] We could drench the cities of the Ruhr and many other cities in Germany in such a way that most of the population would be requiring constant medical attention. […] I quite agree it may be several weeks or even months before I shall ask you to drench Germany with poison gas, and if we do it, let us do it 100%.

13. Multiple Sources: Why Germany Did Not Use Its Nuclear Weapons

Franklin D. Roosevelt. 8 June 1943. Statement Warning the Axis.

From time to time since the present war began there have been reports that one or more of the Axis powers were seriously contemplating use of poisonous or noxious gases or other inhumane devices of warfare. […] I feel obliged now to warn the Axis armies and the Axis peoples, in Europe and in Asia, that the terrible consequences of any use of these inhumane methods on their part will be brought down swiftly and surely upon their own heads. Any use of gas by any Axis power, therefore, will immediately be followed by the fullest possible retaliation upon munition centers, seaports, and other military objectives throughout the whole extent of the territory of such Axis country.

Dwight D. Eisenhower. 1948. *Crusade in Europe.* New York: Doubleday. Ch. 12.

On December 2, 1943, a most regrettable and disturbing incident took place at the port of Bari. […] One of the ships was loaded with a quantity of mustard gas, which we were always forced to carry with us because of uncertainty of German intentions in the use of this weapon. […W]e manufactured and carried this material only for reprisal purposes in case of surprise action on the part of the enemy.

Winston S. Churchill to General Hastings Ismay. 6 July 1944.

I WANT you to think very seriously over this question of poison gas. I would not use it unless it could be shown either that (a) it was life or death for us, or (b) that it would shorten the war by a year. […] I want a cold-blooded calculation made as to how it would pay us to use poison gas, by which I mean principally mustard. […] If the bombardment of London really became a serious nuisance and great rockets with far-reaching and devastating effect fell on many centres of Government and labour, I should be prepared to do anything that would hit the enemy in a murderous place. […] We could drench the cities of the Ruhr and many other cities in Germany in such a way that most of the population would be requiring constant medical attention. […] I quite agree it may be several weeks or even months before I shall ask you to drench Germany with poison gas, and if we do it, let us do it 100%.

Werner Grothmann. 2002 interview. Jonastalverein Archive. pp. 14–16.

If we were now to use such a weapon on Hitler's order, for example to employ it on London, a completely new situation would arise, but not in our favor. […] Important parts of the political and military leadership will fall, but many other levels that have been relocated outside will be preserved. [...] Besides, the British are also on our territory. And the most important argument: with us, no one really believed that they would then withdraw. Quite the contrary! We could picture their reactions to our population. The other side, which must also be considered, is the Americans. […] At the meetings I attended, or about which I learned in hints, no one was so crazy to use a weapon which could no longer help us, but would only make things even much worse. […] What would have happened after the use of our atomic bomb? […] Everything would be much worse.

13. Multiple Sources: Why Germany Did Not Use Its Nuclear Weapons

Franklin D. Roosevelt. 8 June 1943. Statement Warning the Axis.

From time to time since the present war began there have been reports that one or more of the Axis powers were seriously contemplating use of poisonous or noxious gases or other inhumane devices of warfare. […] I feel obliged now to warn the Axis armies and the Axis peoples, in Europe and in Asia, that the terrible consequences of any use of these inhumane methods on their part will be brought down swiftly and surely upon their own heads. Any use of gas by any Axis power, therefore, will immediately be followed by the fullest possible retaliation upon munition centers, seaports, and other military objectives throughout the whole extent of the territory of such Axis country.

Dwight D. Eisenhower. 1948. *Crusade in Europe.* New York: Doubleday. Ch. 12.

On December 2, 1943, a most regrettable and disturbing incident took place at the port of Bari. […] One of the ships was loaded with a quantity of mustard gas, which we were always forced to carry with us because of uncertainty of German intentions in the use of this weapon. […W]e manufactured and carried this material only for reprisal purposes in case of surprise action on the part of the enemy.

Winston S. Churchill to General Hastings Ismay. 6 July 1944.

I WANT you to think very seriously over this question of poison gas. I would not use it unless it could be shown either that (a) it was life or death for us, or (b) that it would shorten the war by a year. […] I want a cold-blooded calculation made as to how it would pay us to use poison gas, by which I mean principally mustard. […] If the bombardment of London really became a serious nuisance and great rockets with far-reaching and devastating effect fell on many centres of Government and labour, I should be prepared to do anything that would hit the enemy in a murderous place. […] We could drench the cities of the Ruhr and many other cities in Germany in such a way that most of the population would be requiring constant medical attention. […] I quite agree it may be several weeks or even months before I shall ask you to drench Germany with poison gas, and if we do it, let us do it 100%.

Werner Grothmann. 2002 interview. Jonastalverein Archive. pp. 14–16.

If we were now to use such a weapon on Hitler's order, for example to employ it on London, a completely new situation would arise, but not in our favor. […] Important parts of the political and military leadership will fall, but many other levels that have been relocated outside will be preserved. [...] Besides, the British are also on our territory. And the most important argument: with us, no one really believed that they would then withdraw. Quite the contrary! We could picture their reactions to our population. The other side, which must also be considered, is the Americans. […] At the meetings I attended, or about which I learned in hints, no one was so crazy to use a weapon which could no longer help us, but would only make things even much worse. […] What would have happened after the use of our atomic bomb? […] Everything would be much worse.

C.S.D.I.C. (U.K.) S.R.G.G. 1118. Information received: 10 Jan 1945. AFHRA A5415 frames 284-285. [Secret recording of German generals Heinrich Kittel and Wilhelm von Thoma as prisoners of war in U.K.]

KITTEL: (Re atom bomb). It's a perfectly horrible thing. […]
THOMA: Then he would have used it long ago.
KITTEL: No; he isn't using it, because the others have promised to retaliate with chemical warfare.

13. Multiple Sources: Why Germany Did Not Use Its Nuclear Weapons

Franklin D. Roosevelt. 8 June 1943. Statement Warning the Axis.

From time to time since the present war began there have been reports that one or more of the Axis powers were seriously contemplating use of poisonous or noxious gases or other inhumane devices of warfare. […] I feel obliged now to warn the Axis armies and the Axis peoples, in Europe and in Asia, that the terrible consequences of any use of these inhumane methods on their part will be brought down swiftly and surely upon their own heads. Any use of gas by any Axis power, therefore, will immediately be followed by the fullest possible retaliation upon munition centers, seaports, and other military objectives throughout the whole extent of the territory of such Axis country.

Dwight D. Eisenhower. 1948. *Crusade in Europe.* New York: Doubleday. Ch. 12.

On December 2, 1943, a most regrettable and disturbing incident took place at the port of Bari. […] One of the ships was loaded with a quantity of mustard gas, which we were always forced to carry with us because of uncertainty of German intentions in the use of this weapon. […W]e manufactured and carried this material only for reprisal purposes in case of surprise action on the part of the enemy.

Winston S. Churchill to General Hastings Ismay. 6 July 1944.

I WANT you to think very seriously over this question of poison gas. I would not use it unless it could be shown either that (a) it was life or death for us, or (b) that it would shorten the war by a year. […] I want a cold-blooded calculation made as to how it would pay us to use poison gas, by which I mean principally mustard. […] If the bombardment of London really became a serious nuisance and great rockets with far-reaching and devastating effect fell on many centres of Government and labour, I should be prepared to do anything that would hit the enemy in a murderous place. […] We could drench the cities of the Ruhr and many other cities in Germany in such a way that most of the population would be requiring constant medical attention. […] I quite agree it may be several weeks or even months before I shall ask you to drench Germany with poison gas, and if we do it, let us do it 100%.

Werner Grothmann. 2002 interview. Jonastalverein Archive. pp. 14–16.

If we were now to use such a weapon on Hitler's order, for example to employ it on London, a completely new situation would arise, but not in our favor. […] Important parts of the political and military leadership will fall, but many other levels that have been relocated outside will be preserved. [...] Besides, the British are also on our territory. And the most important argument: with us, no one really believed that they would then withdraw. Quite the contrary! We could picture their reactions to our population. The other side, which must also be considered, is the Americans. […] At the meetings I attended, or about which I learned in hints, no one was so crazy to use a weapon which could no longer help us, but would only make things even much worse. […] What would have happened after the use of our atomic bomb? […] Everything would be much worse.

C.S.D.I.C. (U.K.) S.R.G.G. 1118. Information received: 10 Jan 1945. AFHRA A5415 frames 284-285. [Secret recording of German generals Heinrich Kittel and Wilhelm von Thoma as prisoners of war in U.K.]

KITTEL: (Re atom bomb). It's a perfectly horrible thing. […]
THOMA: Then he would have used it long ago.
KITTEL: No; he isn't using it, because the others have promised to retaliate with chemical warfare.

Horace K. Calvert to R. V. Jones. 13 March 1945. NARA RG 77, Entry UD-22A, Box 165, Folder ALSOS MATERIAL.

You will recall that Kittel has made numerous references to German atom-splitting activity in the past and apparently is possessed of some information on the subject. We understand that action on our request for permission to interrogate Kittel directly has been withheld. It is suggested that, in view of recurrence of discussion of this subject by Kittel, another attempt be made to arrange for direct interrogation. The fact that Kittel's mind so frequently concerns itself with this subject, his knowledge of facts which we have corroborated from independent sources and the opportunities available to him for obtaining knowledge of such activity which might reasonably be expected to attach to one of his position all strongly persuade the belief that if properly approached he would be an extremely valuable source of information.

13. Multiple Sources: Why Germany Did Not Use Its Nuclear Weapons

Franklin D. Roosevelt. 8 June 1943. Statement Warning the Axis.

From time to time since the present war began there have been reports that one or more of the Axis powers were seriously contemplating use of poisonous or noxious gases or other inhumane devices of warfare. […] I feel obliged now to warn the Axis armies and the Axis peoples, in Europe and in Asia, that the terrible consequences of any use of these inhumane methods on their part will be brought down swiftly and surely upon their own heads. Any use of gas by any Axis power, therefore, will immediately be followed by the fullest possible retaliation upon munition centers, seaports, and other military objectives throughout the whole extent of the territory of such Axis country.

Dwight D. Eisenhower. 1948. *Crusade in Europe.* New York: Doubleday. Ch. 12.

On December 2, 1943, a most regrettable and disturbing incident took place at the port of Bari. […] One of the ships was loaded with a quantity of mustard gas, which we were always forced to carry with us because of uncertainty of German intentions in the use of this weapon. […W]e manufactured and carried this material only for reprisal purposes in case of surprise action on the part of the enemy.

Winston S. Churchill to General Hastings Ismay. 6 July 1944.

I WANT you to think very seriously over this question of poison gas. I would not use it unless it could be shown either that (a) it was life or death for us, or (b) that it would shorten the war by a year. […] I want a cold-blooded calculation made as to how it would pay us to use poison gas, by which I mean principally mustard. […] If the bombardment of London really became a serious nuisance and great rockets with far-reaching and devastating effect fell on many centres of Government and labour, I should be prepared to do anything that would hit the enemy in a murderous place. […] We could drench the cities of the Ruhr and many other cities in Germany in such a way that most of the population would be requiring constant medical attention. […] I quite agree it may be several weeks or even months before I shall ask you to drench Germany with poison gas, and if we do it, let us do it 100%.

Werner Grothmann. 2002 interview. Jonastalverein Archive. pp. 14–16.

If we were now to use such a weapon on Hitler's order, for example to employ it on London, a completely new situation would arise, but not in our favor. […] Important parts of the political and military leadership will fall, but many other levels that have been relocated outside will be preserved. [...] Besides, the British are also on our territory. And the most important argument: with us, no one really believed that they would then withdraw. Quite the contrary! We could picture their reactions to our population. The other side, which must also be considered, is the Americans. […] At the meetings I attended, or about which I learned in hints, no one was so crazy to use a weapon which could no longer help us, but would only make things even much worse. […] What would have happened after the use of our atomic bomb? […] Everything would be much worse.

C.S.D.I.C. (U.K.) S.R.G.G. 1118. Information received: 10 Jan 1945. AFHRA A5415 frames 284-285. [Secret recording of German generals Heinrich Kittel and Wilhelm von Thoma as prisoners of war in U.K.]

KITTEL: (Re atom bomb). It's a perfectly horrible thing. […]
THOMA: Then he would have used it long ago.
KITTEL: No; he isn't using it, because the others have promised to retaliate with chemical warfare.

Horace K. Calvert to R. V. Jones. 13 March 1945. NARA RG 77, Entry UD-22A, Box 165, Folder ALSOS MATERIAL.

You will recall that Kittel has made numerous references to German atom-splitting activity in the past and apparently is possessed of some information on the subject. We understand that action on our request for permission to interrogate Kittel directly has been withheld. It is suggested that, in view of recurrence of discussion of this subject by Kittel, another attempt be made to arrange for direct interrogation. The fact that Kittel's mind so frequently concerns itself with this subject, his knowledge of facts which we have corroborated from independent sources and the opportunities available to him for obtaining knowledge of such activity which might reasonably be expected to attach to one of his position all strongly persuade the belief that if properly approached he would be an extremely valuable source of information.

Allen Dulles. 1 April 1945. Cable IN 9061 from Bern, Switzerland to Office of Strategic Services. NARA RG 226, Entry UD-90, Box 6, Folder 64 SUNRISE.

In his conversation with Kesselring, latter said to Wolff our situation is desperate, nobody dares tell truth to Fuehrer who surrounded by small group of advisers who still believe in a last specific secret weapon which they call "Verzweiflunge" weapon [Verzweiflungswaffe: desperation weapon]. Kesselring believed this weapon can prolong war but not decide it, but might cause terrible blood bath on both sides. Kesselring said if Fuehrer gave him order to use weapon he would surrender his command.

13. Multiple Sources: Why Germany Did Not Use Its Nuclear Weapons

Franklin D. Roosevelt. 8 June 1943. Statement Warning the Axis.

From time to time since the present war began there have been reports that one or more of the Axis powers were seriously contemplating use of poisonous or noxious gases or other inhumane devices of warfare. […] I feel obliged now to warn the Axis armies and the Axis peoples, in Europe and in Asia, that the terrible consequences of any use of these inhumane methods on their part will be brought down swiftly and surely upon their own heads. Any use of gas by any Axis power, therefore, will immediately be followed by the fullest possible retaliation upon munition centers, seaports, and other military objectives throughout the whole extent of the territory of such Axis country.

Dwight D. Eisenhower. 1948. *Crusade in Europe.* New York: Doubleday. Ch. 12.

On December 2, 1943, a most regrettable and disturbing incident took place at the port of Bari. […] One of the ships was loaded with a quantity of mustard gas, which we were always forced to carry with us because of uncertainty of German intentions in the use of this weapon. […W]e manufactured and carried this material only for reprisal purposes in case of surprise action on the part of the enemy.

Winston S. Churchill to General Hastings Ismay. 6 July 1944.

I WANT you to think very seriously over this question of poison gas. I would not use it unless it could be shown either that (a) it was life or death for us, or (b) that it would shorten the war by a year. […] I want a cold-blooded calculation made as to how it would pay us to use poison gas, by which I mean principally mustard. […] If the bombardment of London really became a serious nuisance and great rockets with far-reaching and devastating effect fell on many centres of Government and labour, I should be prepared to do anything that would hit the enemy in a murderous place. […] We could drench the cities of the Ruhr and many other cities in Germany in such a way that most of the population would be requiring constant medical attention. […] I quite agree it may be several weeks or even months before I shall ask you to drench Germany with poison gas, and if we do it, let us do it 100%.

Werner Grothmann. 2002 interview. Jonastalverein Archive. pp. 14–16.

If we were now to use such a weapon on Hitler's order, for example to employ it on London, a completely new situation would arise, but not in our favor. […] Important parts of the political and military leadership will fall, but many other levels that have been relocated outside will be preserved. [...] Besides, the British are also on our territory. And the most important argument: with us, no one really believed that they would then withdraw. Quite the contrary! We could picture their reactions to our population. The other side, which must also be considered, is the Americans. […] At the meetings I attended, or about which I learned in hints, no one was so crazy to use a weapon which could no longer help us, but would only make things even much worse. […] What would have happened after the use of our atomic bomb? […] Everything would be much worse.

C.S.D.I.C. (U.K.) S.R.G.G. 1118. Information received: 10 Jan 1945. AFHRA A5415 frames 284-285. [Secret recording of German generals Heinrich Kittel and Wilhelm von Thoma as prisoners of war in U.K.]

KITTEL: (Re atom bomb). It's a perfectly horrible thing. […]
THOMA: Then he would have used it long ago.
KITTEL: No; he isn't using it, because the others have promised to retaliate with chemical warfare.

Horace K. Calvert to R. V. Jones. 13 March 1945. NARA RG 77, Entry UD-22A, Box 165, Folder ALSOS MATERIAL.

You will recall that Kittel has made numerous references to German atom-splitting activity in the past and apparently is possessed of some information on the subject. We understand that action on our request for permission to interrogate Kittel directly has been withheld. It is suggested that, in view of recurrence of discussion of this subject by Kittel, another attempt be made to arrange for direct interrogation. The fact that Kittel's mind so frequently concerns itself with this subject, his knowledge of facts which we have corroborated from independent sources and the opportunities available to him for obtaining knowledge of such activity which might reasonably be expected to attach to one of his position all strongly persuade the belief that if properly approached he would be an extremely valuable source of information.

Allen Dulles. 1 April 1945. Cable IN 9061 from Bern, Switzerland to Office of Strategic Services. NARA RG 226, Entry UD-90, Box 6, Folder 64 SUNRISE.

In his conversation with Kesselring, latter said to Wolff our situation is desperate, nobody dares tell truth to Fuehrer who surrounded by small group of advisers who still believe in a last specific secret weapon which they call "Verzweiflunge" weapon [Verzweiflungswaffe: desperation weapon]. Kesselring believed this weapon can prolong war but not decide it, but might cause terrible blood bath on both sides. Kesselring said if Fuehrer gave him order to use weapon he would surrender his command.

Rochus Misch. 2014. *Hitler's Last Witness: The Memoirs of Hitler's Bodyguard.* Barnsley: Frontline Books. p. 60.

The Western Allies had threatened that, if Germany used the atom bomb, they would assemble 15,000 aircraft in North Africa and use them to drench all of Germany with poison gas.

[*FC* A.4, D.13]

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Big Projectile Reported New Hitler Weapon. ***Los Angeles Times*****. 30 Sept. 1944. p. 3.**

SOMEWHERE IN FRANCE, Sept. 23 (Delayed.) (AP)--American 3rd Army troops have obtained information indicating that a 14-ton projectile with an explosive radius of three kilometers--almost two miles--is scheduled as the third in Hitler's series of vengeance weapons.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Big Projectile Reported New Hitler Weapon. *Los Angeles Times*. 30 Sept. 1944. p. 3.

SOMEWHERE IN FRANCE, Sept. 23 (Delayed.) (AP)--American 3rd Army troops have obtained information indicating that a 14-ton projectile with an explosive radius of three kilometers--almost two miles--is scheduled as the third in Hitler's series of vengeance weapons.

Germans Are Still Striving to Perfect New V Weapons. *New York Times*. 22 October 1944, p. E5.

V-3 is reported to be the atom bomb… An electric shock from a small instrument set to operate at a given time detonates explosive and atom simultaneously. The expansion caused by a normal explosive substance, such as dynamite when it becomes a gas, is increased by the force of the disintegrating atoms.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Big Projectile Reported New Hitler Weapon. *Los Angeles Times*. 30 Sept. 1944. p. 3.

SOMEWHERE IN FRANCE, Sept. 23 (Delayed.) (AP)--American 3rd Army troops have obtained information indicating that a 14-ton projectile with an explosive radius of three kilometers--almost two miles--is scheduled as the third in Hitler's series of vengeance weapons.

Germans Are Still Striving to Perfect New V Weapons. *New York Times*. 22 October 1944, p. E5.

V-3 is reported to be the atom bomb… An electric shock from a small instrument set to operate at a given time detonates explosive and atom simultaneously. The expansion caused by a normal explosive substance, such as dynamite when it becomes a gas, is increased by the force of the disintegrating atoms.

V-3? *Time.* 27 November 1944, p. 88.

The terrible novelty of V-2 had by no means worn off yet, but London last week was already abuzz with speculation about V-3--supposedly an atomic bomb… The speculative London report suggested that the Nazis are using the same pressure principle to crush atoms. The crusher: A "[Egon] Neumann" demolition charge, which explodes inward instead of outward. Used in a sphere, the Neumann charge might develop pressures of tens of thousands of tons per square inch at the center, perhaps enough to disintegrate an unstable atom such as uranium and release its explosive atomic energy.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Big Projectile Reported New Hitler Weapon. *Los Angeles Times*. 30 Sept. 1944. p. 3.

SOMEWHERE IN FRANCE, Sept. 23 (Delayed.) (AP)--American 3rd Army troops have obtained information indicating that a 14-ton projectile with an explosive radius of three kilometers--almost two miles--is scheduled as the third in Hitler's series of vengeance weapons.

Germans Are Still Striving to Perfect New V Weapons. *New York Times*. 22 October 1944, p. E5.

V-3 is reported to be the atom bomb… An electric shock from a small instrument set to operate at a given time detonates explosive and atom simultaneously. The expansion caused by a normal explosive substance, such as dynamite when it becomes a gas, is increased by the force of the disintegrating atoms.

V-3? *Time.* 27 November 1944, p. 88.

The terrible novelty of V-2 had by no means worn off yet, but London last week was already abuzz with speculation about V-3--supposedly an atomic bomb… The speculative London report suggested that the Nazis are using the same pressure principle to crush atoms. The crusher: A "[Egon] Neumann" demolition charge, which explodes inward instead of outward. Used in a sphere, the Neumann charge might develop pressures of tens of thousands of tons per square inch at the center, perhaps enough to disintegrate an unstable atom such as uranium and release its explosive atomic energy.

Leslie R. Groves. 1962. *Now It Can Be Told.* pp. 147-148.

Another incident that concerned us greatly was the appearance in a national magazine of an article hinting at the theory of implosion. While it did not violate any rules, it was most disturbing. A thorough investigation indicated that it resulted from the work of an alert and inquisitive reporter in another country.

[FDR Library, Small Collections, Box 1, Folder 3, ATOMIC BOMB FILE confirms Groves was referring to the 27 November 1944 article in *Time*.]

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Big Projectile Reported New Hitler Weapon. *Los Angeles Times*. 30 Sept. 1944. p. 3.

SOMEWHERE IN FRANCE, Sept. 23 (Delayed.) (AP)--American 3rd Army troops have obtained information indicating that a 14-ton projectile with an explosive radius of three kilometers--almost two miles--is scheduled as the third in Hitler's series of vengeance weapons.

Germans Are Still Striving to Perfect New V Weapons. *New York Times*. 22 October 1944, p. E5.

V-3 is reported to be the atom bomb… An electric shock from a small instrument set to operate at a given time detonates explosive and atom simultaneously. The expansion caused by a normal explosive substance, such as dynamite when it becomes a gas, is increased by the force of the disintegrating atoms.

V-3? *Time.* 27 November 1944, p. 88.

The terrible novelty of V-2 had by no means worn off yet, but London last week was already abuzz with speculation about V-3--supposedly an atomic bomb… The speculative London report suggested that the Nazis are using the same pressure principle to crush atoms. The crusher: A "[Egon] Neumann" demolition charge, which explodes inward instead of outward. Used in a sphere, the Neumann charge might develop pressures of tens of thousands of tons per square inch at the center, perhaps enough to disintegrate an unstable atom such as uranium and release its explosive atomic energy.

Leslie R. Groves. 1962. *Now It Can Be Told.* pp. 147-148.

Another incident that concerned us greatly was the appearance in a national magazine of an article hinting at the theory of implosion. While it did not violate any rules, it was most disturbing. A thorough investigation indicated that it resulted from the work of an alert and inquisitive reporter in another country.

[FDR Library, Small Collections, Box 1, Folder 3, ATOMIC BOMB FILE confirms Groves was referring to the 27 November 1944 article in *Time*.]

Margaret L. Suckley Papers. 9 December 1944. Journal Group E. JE 208. Franklin D. Roosevelt Library, Hyde Park, NY.

He [FDR] spoke very seriously at dinner about the German menace. He has just had a secret report from a German source which has been quite reliable in the past, to the effect that the Germans have a V3 bomb which will kill by concussion everything within a mile. They are planning to use it on New York for morale purposes—again, not seeming to realize that it will have the exact opposite effect to that which they expect. The entire Atlantic seaboard has relaxed all its dim-outs and air-raid precautions, etc. & the Pres. sent word to the Gen. staff that all previous preparations of that sort should be reviewed on the chance that the report about the V3 may be true. He said that in the next war, the side which first uses these new explosives will undoubtedly win. The Germans are way ahead of us in that direction, though we are doing a lot of research trying to catch up to them.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Big Projectile Reported New Hitler Weapon. *Los Angeles Times*. 30 Sept. 1944. p. 3.

SOMEWHERE IN FRANCE, Sept. 23 (Delayed.) (AP)--American 3rd Army troops have obtained information indicating that a 14-ton projectile with an explosive radius of three kilometers--almost two miles--is scheduled as the third in Hitler's series of vengeance weapons.

Germans Are Still Striving to Perfect New V Weapons. *New York Times*. 22 October 1944, p. E5.

V-3 is reported to be the atom bomb… An electric shock from a small instrument set to operate at a given time detonates explosive and atom simultaneously. The expansion caused by a normal explosive substance, such as dynamite when it becomes a gas, is increased by the force of the disintegrating atoms.

V-3? *Time.* 27 November 1944, p. 88.

The terrible novelty of V-2 had by no means worn off yet, but London last week was already abuzz with speculation about V-3--supposedly an atomic bomb… The speculative London report suggested that the Nazis are using the same pressure principle to crush atoms. The crusher: A "[Egon] Neumann" demolition charge, which explodes inward instead of outward. Used in a sphere, the Neumann charge might develop pressures of tens of thousands of tons per square inch at the center, perhaps enough to disintegrate an unstable atom such as uranium and release its explosive atomic energy.

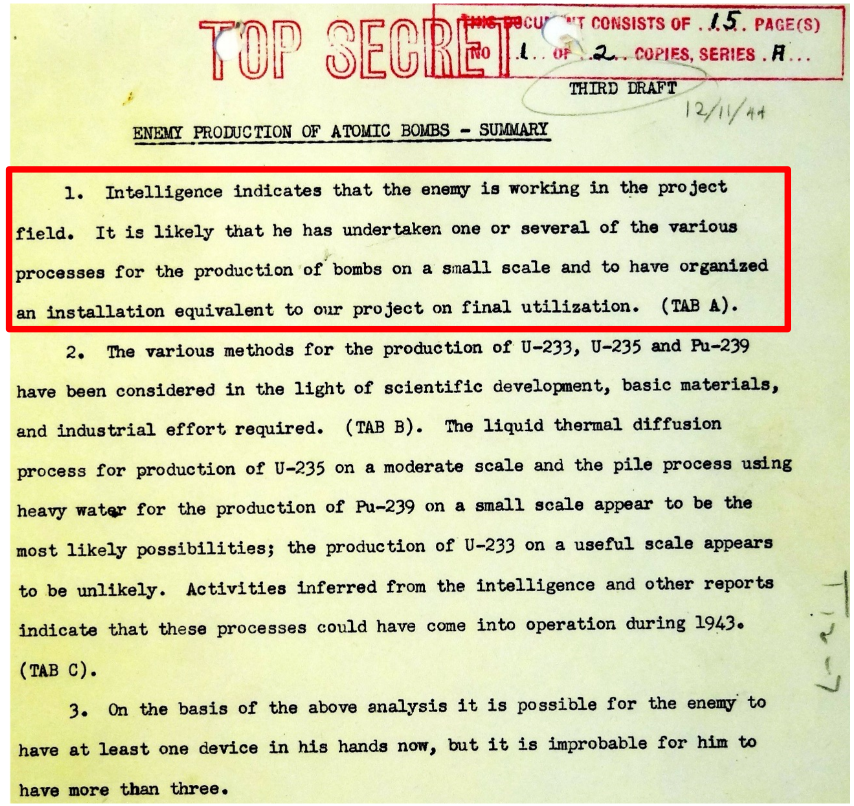
Leslie R. Groves. 1962. *Now It Can Be Told.* pp. 147-148.

Another incident that concerned us greatly was the appearance in a national magazine of an article hinting at the theory of implosion. While it did not violate any rules, it was most disturbing. A thorough investigation indicated that it resulted from the work of an alert and inquisitive reporter in another country.

[FDR Library, Small Collections, Box 1, Folder 3, ATOMIC BOMB FILE confirms Groves was referring to the 27 November 1944 article in *Time*.]

Margaret L. Suckley Papers. 9 December 1944. Journal Group E. JE 208. Franklin D. Roosevelt Library, Hyde Park, NY.

He [FDR] spoke very seriously at dinner about the German menace. He has just had a secret report from a German source which has been quite reliable in the past, to the effect that the Germans have a V3 bomb which will kill by concussion everything within a mile. They are planning to use it on New York for morale purposes—again, not seeming to realize that it will have the exact opposite effect to that which they expect. The entire Atlantic seaboard has relaxed all its dim-outs and air-raid precautions, etc. & the Pres. sent word to the Gen. staff that all previous preparations of that sort should be reviewed on the chance that the report about the V3 may be true. He said that in the next war, the side which first uses these new explosives will undoubtedly win. The Germans are way ahead of us in that direction, though we are doing a lot of research trying to catch up to them.



TOP SECRET

THIS DOCUMENT CONSISTS OF .15. PAGE(S)
NO .1. OF .2. COPIES, SERIES .A...

THIRD DRAFT

12/11/44

ENEMY PRODUCTION OF ATOMIC BOMBS - SUMMARY

1. Intelligence indicates that the enemy is working in the project field. It is likely that he has undertaken one or several of the various processes for the production of bombs on a small scale and to have organized an installation equivalent to our project on final utilization. (TAB A).

2. The various methods for the production of U-233, U-235 and Pu-239 have been considered in the light of scientific development, basic materials, and industrial effort required. (TAB B). The liquid thermal diffusion process for production of U-235 on a moderate scale and the pile process using heavy water for the production of Pu-239 on a small scale appear to be the most likely possibilities; the production of U-233 on a useful scale appears to be unlikely. Activities inferred from the intelligence and other reports indicate that these processes could have come into operation during 1943. (TAB C).

3. On the basis of the above analysis it is possible for the enemy to have at least one device in his hands now, but it is improbable for him to have more than three.

NARA RG 77, Entry UD-22A, Box 171, Folder 32.60-2 Germany: Summary Reports (1945-1946)

Forgotten Creators D.14

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Big Projectile Reported New Hitler Weapon. *Los Angeles Times*. 30 Sept. 1944. p. 3.

SOMEWHERE IN FRANCE, Sept. 23 (Delayed.) (AP)--American 3rd Army troops have obtained information indicating that a 14-ton projectile with an explosive radius of three kilometers--almost two miles--is scheduled as the third in Hitler's series of vengeance weapons.

Germans Are Still Striving to Perfect New V Weapons. *New York Times*. 22 October 1944, p. E5.

V-3 is reported to be the atom bomb… An electric shock from a small instrument set to operate at a given time detonates explosive and atom simultaneously. The expansion caused by a normal explosive substance, such as dynamite when it becomes a gas, is increased by the force of the disintegrating atoms.

V-3? *Time.* 27 November 1944, p. 88.

The terrible novelty of V-2 had by no means worn off yet, but London last week was already abuzz with speculation about V-3--supposedly an atomic bomb… The speculative London report suggested that the Nazis are using the same pressure principle to crush atoms. The crusher: A "[Egon] Neumann" demolition charge, which explodes inward instead of outward. Used in a sphere, the Neumann charge might develop pressures of tens of thousands of tons per square inch at the center, perhaps enough to disintegrate an unstable atom such as uranium and release its explosive atomic energy.

Leslie R. Groves. 1962. *Now It Can Be Told.* pp. 147-148.

Another incident that concerned us greatly was the appearance in a national magazine of an article hinting at the theory of implosion. While it did not violate any rules, it was most disturbing. A thorough investigation indicated that it resulted from the work of an alert and inquisitive reporter in another country.

[FDR Library, Small Collections, Box 1, Folder 3, ATOMIC BOMB FILE confirms Groves was referring to the 27 November 1944 article in *Time*.]

Margaret L. Suckley Papers. 9 December 1944. Journal Group E. JE 208. Franklin D. Roosevelt Library, Hyde Park, NY.

He [FDR] spoke very seriously at dinner about the German menace. He has just had a secret report from a German source which has been quite reliable in the past, to the effect that the Germans have a V3 bomb which will kill by concussion everything within a mile. They are planning to use it on New York for morale purposes—again, not seeming to realize that it will have the exact opposite effect to that which they expect. The entire Atlantic seaboard has relaxed all its dim-outs and air-raid precautions, etc. & the Pres. sent word to the Gen. staff that all previous preparations of that sort should be reviewed on the chance that the report about the V3 may be true. He said that in the next war, the side which first uses these new explosives will undoubtedly win. The Germans are way ahead of us in that direction, though we are doing a lot of research trying to catch up to them.

TOP SECRET

THIS DOCUMENT CONSISTS OF 15 PAGE(S)
NO 1 OF 2 COPIES, SERIES A

THIRD DRAFT

12/11/44

ENEMY PRODUCTION OF ATOMIC BOMBS - SUMMARY

1. Intelligence indicates that the enemy is working in the project field. It is likely that he has undertaken one or several of the various processes for the production of bombs on a small scale and to have organized an installation equivalent to our project on final utilization. (TAB A).

2. The various methods for the production of U-233, U-235 and Pu-239 have been considered in the light of scientific development, basic materials, and industrial effort required. (TAB B). The liquid thermal diffusion process for production of U-235 on a moderate scale and the pile process using heavy water for the production of Pu-239 on a small scale appear to be the most likely possibilities; the production of U-233 on a useful scale appears to be unlikely. Activities inferred from the intelligence and other reports indicate that these processes could have come into operation during 1943. (TAB C).

3. On the basis of the above analysis it is possible for the enemy to have at least one device in his hands now, but it is improbable for him to have more than three.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 32.60-2 Germany: Summary 1945-46
Tab A

Date 1944

From —

To —

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information

☐ Otherwise Restricted Information

NND 917017
Authority

4-8-91 cc
Date

WITHDRAWAL NOTICE

NARA RG 77, Entry UD-22A, Box 171, Folder 32.60-2 Germany: Summary Reports (1945-1946)

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.
A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.
A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

***Newsweek*. 13 August 1945, p. 30.**
Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2

LONDON OFFICE: Combined Intell Disc.

Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.

A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

Newsweek. 13 August 1945, p. 30.

Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

U.S. News. 17 August 1945, pp. 20-23.

The Germans had planned to use the atomic bomb in the warhead of a V-type winged torpedo such as they fired upon England across the Channel. With such a bomb, they might have devastated England.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.
A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

***Newsweek*. 13 August 1945, p. 30.**
Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

***U.S. News*. 17 August 1945, pp. 20-23.**
The Germans had planned to use the atomic bomb in the warhead of a V-type winged torpedo such as they fired upon England across the Channel. With such a bomb, they might have devastated England.

U.S. Office of War Information. 25 August 1945. NARA RG 208, Entry 198, Box 1042.
Germany's inner war secrets ranged from experiments with the atomic bomb, anti-radar devices, and piloted rocket missiles that they expected to cross the Atlantic in 17 minutes, to butter made from coal, the Office of War Information reported today.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.
A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

***Newsweek*. 13 August 1945, p. 30.**
Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

***U.S. News*. 17 August 1945, pp. 20-23.**
The Germans had planned to use the atomic bomb in the warhead of a V-type winged torpedo such as they fired upon England across the Channel. With such a bomb, they might have devastated England.

U.S. Office of War Information. 25 August 1945. NARA RG 208, Entry 198, Box 1042.
Germany's inner war secrets ranged from experiments with the atomic bomb, anti-radar devices, and piloted rocket missiles that they expected to cross the Atlantic in 17 minutes, to butter made from coal, the Office of War Information reported today.

General George C. Marshall. 1 September 1945. Final Report to the Secretary of War.
Victory in this global war depended on the successful execution of OVERLORD. That must not fail… These conclusions seemed inescapable: France must be invaded in 1944, to shorten the war by facilitating the advance westward of the Soviet forces. At the same time German technological advances such as in the development of atomic explosives made it imperative that we attack before these terrible weapons could be turned against us.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.
A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

***Newsweek*. 13 August 1945, p. 30.**
Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

***U.S. News*. 17 August 1945, pp. 20-23.**
The Germans had planned to use the atomic bomb in the warhead of a V-type winged torpedo such as they fired upon England across the Channel. With such a bomb, they might have devastated England.

U.S. Office of War Information. 25 August 1945. NARA RG 208, Entry 198, Box 1042.
Germany's inner war secrets ranged from experiments with the atomic bomb, anti-radar devices, and piloted rocket missiles that they expected to cross the Atlantic in 17 minutes, to butter made from coal, the Office of War Information reported today.

General George C. Marshall. 1 September 1945. Final Report to the Secretary of War.
Victory in this global war depended on the successful execution of OVERLORD. That must not fail… These conclusions seemed inescapable: France must be invaded in 1944, to shorten the war by facilitating the advance westward of the Soviet forces. At the same time German technological advances such as in the development of atomic explosives made it imperative that we attack before these terrible weapons could be turned against us.

General T. J. Betts and Sir R. P. Linstead. 15 Sept. 1945. AFHRA A5186, pp. 904–1026.
Certain items have been omitted because of security considerations… Of particular significance were the statements, made by German experts in the rocket and controlled missile field, that much of the priority accorded their work by the German High Command was in anticipation of the use of atomic explosives. These authorities stated that KWI had repeatedly assured Hitler that an atomic explosive would be available for use within a comparatively short time. During the last months of work by the Peenemünde staff, V-weapons were designed with much smaller war-heads. Quite possibly this trend was in anticipation of the successful development of a German atomic explosive.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.
A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

***Newsweek*. 13 August 1945, p. 30.**
Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

***U.S. News*. 17 August 1945, pp. 20-23.**
The Germans had planned to use the atomic bomb in the warhead of a V-type winged torpedo such as they fired upon England across the Channel. With such a bomb, they might have devastated England.

U.S. Office of War Information. 25 August 1945. NARA RG 208, Entry 198, Box 1042.
Germany's inner war secrets ranged from experiments with the atomic bomb, anti-radar devices, and piloted rocket missiles that they expected to cross the Atlantic in 17 minutes, to butter made from coal, the Office of War Information reported today.

General George C. Marshall. 1 September 1945. Final Report to the Secretary of War.
Victory in this global war depended on the successful execution of OVERLORD. That must not fail… These conclusions seemed inescapable: France must be invaded in 1944, to shorten the war by facilitating the advance westward of the Soviet forces. At the same time German technological advances such as in the development of atomic explosives made it imperative that we attack before these terrible weapons could be turned against us.

General T. J. Betts and Sir R. P. Linstead. 15 Sept. 1945. AFHRA A5186, pp. 904–1026.
Certain items have been omitted because of security considerations… Of particular significance were the statements, made by German experts in the rocket and controlled missile field, that much of the priority accorded their work by the German High Command was in anticipation of the use of atomic explosives. These authorities stated that KWI had repeatedly assured Hitler that an atomic explosive would be available for use within a comparatively short time. During the last months of work by the Peenemünde staff, V-weapons were designed with much smaller war-heads. Quite possibly this trend was in anticipation of the successful development of a German atomic explosive.

Sir Roy Fedden. German Plans to Revolutionise Air Warfare. *Daily Telegraph & Morning Post.* 1 October 1945, p. 4.
There is some reason to believe that Hitler had been promised atomic explosives by October of this year… Immense developments were under way with robot rocket weapons, some of which had already started in production. They were simple and cheap to make, and with atomic explosives even a few such devices could have placed air warfare on a new nightmare plane of impersonal long-distance annihilation...

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.
A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

***Newsweek*. 13 August 1945, p. 30.**
Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

***U.S. News*. 17 August 1945, pp. 20-23.**
The Germans had planned to use the atomic bomb in the warhead of a V-type winged torpedo such as they fired upon England across the Channel. With such a bomb, they might have devastated England.

U.S. Office of War Information. 25 August 1945. NARA RG 208, Entry 198, Box 1042.
Germany's inner war secrets ranged from experiments with the atomic bomb, anti-radar devices, and piloted rocket missiles that they expected to cross the Atlantic in 17 minutes, to butter made from coal, the Office of War Information reported today.

General George C. Marshall. 1 September 1945. Final Report to the Secretary of War.
Victory in this global war depended on the successful execution of OVERLORD. That must not fail… These conclusions seemed inescapable: France must be invaded in 1944, to shorten the war by facilitating the advance westward of the Soviet forces. At the same time German technological advances such as in the development of atomic explosives made it imperative that we attack before these terrible weapons could be turned against us.

General T. J. Betts and Sir R. P. Linstead. 15 Sept. 1945. AFHRA A5186, pp. 904–1026.
Certain items have been omitted because of security considerations… Of particular significance were the statements, made by German experts in the rocket and controlled missile field, that much of the priority accorded their work by the German High Command was in anticipation of the use of atomic explosives. These authorities stated that KWI had repeatedly assured Hitler that an atomic explosive would be available for use within a comparatively short time. During the last months of work by the Peenemünde staff, V-weapons were designed with much smaller war-heads. Quite possibly this trend was in anticipation of the successful development of a German atomic explosive.

Sir Roy Fedden. German Plans to Revolutionise Air Warfare. *Daily Telegraph & Morning Post.* 1 October 1945, p. 4.
There is some reason to believe that Hitler had been promised atomic explosives by October of this year… Immense developments were under way with robot rocket weapons, some of which had already started in production. They were simple and cheap to make, and with atomic explosives even a few such devices could have placed air warfare on a new nightmare plane of impersonal long-distance annihilation...

U.S. Department of Commerce. 1946. The Chemical Problem in Germany. p. 8. NARA RG 40, Entry UD-75, Box 3, Folder Press Releases.
Spectacular accomplishments in uranium,… nuclear physics and many other fields, have been uncovered in the investigation of the chemicals field alone.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2

LONDON OFFICE: Combined Intell Disc.

Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.

A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

Newsweek. 13 August 1945, p. 30.

Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

U.S. News. 17 August 1945, pp. 20-23.

The Germans had planned to use the atomic bomb in the warhead of a V-type winged torpedo such as they fired upon England across the Channel. With such a bomb, they might have devastated England.

U.S. Office of War Information. 25 August 1945. NARA RG 208, Entry 198, Box 1042.

Germany's inner war secrets ranged from experiments with the atomic bomb, anti-radar devices, and piloted rocket missiles that they expected to cross the Atlantic in 17 minutes, to butter made from coal, the Office of War Information reported today.

General George C. Marshall. 1 September 1945. Final Report to the Secretary of War.

Victory in this global war depended on the successful execution of OVERLORD. That must not fail… These conclusions seemed inescapable: France must be invaded in 1944, to shorten the war by facilitating the advance westward of the Soviet forces. At the same time German technological advances such as in the development of atomic explosives made it imperative that we attack before these terrible weapons could be turned against us.

General T. J. Betts and Sir R. P. Linstead. 15 Sept. 1945. AFHRA A5186, pp. 904–1026.

Certain items have been omitted because of security considerations… Of particular significance were the statements, made by German experts in the rocket and controlled missile field, that much of the priority accorded their work by the German High Command was in anticipation of the use of atomic explosives. These authorities stated that KWI had repeatedly assured Hitler that an atomic explosive would be available for use within a comparatively short time. During the last months of work by the Peenemünde staff, V-weapons were designed with much smaller war-heads. Quite possibly this trend was in anticipation of the successful development of a German atomic explosive.

Sir Roy Fedden. German Plans to Revolutionise Air Warfare. *Daily Telegraph & Morning Post.* 1 October 1945, p. 4.

There is some reason to believe that Hitler had been promised atomic explosives by October of this year… Immense developments were under way with robot rocket weapons, some of which had already started in production. They were simple and cheap to make, and with atomic explosives even a few such devices could have placed air warfare on a new nightmare plane of impersonal long-distance annihilation...

U.S. Department of Commerce. 1946. The Chemical Problem in Germany. p. 8. NARA RG 40, Entry UD-75, Box 3, Folder Press Releases.

Spectacular accomplishments in uranium,… nuclear physics and many other fields, have been uncovered in the investigation of the chemicals field alone.

Colonel George Bryant Woods. 1946. *The Aircraft Manufacturing Industry: Present and Future Prospects.* New York: White, Weld & Co. p. 32.

Germany's Plans for the "A-9" with Atomic Bomb… In captured scientific German documents there are diagrams of the city of New York showing anticipated areas of destruction to be expected after perfection of such a weapon to carry an atomic war head, and it is well known that the Germans originally had hoped to have their atomic bomb developments completed by the end of 1944.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.
A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

Newsweek. 13 August 1945, p. 30.
Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

U.S. News. 17 August 1945, pp. 20-23.
The Germans had planned to use the atomic bomb in the warhead of a V-type winged torpedo such as they fired upon England across the Channel. With such a bomb, they might have devastated England.

U.S. Office of War Information. 25 August 1945. NARA RG 208, Entry 198, Box 1042.
Germany's inner war secrets ranged from experiments with the atomic bomb, anti-radar devices, and piloted rocket missiles that they expected to cross the Atlantic in 17 minutes, to butter made from coal, the Office of War Information reported today.

General George C. Marshall. 1 September 1945. Final Report to the Secretary of War.
Victory in this global war depended on the successful execution of OVERLORD. That must not fail… These conclusions seemed inescapable: France must be invaded in 1944, to shorten the war by facilitating the advance westward of the Soviet forces. At the same time German technological advances such as in the development of atomic explosives made it imperative that we attack before these terrible weapons could be turned against us.

General T. J. Betts and Sir R. P. Linstead. 15 Sept. 1945. AFHRA A5186, pp. 904–1026.
Certain items have been omitted because of security considerations… Of particular significance were the statements, made by German experts in the rocket and controlled missile field, that much of the priority accorded their work by the German High Command was in anticipation of the use of atomic explosives. These authorities stated that KWI had repeatedly assured Hitler that an atomic explosive would be available for use within a comparatively short time. During the last months of work by the Peenemünde staff, V-weapons were designed with much smaller war-heads. Quite possibly this trend was in anticipation of the successful development of a German atomic explosive.

Sir Roy Fedden. German Plans to Revolutionise Air Warfare. *Daily Telegraph & Morning Post*. 1 October 1945, p. 4.
There is some reason to believe that Hitler had been promised atomic explosives by October of this year… Immense developments were under way with robot rocket weapons, some of which had already started in production. They were simple and cheap to make, and with atomic explosives even a few such devices could have placed air warfare on a new nightmare plane of impersonal long-distance annihilation...

U.S. Department of Commerce. 1946. The Chemical Problem in Germany. p. 8. NARA RG 40, Entry UD-75, Box 3, Folder Press Releases.
Spectacular accomplishments in uranium,… nuclear physics and many other fields, have been uncovered in the investigation of the chemicals field alone.

Colonel George Bryant Woods. 1946. *The Aircraft Manufacturing Industry: Present and Future Prospects*. New York: White, Weld & Co. p. 32.
Germany's Plans for the "A-9" with Atomic Bomb… In captured scientific German documents there are diagrams of the city of New York showing anticipated areas of destruction to be expected after perfection of such a weapon to carry an atomic war head, and it is well known that the Germans originally had hoped to have their atomic bomb developments completed by the end of 1944.

AAF Review. July 1946. German Rocketeers: German Rockets and Guided Missiles Almost Won the War for the Nazis. [Based heavily on information from Col. Donald Putt.]
It is now also fairly generally known that the atomic bomb race was close--again, closer than we care to think about. And paralleling the Nazis' research on atomic explosives was their accelerated development of the V-2 program. Linking these two projects together makes credible another theory which is current among Allied guided missile groups: namely, that it was the intention of Nazi technicians to put some sort of atomic device in the warhead of the V-2... But it is still a matter of scientific conjecture just how many weeks--or days--it might have taken Germany to be ready with her atomic devices for the V-2s.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.
A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

Newsweek. 13 August 1945, p. 30.
Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

U.S. News. 17 August 1945, pp. 20-23.
The Germans had planned to use the atomic bomb in the warhead of a V-type winged torpedo such as they fired upon England across the Channel. With such a bomb, they might have devastated England.

U.S. Office of War Information. 25 August 1945. NARA RG 208, Entry 198, Box 1042.
Germany's inner war secrets ranged from experiments with the atomic bomb, anti-radar devices, and piloted rocket missiles that they expected to cross the Atlantic in 17 minutes, to butter made from coal, the Office of War Information reported today.

General George C. Marshall. 1 September 1945. Final Report to the Secretary of War.
Victory in this global war depended on the successful execution of OVERLORD. That must not fail… These conclusions seemed inescapable: France must be invaded in 1944, to shorten the war by facilitating the advance westward of the Soviet forces. At the same time German technological advances such as in the development of atomic explosives made it imperative that we attack before these terrible weapons could be turned against us.

General T. J. Betts and Sir R. P. Linstead. 15 Sept. 1945. AFHRA A5186, pp. 904–1026.
Certain items have been omitted because of security considerations… Of particular significance were the statements, made by German experts in the rocket and controlled missile field, that much of the priority accorded their work by the German High Command was in anticipation of the use of atomic explosives. These authorities stated that KWI had repeatedly assured Hitler that an atomic explosive would be available for use within a comparatively short time. During the last months of work by the Peenemünde staff, V-weapons were designed with much smaller war-heads. Quite possibly this trend was in anticipation of the successful development of a German atomic explosive.

Sir Roy Fedden. German Plans to Revolutionise Air Warfare. *Daily Telegraph & Morning Post*. 1 October 1945, p. 4.
There is some reason to believe that Hitler had been promised atomic explosives by October of this year… Immense developments were under way with robot rocket weapons, some of which had already started in production. They were simple and cheap to make, and with atomic explosives even a few such devices could have placed air warfare on a new nightmare plane of impersonal long-distance annihilation...

U.S. Department of Commerce. 1946. The Chemical Problem in Germany. p. 8. NARA RG 40, Entry UD-75, Box 3, Folder Press Releases.
Spectacular accomplishments in uranium,… nuclear physics and many other fields, have been uncovered in the investigation of the chemicals field alone.

Colonel George Bryant Woods. 1946. *The Aircraft Manufacturing Industry: Present and Future Prospects*. New York: White, Weld & Co. p. 32.
Germany's Plans for the "A-9" with Atomic Bomb… In captured scientific German documents there are diagrams of the city of New York showing anticipated areas of destruction to be expected after perfection of such a weapon to carry an atomic war head, and it is well known that the Germans originally had hoped to have their atomic bomb developments completed by the end of 1944.

AAF Review. July 1946. German Rocketeers: German Rockets and Guided Missiles Almost Won the War for the Nazis. [Based heavily on information from Col. Donald Putt.]
It is now also fairly generally known that the atomic bomb race was close--again, closer than we care to think about. And paralleling the Nazis' research on atomic explosives was their accelerated development of the V-2 program. Linking these two projects together makes credible another theory which is current among Allied guided missile groups: namely, that it was the intention of Nazi technicians to put some sort of atomic device in the warhead of the V-2... But it is still a matter of scientific conjecture just how many weeks--or days--it might have taken Germany to be ready with her atomic devices for the V-2s.

Royal Army Ordnance Corps. October 1946. *R.A.O.C. Gazette* 28:5:150.
Many interesting discoveries were made by Ordnance representatives *en route*. D.D.O.S. of 8 Corps found a factory engaged in production work for the German atomic bomb. The ammunition for Germany's largest gun was also located. Two of these massive guns had been captured by the Russians, but this was the first time their ammunition had been seen. At Belsen, the Ordnance service found itself faced with an unprecedented task.

14. Allied Belief in German Nuclear Weapons—Where Are the Reports?

Major Robert Furman. 22 May 1945. NARA RG 77, Entry UD-22A, Box 168, Folder 202.2
LONDON OFFICE: Combined Intell Disc.
Boris [Pash] left here for home to try to convince authorities that the Alsos job is over. But in this theater, [General T. J.] Betts, [General George] Conrad and [MIT Professor Edward] Bowles are not agreeing that the job for which Alsos was set up to do is in any way completed… A great many TA [nuclear] reports still remain in Germany, as you know. Therefore, reports on installations are received weekly about which we do very little. We always try to pick up papers that are reported to exist, to remove them from circulation but it is impossible to keep other agencies from finding out about the German effort.

Generals Omar Bradley and Dwight Eisenhower. 31 May 1945. NARA RG 77, Entry UD-22A, Box 160, Folder APR 45-Dec. '45.
A laboratory containing equipment and documents related to experimental work on atomic bombs and AA rockets was located near Lofer, E 7399 by Third US Army.

***Newsweek*. 13 August 1945, p. 30.**
Metal of the Millennium: German scientists nearly succeeded in solving it. Since the surrender of the Nazi armies, Allied officers have revealed that Germany would have been able to strike with atomic bombs by January 1945, if the invasion had not come six months before. The highest Allied officials knew that such explosives could have won the war for the Axis.

***U.S. News*. 17 August 1945, pp. 20-23.**
The Germans had planned to use the atomic bomb in the warhead of a V-type winged torpedo such as they fired upon England across the Channel. With such a bomb, they might have devastated England.

U.S. Office of War Information. 25 August 1945. NARA RG 208, Entry 198, Box 1042.
Germany's inner war secrets ranged from experiments with the atomic bomb, anti-radar devices, and piloted rocket missiles that they expected to cross the Atlantic in 17 minutes, to butter made from coal, the Office of War Information reported today.

General George C. Marshall. 1 September 1945. Final Report to the Secretary of War.
Victory in this global war depended on the successful execution of OVERLORD. That must not fail… These conclusions seemed inescapable: France must be invaded in 1944, to shorten the war by facilitating the advance westward of the Soviet forces. At the same time German technological advances such as in the development of atomic explosives made it imperative that we attack before these terrible weapons could be turned against us.

General T. J. Betts and Sir R. P. Linstead. 15 Sept. 1945. AFHRA A5186, pp. 904–1026.
Certain items have been omitted because of security considerations… Of particular significance were the statements, made by German experts in the rocket and controlled missile field, that much of the priority accorded their work by the German High Command was in anticipation of the use of atomic explosives. These authorities stated that KWI had repeatedly assured Hitler that an atomic explosive would be available for use within a comparatively short time. During the last months of work by the Peenemünde staff, V-weapons were designed with much smaller war-heads. Quite possibly this trend was in anticipation of the successful development of a German atomic explosive.

Sir Roy Fedden. German Plans to Revolutionise Air Warfare. *Daily Telegraph & Morning Post.* 1 October 1945, p. 4.
There is some reason to believe that Hitler had been promised atomic explosives by October of this year… Immense developments were under way with robot rocket weapons, some of which had already started in production. They were simple and cheap to make, and with atomic explosives even a few such devices could have placed air warfare on a new nightmare plane of impersonal long-distance annihilation...

U.S. Department of Commerce. 1946. The Chemical Problem in Germany. p. 8. NARA RG 40, Entry UD-75, Box 3, Folder Press Releases.
Spectacular accomplishments in uranium,… nuclear physics and many other fields, have been uncovered in the investigation of the chemicals field alone.

Colonel George Bryant Woods. 1946. *The Aircraft Manufacturing Industry: Present and Future Prospects.* New York: White, Weld & Co. p. 32.
Germany's Plans for the "A-9" with Atomic Bomb… In captured scientific German documents there are diagrams of the city of New York showing anticipated areas of destruction to be expected after perfection of such a weapon to carry an atomic war head, and it is well known that the Germans originally had hoped to have their atomic bomb developments completed by the end of 1944.

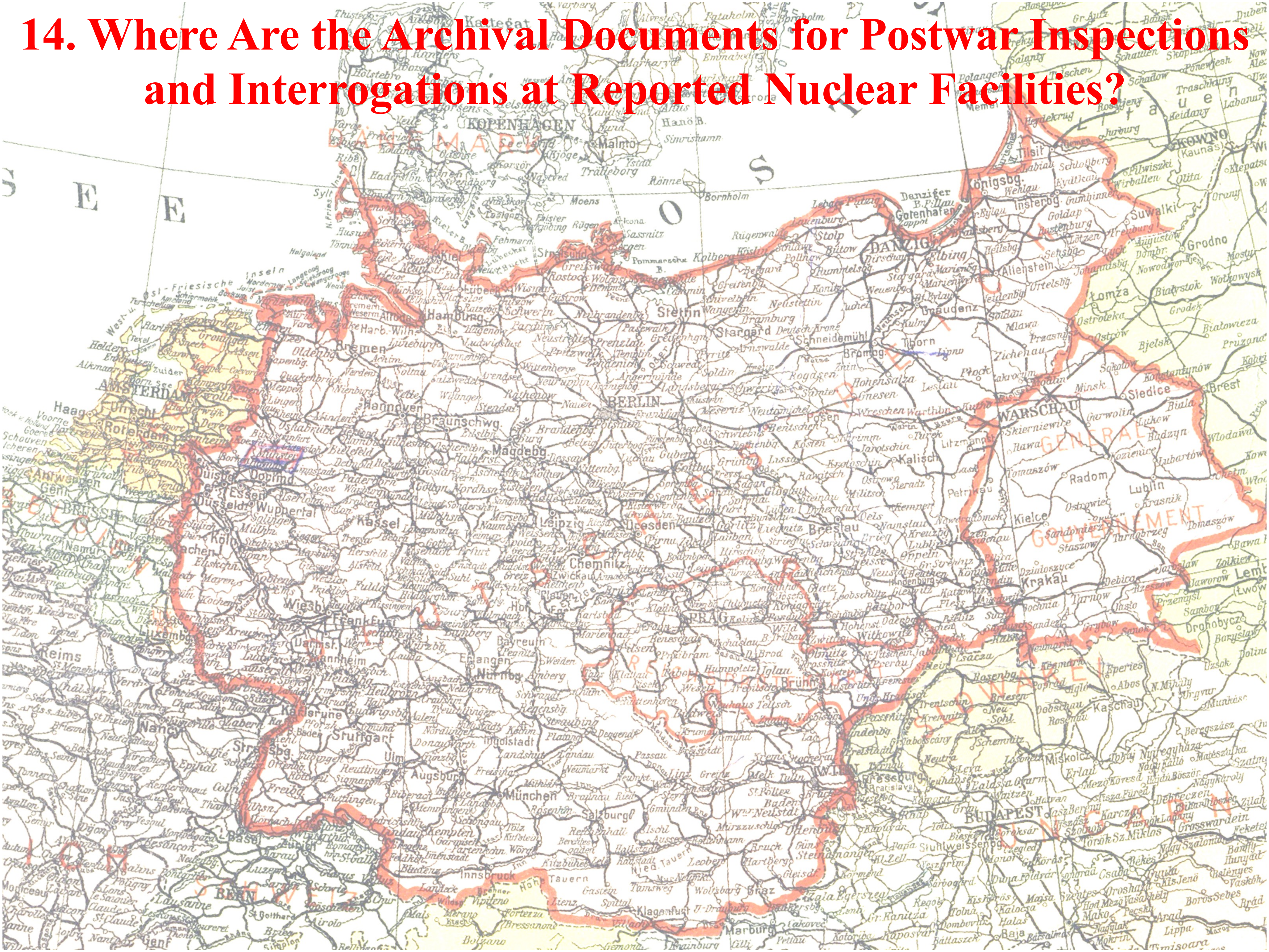
***AAF Review*. July 1946. German Rocketeers: German Rockets and Guided Missiles Almost Won the War for the Nazis. [Based heavily on information from Col. Donald Putt.]**
It is now also fairly generally known that the atomic bomb race was close--again, closer than we care to think about. And paralleling the Nazis' research on atomic explosives was their accelerated development of the V-2 program. Linking these two projects together makes credible another theory which is current among Allied guided missile groups: namely, that it was the intention of Nazi technicians to put some sort of atomic device in the warhead of the V-2... But it is still a matter of scientific conjecture just how many weeks--or days--it might have taken Germany to be ready with her atomic devices for the V-2s.

Royal Army Ordnance Corps. October 1946. *R.A.O.C. Gazette* 28:5:150.
Many interesting discoveries were made by Ordnance representatives *en route*. D.D.O.S. of 8 Corps found a factory engaged in production work for the German atomic bomb. The ammunition for Germany's largest gun was also located. Two of these massive guns had been captured by the Russians, but this was the first time their ammunition had been seen. At Belsen, the Ordnance service found itself faced with an unprecedented task.

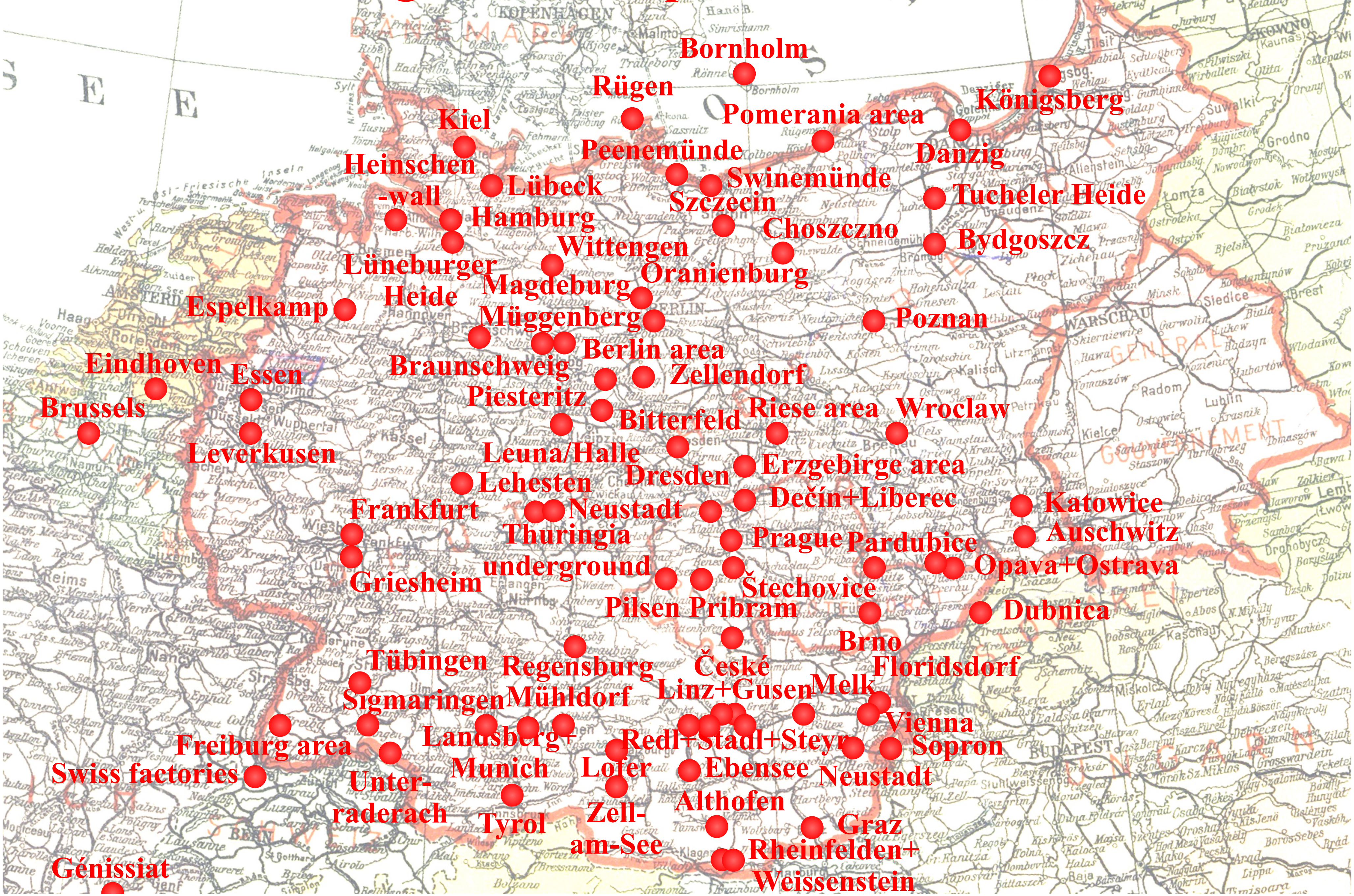
Science Service. Reveal Nazis Planned Rocket to Blast N.Y. at 6000 MPH. *Indianapolis Times.* 2 August 1947, p. 4.
WASHINGTON, Aug. 2---The Germans planned a bomb to cross the Atlantic and blast New York. It was a rocket to be started on its long journey by another rocket which detached itself when its job was done. This was revealed today by Brig. Gen. William L. Richardson of the U.S. Army Air Forces. Gen. Richardson, chief of the A.A.F. Guided Missiles and Air Defense Division, spoke as a guest of Watson Davis, director of Science Service, on "Adventures in Science," heard over the Columbia network… There is evidence to believe, he stated, that the Germans intended to utilize an atomic warhead which would have made this weapon extremely deadly.

[See *Forgotten Creators* D.14]

14. Where Are the Archival Documents for Postwar Inspections and Interrogations at Reported Nuclear Facilities?



14. Where Are the Archival Documents for Postwar Inspections and Interrogations at Reported Nuclear Facilities?



14. Where Are the Archival Documents for Postwar Inspections and Interrogations at Reported Nuclear Facilities?

14. International Shipments—Where Are the Reports???

14. International Shipments—Where Are the Reports???

NARA RG 77, Entry UD-22A, Box 171, Folder 32.60-2
GERMANY: Summary Reports (1945-1946),
Summary of Information June and July [1944]

The Japanese have announced that they too have discovered the effects of fission and have also said that Germany was working on the project. The interchange of technical information between Japan and Germany is being accomplished by means of submarine, surface ships, the Siberian railway and by air.

DECLASSIFIED
Authority NND 917017

14. International Shipments—Where Are the Reports???

NARA RG 77, Entry UD-22A, Box 171, Folder 32.60-2
GERMANY: Summary Reports (1945-1946),
Summary of Information June and July [1944]

The Japanese have announced that they too have discovered the effects of fission and have also said that Germany was working on the project. The interchange of technical information between Japan and Germany is being accomplished by means of submarine, surface ships, the Siberian railway and by air.

DECLASSIFIED
Authority NND 917017

Operation LUSTY. Jan 1946.
AFHRA folder 570.650A V.1 6 June 1944--1 Feb 1946, IRIS 241258

A casual remark made by a technical engineer, who stated that he had recently been offered a position in Japan, led to his being thoroughly interrogated for significant technical information. As an aside, and what he probably considered a relatively unimportant incident, he stated that less than a month ago, about the middle of April, ten submarines heavily loaded with the latest German equipment relative to aerial warfare, were dispatched from Kiel to Japan. When Lt Col. O'Brien was thus informed he immediately advised the Directorate of Intelligence, USAFE, who in turn notified the Japanese Intelligence Section of SHAEF. A cable was then dispatched to all commands in every theater of war. All vessels in ports and at sea were notified, and one of the biggest searches ever undertaken during the war for submarines was initiated. What route they had taken, whether they had gone alone or together, no one knew. But so extensive was the search and so carefully was it executed by warships of all Allied nations, that by the end of June, six of these ten submarines had been captured intact, some a relatively short distance away from their bases, others perilously close to Japan.

THIS PAGE IS DECLASSIFIED IAW EO 13526

For more information, see *Forgotten Creators* D.14.

14. International Shipments—Where Are the Reports???

**NARA RG 77, Entry UD-22A, Box 171, Folder 32.60-2
GERMANY: Summary Reports (1945-1946),
Summary of Information June and July [1944]**

The Japanese have announced that they too have discovered the effects of fission and have also said that Germany was working on the project. The interchange of technical information between Japan and Germany is being accomplished by means of submarine, surface ships, the Siberian railway and by air.

DECLASSIFIED
Authority NND 917017

**Operation LUSTY. Jan 1946.
AFHRA folder 570.650A V.1 6 June 1944--1 Feb 1946, IRIS 241258**

A casual remark made by a technical engineer, who stated that he had recently been offered a position in Japan, led to his being thoroughly interrogated for significant technical information. As an aside, and what he probably considered a relatively unimportant incident, he stated that less than a month ago, about the middle of April, ten submarines heavily loaded with the latest German equipment relative to aerial warfare, were dispatched from Kiel to Japan. When Lt Col. O'Brien was thus informed he immediately advised the Directorate of Intelligence, USAFE, who in turn notified the Japanese Intelligence Section of SHAEF. A cable was then dispatched to all commands in every theater of war. All vessels in ports and at sea were notified, and one of the biggest searches ever undertaken during the war for submarines was initiated. What route they had taken, whether they had gone alone or together, no one knew. But so extensive was the search and so carefully was it executed by warships of all Allied nations, that by the end of June, six of these ten submarines had been captured intact, some a relatively short distance away from their bases, others perilously close to Japan.

For more information, see *Forgotten Creators* D.14.

NARA Boston RG 181. 1st Naval District. Office of the Assistant Chief of Staff for Operations. Formerly Security Classified General Correspondence 1944--1945. Box 26. Folder U-Boats, Surrender of.

SECRET
262151 (P) 27 MAY

FROM: CNO
TO: NYPORT
INFO: COMONE
SUBJECT: MINE TUBES, UNLOADING OF

INTERROGATION LT PFAFF SECOND WATCH OFFICER U-234 DISCLOSES HE WAS IN CHARGE OF CARGO AND PERSONALLY SUPERVISED LOADING ALL MINE TUBES.

PFAFF PREPARED MANIFEST LIST AND KNOWS KIND DOCUMENTS AND CARGO IN EACH TUBE.

PFAFF STATES LONG CONTAINERS SHOULD BE UNPACKED IN HORIZONTAL POSITION AND SHORT CONTAINERS IN VERTICAL POSITION.

URANIUM OXIDE LOADED IN GOLD LINED CYLINDERS AND AS LONG AS CYLINDERS NOT OPENED CAN BE HANDLED LIKE CRUDE TNT.

THESE CONTAINERS SHOULD NOT BE OPENED AS SUBSTANCE WILL BECOME SENSITIVE AND DANGEROUS.

PFAFF IS AVAILABLE AND WILLING TO AID UNLOADING IF RNEDT DESIRES.

ADVISE.

DISTRIBUTION
COMDT
C/S
DUTY OFF
ACO (A)
DIO
D ORD OFF

CTM

14. Personnel: Hans Kammler

14. Personnel: Hans Kammler

SS General Hans Kammler was in charge of the nuclear weapons program by the end of the war.

14. Personnel: Hans Kammler

SS General Hans Kammler was in charge of the nuclear weapons program by the end of the war.

Wilhelm Voss. April 1946. NARA RG 319, Entry A1-134B, Folder XE065651.

In the last years [of the war], the central management of the development and production of the most secret weapons and devices was in the hands of SS General Professor Kammler and his working group. These were the most secret weapons, devices, and processes, some of which were actually used, but some of which were not used [in the war], namely in the field of atom smashing, the transformation of elements, the atomic bomb and atomic energy, and also rocket weapons, the latest propulsion systems for aircraft, remote control, etc…. Kammler succeeded in centralizing the development work in his field. He was the representative of the Ministry of Armaments, the Army Ordnance Office, the Air Force, and the SS at the same time.

14. Personnel: Hans Kammler

SS General Hans Kammler was in charge of the nuclear weapons program by the end of the war.

Wilhelm Voss. April 1946. NARA RG 319, Entry A1-134B, Folder XE065651.
In the last years [of the war], the central management of the development and production of the most secret weapons and devices was in the hands of SS General Professor Kammler and his working group. These were the most secret weapons, devices, and processes, some of which were actually used, but some of which were not used [in the war], namely in the field of atom smashing, the transformation of elements, the atomic bomb and atomic energy, and also rocket weapons, the latest propulsion systems for aircraft, remote control, etc…. Kammler succeeded in centralizing the development work in his field. He was the representative of the Ministry of Armaments, the Army Ordnance Office, the Air Force, and the SS at the same time.

HQ CIC, USFET, Region Munich IV, 25 April 1946. Subject: Wilhelm Voss. NARA RG 263, Entry ZZ-18, Box 133, Folder Voss, Friedrich Wilhelm.
Subject states that the two men that were responsible for research on the most secret weapons at Skoda were SS Gruppenfuehrer Prof. KAMMLER and his deputy SS Oberfuehrer PURUCKER. On the 10 May 1945 VOSS and PURUCKER were in Schimelitz, fleeing in the direction of the American troops. PURUCKER was driving a large civilian car which contained many of the plans on the atom bomb. This car plus material fell into the hands of the Russians…

14. Personnel: Hans Kammler

SS General Hans Kammler was in charge of the nuclear weapons program by the end of the war.

Wilhelm Voss. April 1946. NARA RG 319, Entry A1-134B, Folder XE065651.
In the last years [of the war], the central management of the development and production of the most secret weapons and devices was in the hands of SS General Professor Kammler and his working group. These were the most secret weapons, devices, and processes, some of which were actually used, but some of which were not used [in the war], namely in the field of atom smashing, the transformation of elements, the atomic bomb and atomic energy, and also rocket weapons, the latest propulsion systems for aircraft, remote control, etc…. Kammler succeeded in centralizing the development work in his field. He was the representative of the Ministry of Armaments, the Army Ordnance Office, the Air Force, and the SS at the same time.

HQ CIC, USFET, Region Munich IV, 25 April 1946. Subject: Wilhelm Voss. NARA RG 263, Entry ZZ-18, Box 133, Folder Voss, Friedrich Wilhelm.
Subject states that the two men that were responsible for research on the most secret weapons at Skoda were SS Gruppenfuehrer Prof. KAMMLER and his deputy SS Oberfuehrer PURUCKER. On the 10 May 1945 VOSS and PURUCKER were in Schimelitz, fleeing in the direction of the American troops. PURUCKER was driving a large civilian car which contained many of the plans on the atom bomb. This car plus material fell into the hands of the Russians…

Heinrich Klein. 1977. *Vom Geschoß zum Feuerpfeil.* Motorbuch. pp. 96-97.
In mid-May 1945… the author was questioned by a mixed American-English-Australian technical commission at the Unterlüss firing range about the new weapons developments in Germany… Several times during this questioning, the commission asked whether the “Rheinbote” would have been the missile to be fitted with a nuclear warhead... The author is not in a position to judge to what extent this would have been possible given the state of nuclear technology in Germany. Tröller's report was based on the fact that SS-Obergruppenführer Dr. Kammler had actually spoken to him about such a possible use.

14. Personnel: Hans Kammler

SS General Hans Kammler was in charge of the nuclear weapons program by the end of the war.

Wilhelm Voss. April 1946. NARA RG 319, Entry A1-134B, Folder XE065651.

In the last years [of the war], the central management of the development and production of the most secret weapons and devices was in the hands of SS General Professor Kammler and his working group. These were the most secret weapons, devices, and processes, some of which were actually used, but some of which were not used [in the war], namely in the field of atom smashing, the transformation of elements, the atomic bomb and atomic energy, and also rocket weapons, the latest propulsion systems for aircraft, remote control, etc…. Kammler succeeded in centralizing the development work in his field. He was the representative of the Ministry of Armaments, the Army Ordnance Office, the Air Force, and the SS at the same time.

HQ CIC, USFET, Region Munich IV, 25 April 1946. Subject: Wilhelm Voss. NARA RG 263, Entry ZZ-18, Box 133, Folder Voss, Friedrich Wilhelm.

Subject states that the two men that were responsible for research on the most secret weapons at Skoda were SS Gruppenfuehrer Prof. KAMMLER and his deputy SS Oberfuehrer PURUCKER. On the 10 May 1945 VOSS and PURUCKER were in Schimelitz, fleeing in the direction of the American troops. PURUCKER was driving a large civilian car which contained many of the plans on the atom bomb. This car plus material fell into the hands of the Russians…

Heinrich Klein. 1977. *Vom Geschoß zum Feuerpfeil.* Motorbuch. pp. 96-97.

In mid-May 1945… the author was questioned by a mixed American-English-Australian technical commission at the Unterlüss firing range about the new weapons developments in Germany… Several times during this questioning, the commission asked whether the “Rheinbote” would have been the missile to be fitted with a nuclear warhead... The author is not in a position to judge to what extent this would have been possible given the state of nuclear technology in Germany. Tröller's report was based on the fact that SS-Obergruppenführer Dr. Kammler had actually spoken to him about such a possible use.

BIOS 142. Targets of Opportunity in the Sonthofen Area. 1945.

Obergruppenführer Professor Kammler, one of the directors of the S.S. Hauptamt, was said to have great influence on Himmler and more influence on Hitler than Speer himself; and he was kept informed on all questions concerning armaments… One of the functions of the S.S. was to control the work of politically unreliable scientists who were kept in concentration camps… Trials on some kind of atomic bomb were made at or near the camp.

14. Personnel: Hans Kammler

SS General Hans Kammler was in charge of the nuclear weapons program by the end of the war.

Wilhelm Voss. April 1946. NARA RG 319, Entry A1-134B, Folder XE065651.
In the last years [of the war], the central management of the development and production of the most secret weapons and devices was in the hands of SS General Professor Kammler and his working group. These were the most secret weapons, devices, and processes, some of which were actually used, but some of which were not used [in the war], namely in the field of atom smashing, the transformation of elements, the atomic bomb and atomic energy, and also rocket weapons, the latest propulsion systems for aircraft, remote control, etc…. Kammler succeeded in centralizing the development work in his field. He was the representative of the Ministry of Armaments, the Army Ordnance Office, the Air Force, and the SS at the same time.

HQ CIC, USFET, Region Munich IV, 25 April 1946. Subject: Wilhelm Voss. NARA RG 263, Entry ZZ-18, Box 133, Folder Voss, Friedrich Wilhelm.
Subject states that the two men that were responsible for research on the most secret weapons at Skoda were SS Gruppenfuehrer Prof. KAMMLER and his deputy SS Oberfuehrer PURUCKER. On the 10 May 1945 VOSS and PURUCKER were in Schimelitz, fleeing in the direction of the American troops. PURUCKER was driving a large civilian car which contained many of the plans on the atom bomb. This car plus material fell into the hands of the Russians…

Heinrich Klein. 1977. *Vom Geschoß zum Feuerpfeil.* Motorbuch. pp. 96-97.
In mid-May 1945… the author was questioned by a mixed American-English-Australian technical commission at the Unterlüss firing range about the new weapons developments in Germany… Several times during this questioning, the commission asked whether the "Rheinbote" would have been the missile to be fitted with a nuclear warhead... The author is not in a position to judge to what extent this would have been possible given the state of nuclear technology in Germany. Tröller's report was based on the fact that SS-Obergruppenführer Dr. Kammler had actually spoken to him about such a possible use.

BIOS 142. Targets of Opportunity in the Sonthofen Area. 1945.
Obergruppenführer Professor Kammler, one of the directors of the S.S. Hauptamt, was said to have great influence on Himmler and more influence on Hitler than Speer himself; and he was kept informed on all questions concerning armaments… One of the functions of the S.S. was to control the work of politically unreliable scientists who were kept in concentration camps… Trials on some kind of atomic bomb were made at or near the camp.

Werner Grothmann. 2002. Jonastalverein Archive. p. 18.
Kammler was responsible for almost all secret developments and special projects, and he was constantly on the move. He spread optimism almost until the end of March [1945]…

[See *Forgotten Creators* D.14]

14. Personnel: Hans Kammler

SECRET

HEADQUARTERS
UNITED STATES STRATEGIC AIR FORCES IN EUROPE
Office of Asst. Chief of Staff A-2
Exploitation Division, Operations Section

A-2

30 May, 1945

MEMORANDUM: Summary of Activities, Operations Section, Exploitation Division.

TO : Colonel Sheldon.

To date the intelligence exploitation of the German Air Force and of German technical facilities has yielded a vast amount of materiel and documents. Briefly to evaluate at this time the worth of such materiel and documents is made difficult due to the fact that the emphasis has necessarily been upon the speed of collection rather than upon concise evaluation. However enough progress has already been made to indicate that approximately half of the category "one" items assigned for evacuation by Wright Field have been secured. Much of the materiel for the longer term research into all aspects of the German Air Force as required by "Air Staff Post Hostilities Intelligence Requirements" prepared by AC/AS, Intelligence, Hq, AAF, is presently being gathered.

There follows a brief outline of recapitulation of the accomplishments to date divided into technical and non-technical exploitation.

GERMAN NON-TECHNICAL PERSONNEL

47. The following is a list of key German Air Force non-technical personnel presently being held for interrogation.

Reichsmarschall Hermann Goering	Commander in Chief of Luftwaffe.
Generalfeldmarschall Ehrhard Milch	Secretary of State for Air and Inspector General of the GAF-Director General of Equipment.
General der Flieger Koller	Chief of General Staff of Luftwaffe.
Dr. Albert Speer	Minister for Armament and War Production.
General Martini	Director General of GAF Signals.
General von Criegern	General Quartermaster of Luftwaffe.
Generaloberst Weise	Specially detailed officer for defense against enemy long-range arms.
SS-Obergruppenführer Kammler	Inspector of all units of the Luftwaffe working with rocket-propelled arms.

Ebensee and about S 2,400,000 were authorized for payment to creditors. Payment, however, was stopped and this accounts for the large balance. Had this sum been paid the balance would have been 1,100,000. On the other hand some additional 3,000,000 was forwarded to this account by the Reichsbank in München but the sum was not credited to the account because it was stopped by the Military authorities before it left München.

Shortly after the occupation, Hans Kammler appeared before the CIC in Gmünden and made a detailed statement on the operations and activities of the Baustelle Ebensee, as well as on the account, and his own authority and authority of Karl Englehardt. None of the present American Officers at the CIC, Gmünden, is familiar with his statement but it should be in the files there. Mr. Morrison of the CIC, Gmünden was requested by the team to send a copy of this statement to Mr. Loehr.

CONCLUSIONS :

1. Sammelkonto was established by the Financial Division of the Military Government on 31 July 1945.

2. Sammelkonto received monies belonging to the German Wehrmacht and its affiliated organizations.

3. The details of the account show that some of the funds could not be classified as direct Wehrmacht funds without a more thorough investigation. There could be other funds which were erroneously classified as Wehrmacht funds.

CONFIDENTIAL

Int/Adm

IX-4

A-2
File

HEADQUARTERS
UNITED STATES AIR FORCES IN EUROPE
Office of Asst. Chief of Staff A-2
APO 633

AAF Station 179
2 November 1945

Special Projects

SUBJECT: German Underground Installations.

TO: Major ERNST ENGLANDER, A.C., Headquarters USAFE, APO 633.

1. I have been instructed by the AC of S A-2, Headquarters Army Air Forces, Washington, D. C., to furnish detailed information from many aspects on enemy underground installations, technique, etc.

2. In view of recent scientific developments, it is considered of the utmost importance for future planning and of the highest priority that we obtain all the benefit of the experience of German industry regarding the use of such facilities.

3. To implement the required study, you are directed to make the necessary arrangements to personally interrogate Speer, Kammler and Sauer and report your findings to me as soon as possible.

GEORGE C. McDONALD,
Brigadier General, U.S.A.
Asst. Chief of Staff A-2.

by hand to Maj. Englander
2 Nov 45

[redacted]

2 NOV. 1945

Loyd K. Pepple. 30 May 1945. AFHRA folder 570.605 1944-46.
Louis D. Caplane and William G. Magee. NARA RG 260, DN1929, Roll 0126, pp. 26 ff.
George C. McDonald. 2 November 1945. AFHRA folder 570.6501A 1945-46.

SS General Hans Kammler was in charge of the nuclear weapons program by the end of the war.

He was interrogated by the U.S. for at least 6 months after the war. The information he provided was sufficiently valuable to shield him from all prosecution. Where are the reports on his wartime work and postwar life?

Wilhelm Voss. April 1946. NARA RG 319, Entry A1-134B, Folder XE065651.
In the last years [of the war], the central management of the development and production of the most secret weapons and devices was in the hands of SS General Professor Kammler and his working group. These were the most secret weapons, devices, and processes, some of which were actually used, but some of which were not used [in the war], namely in the field of atom smashing, the transformation of elements, the atomic bomb and atomic energy, and also rocket weapons, the latest propulsion systems for aircraft, remote control, etc.… Kammler succeeded in centralizing the development work in his field. He was the representative of the Ministry of Armaments, the Army Ordnance Office, the Air Force, and the SS at the same time.

HQ CIC, USFET, Region Munich IV, 25 April 1946. Subject: Wilhelm Voss. NARA RG 263, Entry ZZ-18, Box 133, Folder Voss, Friedrich Wilhelm.
Subject states that the two men that were responsible for research on the most secret weapons at Skoda were SS Gruppenfuehrer Prof. KAMMLER and his deputy SS Oberfuehrer PURUCKER. On the 10 May 1945 VOSS and PURUCKER were in Schimelitz, fleeing in the direction of the American troops. PURUCKER was driving a large civilian car which contained many of the plans on the atom bomb. This car plus material fell into the hands of the Russians…

Heinrich Klein. 1977. *Vom Geschoß zum Feuerpfeil.* Motorbuch. pp. 96-97.
In mid-May 1945… the author was questioned by a mixed American-English-Australian technical commission at the Unterlüss firing range about the new weapons developments in Germany… Several times during this questioning, the commission asked whether the "Rheinbote" would have been the missile to be fitted with a nuclear warhead... The author is not in a position to judge to what extent this would have been possible given the state of nuclear technology in Germany. Tröller's report was based on the fact that SS-Obergruppenführer Dr. Kammler had actually spoken to him about such a possible use.

BIOS 142. Targets of Opportunity in the Sonthofen Area. 1945.
Obergruppenführer Professor Kammler, one of the directors of the S.S. Hauptamt, was said to have great influence on Himmler and more influence on Hitler than Speer himself; and he was kept informed on all questions concerning armaments… One of the functions of the S.S. was to control the work of politically unreliable scientists who were kept in concentration camps… Trials on some kind of atomic bomb were made at or near the camp.

Werner Grothmann. 2002. Jonastalverein Archive. p. 18.
Kammler was responsible for almost all secret developments and special projects, and he was constantly on the move. He spread optimism almost until the end of March [1945]… **[See *Forgotten Creators* D.14]**

14. Personnel: Siegfried Flügge

- **Published detailed calculations of fission reactors and fission bombs in June 1939.**

14. Personnel: Siegfried Flügge

- **Published detailed calculations of fission reactors and fission bombs in June 1939.**
- **Appears to have been the top physicist of the German nuclear weapons program, working for the Reichspost, Heereswaffenamt, University of Berlin, Kaiser Wilhelm Institutes, Reichsforschungsrat, University of Königsberg (reported to have fission reactors), and Gusen SS facility.**

DECLASSIFIED
Authority NND007017

NARA RG 319, Entry A1-134B, Box 202, Folder XE196681 Siegfried Fluegge

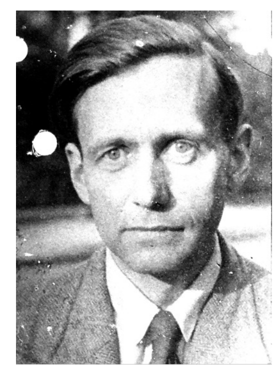
The following information was received by phone from L&S Office Marburg, Wednesday, 17 Sept 47, thru Mrs. Steinbacher:

F l ü g g e, Siegfried, Dr.

Date of birth:	16 March 1912	
Place of Birth:	Dresden, Saxony, Germany	
Present address:	Marburg/Lahn, Wilhelm Roser Str. 33 A	
Present employment:	as professor at University of Marburg (ordentlicher Professor)	
Special Field:	Nuclear Physics (Struktur der Materie)	
Background information:	from 1918 - 1921:	attended elementary school, Dresden
	" 1921 - 1929:	" high school (Gymnasium) in Dresden
	" 1929 - 1930:	attended Technical High School, Dresden.
	" 1930 - 1933:	at University in Göttingen
	" 1933	Doctor of Physics at University of Göttingen.
	" 1933 - 1935:	worked at University of Frankfurt as Scientific Assistant.
	" 1935 - 1937:	lectured at University of Leipzig
	1937	to Berlin
	" 1937 - 1942:	worked in chemical department of the Kaiser-Wilhelm-Institute in Berlin, Dahlem.
	" 1942 - 1944:	assistant at the Institute of Scientific Research of the Reichspost, Berlin
	" 1940 - 1944:	lectured at the University of Berlin
	" 1944	appointed professor (ausserordentlicher) at the University of Königsberg.

After the surrender, he went to Göttingen, where he was employed as Professor for History of Physical Science from 1945 - 1947.

He was not called to Military Service during the War, because he worked as a Scientist of Physics for the "Heereswaffenamt", Berlin, and was later exempted of any Army Service by the Reichsforschungsrat in Berlin.



14. Personnel: Siegfried Flügge

- **Published detailed calculations of fission reactors and fission bombs in June 1939.**
- **Appears to have been the top physicist of the German nuclear weapons program, working for the Reichspost, Heereswaffenamt, University of Berlin, Kaiser Wilhelm Institutes, Reichsforschungsrat, University of Königsberg (reported to have fission reactors), and Gusen SS facility.**
- **Was brought to work in the U.S. after the war at the specific request of Edward Teller to "be of marked assistance in carrying out" a "physics... program... of interest and importance to the national security."**

DECLASSIFIED
Authority NND007017

NARA RG 319, Entry A1-134B, Box 202, Folder XE196681 Siegfried Fluegge

The following information was received by phone from L&S Office Marburg, Wednesday, 17 Sept 47, thru Mrs. Steinbacher:

Flügge, Siegfried, Dr.

Date of birth:	16 March 1912	
Place of Birth:	Dresden, Saxony, Germany	
Present address:	Marburg/Lahn, Wilhelm Roser Str. 33 A	
Present employment:	as professor at University of Marburg (ordentlicher Professor)	
Special Field:	Nuclear Physics (Struktur der Materie)	
Background information:	from 1918 - 1921:	attended elementary school, Dresden
	" 1921 - 1929:	" high school (Gymnasium) in Dresden
	" 1929 - 1930:	attended Technical High School, Dresden.
	" 1930 - 1933:	at University in Göttingen
	X 1933	Doctor of Physics at University of Göttingen.
	" 1933 - 1935:	worked at University of Frankfurt as Scientific Assistant.
	" 1935 - 1937:	lectured at University of Leipzig
	1937	to Berlin
	" 1937 - 1942:	worked in chemical department of the Kaiser-Wilhelm-Institute in Berlin, Dahlem.
	" 1942 - 1944:	assistant at the Institute of Scientific Research of the Reichspost, Berlin
	" 1940 - 1944:	lectured at the University of Berlin
	" 1944	appointed professor (ausserordentlicher) at the University of Königsberg.

After the surrender, he went to Göttingen, where he was employed as Professor for History of Physical Science from 1945 - 1947.

He was not called to Military Service during the War, because he worked as a Scientist of Physics for the "Heereswaffenamt", Berlin, and was later exempted of any Army Service by the Reichsforschungsrat ih Berlin.

DECLASSIFIED
Authority NND 013039

NARA RG 330, Entry A1-1B, Box 43, Folder Flügge, Siegfried

EXOS:ONR:N421:UL:kcm

Serial No. 14654

C O P Y

NAVY DEPARTMENT
Office of Naval Research
Washington 25, D.C.

July 18, 1947

From: Chief of Naval Research
To: Chief of Naval Intelligence

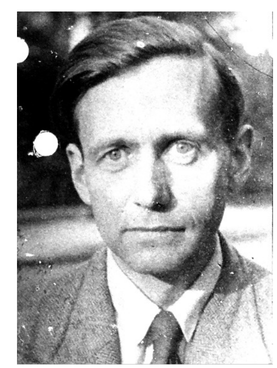
Subj: Foreign Scientists, Request for assistance on.

1. Professor Edward Teller, Physics Department, University of Chicago, is supervising under contract to this Office a research program on various phases of research in physics of the solid state. This program is of interest and importance to the national security. Professor Teller is very desirous to obtain the services of the German physicist, Dr. Siegfried Flugge, who can be of marked assistance in carrying out the aforementioned program.

2. Professor Teller has requested the Office of Technical Services, Department of Commerce, to obtain Dr. Flügge from Germany. It is requested that the Joint Intelligence Objectives Agency be informed of the Navy's interest in this case, and asked to provide such assistance as is possible to Professor Teller in aiding Dr. Flügge to come to this country.

/s/ C.M. Bolster
Capt., USN
Acting Chief of Naval Research

cc: Mr. Robert Frye, OTS, Dept. of Commerce
Professor Edward Teller, Physics Dept.
University of Chicago



14. Personnel: Siegfried Flügge

For more information, see *Forgotten Creators* D.14

- **Published detailed calculations of fission reactors and fission bombs in June 1939.**
- **Appears to have been the top physicist of the German nuclear weapons program, working for the Reichspost, Heereswaffenamt, University of Berlin, Kaiser Wilhelm Institutes, Reichsforschungsrat, University of Königsberg (reported to have fission reactors), and Gusen SS facility.**
- **Was brought to work in the U.S. after the war at the specific request of Edward Teller to "be of marked assistance in carrying out" a "physics... program... of interest and importance to the national security."**
- **Was placed on the Top Secret JIOA K "hot list" when not in the U.S. and constantly monitored/detained for at least a decade after the war, on the direct orders of CIC Colonel George R. Eckman, formerly of Alsos.**

DECLASSIFIED Authority NND007017

NARA RG 319, Entry A1-134B, Box 202, Folder XE196681 Siegfried Fluegge

Where are the reports on Flügge's interrogations and on his postwar work?

The following information was received by phone from L&S Office Marburg, Wednesday, 17 Sept 47, thru Mrs. Steinbacher:

Flügge, Siegfried, Dr.

Date of birth:	16 March 1912	
Place of Birth:	Dresden, Saxony, Germany	
Present address:	Marburg/Lahn, Wilhelm Roser Str. 33 A	
Present employment:	as professor at University of Marburg (ordentlicher Professor)	
Special Field:	Nuclear Physics (Struktur der Materie)	
Background information:	from 1918 - 1921:	attended elementary school, Dresden
	" 1921 - 1929:	" high school (Gymnasium) in Dresden
	" 1929 - 1930:	attended Technical High School, Dresden.
	" 1930 - 1933:	at University in Göttingen
	" 1933	Doctor of Physics at University of Göttingen.
	" 1933 - 1935:	worked at University of Frankfurt as Scientific Assistant.
	" 1935 - 1937:	lectured at University of Leipzig
	1937	to Berlin
	" 1937 - 1942:	worked in chemical department of the Kaiser-Wilhelm-Institute in Berlin, Dahlem.
	" 1942 - 1944:	assistant at the Institute of Scientific Research of the Reichspost, Berlin
	" 1940 - 1944:	lectured at the University of Berlin
	" 1944	appointed professor (ausserordentlicher) at the University of Königsberg.

After the surrender, he went to Göttingen, where he was employed as Professor for History of Physical Science from 1945 to 1947.

He was not called to Military Service during the War, because he worked as a Scientist of Physics for the "Heereswaffenamt", Berlin, and was later exempted of any Army Service by the Reichsforschungsrat in Berlin.

DECLASSIFIED Authority NND013039

NARA RG 330, Entry A1-1B, Box 43, Folder Flügge, Siegfried

EXOS:ONR:N421:UL:kom

Serial No. 14654

C O P Y

NAVY DEPARTMENT
Office of Naval Research
Washington 25, D.C.

July 18, 1947

From: Chief of Naval Research
To: Chief of Naval Intelligence

Subj: Foreign Scientists, Request for assistance on.

1. Professor Edward Teller, Physics Department, University of Chicago, is supervising under contract to this Office a research program on various phases of research in physics of the solid state. This program is of interest and importance to the national security. Professor Teller is very desirous to obtain the services of the German physicist, Dr. Siegfried Flugge, who can be of marked assistance in carrying out the aforementioned program.

2. Professor Teller has requested the Office of Technical Services, Department of Commerce, to obtain Dr. Flügge from Germany. It is requested that the Joint Intelligence Objectives Agency be informed of the Navy's interest in this case, and asked to provide such assistance as is possible to Professor Teller in aiding Dr. Flügge to come to this country.

/s/ C.M. Bolster
Capt., USN
Acting Chief of Naval Research

cc: Mr. Robert Frye, OTS, Dept. of Commerce
Professor Edward Teller, Physics Dept.
University of Chicago

DECLASSIFIED Authority NND007017

NARA RG 319, Entry A1-134B, Box 202, Folder XE196681 Siegfried Fluegge

FLUEGGE, Siegfried Wilhelm (Dr.) 25 April 1952

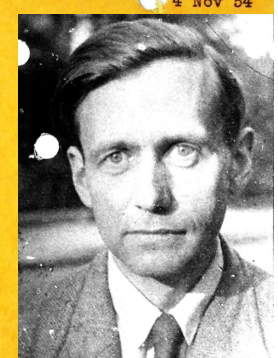
File D-196681

Res: MARBURG, Wilhelm Roserstrasse 33a

Priority 1, (JIOA Personality on the "K" List)

REF: D-137899 Secret ltr dtd 31 Jan 52 file X-272
SUB: Custodial Detention
cs

FLUEGGE, S. (Professor) 4 Nov 54



Employed by subject. Now in MARBURG.

Ref: D-284237 BfV Report dtd 26 Aug 53 File: BR53-11-91
Sub: German Academy of Sciences of BERLIN F-3
Re: Nuclear Physics Institute
CS GERNAND

14. Personnel: Others

Where Are the Reports/Interrogations?

14. Personnel: Others

Where Are the Reports/Interrogations?

Dozens of experts with knowledge of the German nuclear program (including H-bombs) were brought to the U.S./U.K. after WWII

14. Personnel: Others

Where Are the Reports/Interrogations?

Dozens of experts with knowledge of the German nuclear program (including H-bombs) were brought to the U.S./U.K. after WWII

Karl-Friedrich Bonhoeffer	**Gottfried Guderley**	**Walter Nielsch (?)**
Wernher von Braun	**Paul Harteck**	**Edgar Petersen**
Rudolf Brill	**Otto Haxel**	**Heinz Schlicke**
Adolf Busemann	**Richard Herzog**	**Erich Schumann**
Walter Dornberger	**Johannes Hans Jensen**	**Otto Schwede**
Rudolf Edse	**Willibald Jentschke**	**Edmung Sorg**
Krafft Ehricke	**Ulrich Jetter**	**Kurt Starke**
Wilhelm Eitel	**Georg Joos**	**Wolfgang Steurer**
Gerhard Falck	**Hartmut Kallmann**	**Ernst Stuhlinger**
Karl Fiebinger	**Hans Kammler**	**Hans Suess**
Wolfgang Finkelnburg	**Gerald Klein**	**Herbert Wagner**
Rudolf Fleischmann	**Stanley Kronenberg**	**Wilhelm Westphal**
Siegfried Flügge	**Heinz Maier-Leibnitz**	**Friedwardt Winterberg**
Walter Glaser	**Werner Maurer**	**Karl Wirtz**
Wilhelm Groth	**Hugo Neuert**	**Gernot Zippe**

For more information, see *Forgotten Creators* D.14

NARA RG 330, Entry A1-1B, Boxes 1-186. JIOA Foreign Scientist Case Files.

14. Personnel: Others

Where Are the Reports/Interrogations?

Dozens of experts with knowledge of the German nuclear program (including H-bombs) were brought to the U.S./U.K. after WWII

Karl-Friedrich Bonhoeffer
Wernher von Braun
Rudolf Brill
Adolf Busemann
Walter Dornberger
Rudolf Edse
Krafft Ehricke
Wilhelm Eitel
Gerhard Falck
Karl Fiebinger
Wolfgang Finkelnburg
Rudolf Fleischmann
Siegfried Flügge
Walter Glaser
Wilhelm Groth
Gottfried Guderley
Paul Harteck
Otto Haxel
Richard Herzog
Johannes Hans Jensen
Willibald Jentschke
Ulrich Jetter
Georg Joos
Hartmut Kallmann
Hans Kammler
Gerald Klein
Stanley Kronenberg
Heinz Maier-Leibnitz
Werner Maurer
Hugo Neuert
Walter Nielsch (?)
Edgar Petersen
Heinz Schlicke
Erich Schumann
Otto Schwede
Edmung Sorg
Kurt Starke
Wolfgang Steurer
Ernst Stuhlinger
Hans Suess
Herbert Wagner
Wilhelm Westphal
Friedwardt Winterberg
Karl Wirtz
Gernot Zippe

For more information, see *Forgotten Creators* D.14

NARA RG 330, Entry A1-1B, Boxes 1-186.
JIOA Foreign Scientist Case Files.

DECLASSIFIED
Authority NND 013039

Countless others were interrogated in Europe, or taken to France, the Soviet Union, or other countries

14. Personnel: Others

Where Are the Reports/Interrogations?

Dozens of experts with knowledge of the German nuclear program (including H-bombs) were brought to the U.S./U.K. after WWII

Karl-Friedrich Bonhoeffer
Wernher von Braun
Rudolf Brill
Adolf Busemann
Walter Dornberger
Rudolf Edse
Krafft Ehricke
Wilhelm Eitel
Gerhard Falck
Karl Fiebinger
Wolfgang Finkelnburg
Rudolf Fleischmann
Siegfried Flügge
Walter Glaser
Wilhelm Groth
Gottfried Guderley
Paul Harteck
Otto Haxel
Richard Herzog
Johannes Hans Jensen
Willibald Jentschke
Ulrich Jetter
Georg Joos
Hartmut Kallmann
Hans Kammler
Gerald Klein
Stanley Kronenberg
Heinz Maier-Leibnitz
Werner Maurer
Hugo Neuert
Walter Nielsch (?)
Edgar Petersen
Heinz Schlicke
Erich Schumann
Otto Schwede
Edmung Sorg
Kurt Starke
Wolfgang Steurer
Ernst Stuhlinger
Hans Suess
Herbert Wagner
Wilhelm Westphal
Friedwardt Winterberg
Karl Wirtz
Gernot Zippe

For more information, see *Forgotten Creators* D.14

NARA RG 330, Entry A1-1B, Boxes 1-186. JIOA Foreign Scientist Case Files.

Countless others were interrogated in Europe, or taken to France, the Soviet Union, or other countries

Walter Trinks. 1945. NARA RG 319, Entry A1-134B, Folder XE098301 Trinks, Walter. TO THE AMERICAN COMMAND OF THE INTERNMENT CAMP? CIC-STAFF… I am a Physicist and have been employed with the OKH until the end of the war in the research dept. of the office for arms [Heereswaffenamt] as referee for the physics of explosions and blasting… At the end of the war I was occupied with experiments for producing extreme high pressures and temperatures, extreme velocities (up to 15 km/sec) and heavy swingings of the air [shock waves]. The practical use of these researches comprises: 1st for the war: the defense against V-weapons super- and atomic bombs by destroying them before they reach their target and the initiation of atomic bombs.

14. Personnel: Others

Where Are the Reports/Interrogations?

Dozens of experts with knowledge of the German nuclear program (including H-bombs) were brought to the U.S./U.K. after WWII

Karl-Friedrich Bonhoeffer	Gottfried Guderley	Walter Nielsch (?)
Wernher von Braun	Paul Harteck	Edgar Petersen
Rudolf Brill	Otto Haxel	Heinz Schlicke
Adolf Busemann	Richard Herzog	Erich Schumann
Walter Dornberger	Johannes Hans Jensen	Otto Schwede
Rudolf Edse	Willibald Jentschke	Edmung Sorg
Krafft Ehricke	Ulrich Jetter	Kurt Starke
Wilhelm Eitel	Georg Joos	Wolfgang Steurer
Gerhard Falck	Hartmut Kallmann	Ernst Stuhlinger
Karl Fiebinger	Hans Kammler	Hans Suess
Wolfgang Finkelnburg	Gerald Klein	Herbert Wagner
Rudolf Fleischmann	Stanley Kronenberg	Wilhelm Westphal
Siegfried Flügge	Heinz Maier-Leibnitz	Friedwardt Winterberg
Walter Glaser	Werner Maurer	Karl Wirtz
Wilhelm Groth	Hugo Neuert	Gernot Zippe

For more information, see *Forgotten Creators* D.14

NARA RG 330, Entry A1-1B, Boxes 1-186.
JIOA Foreign Scientist Case Files.

Countless others were interrogated in Europe, or taken to France, the Soviet Union, or other countries

Walter Trinks. 1945. NARA RG 319, Entry A1-134B, Folder XE098301 Trinks, Walter. TO THE AMERICAN COMMAND OF THE INTERNMENT CAMP? CIC-STAFF… I am a Physicist and have been employed with the OKH until the end of the war in the research dept. of the office for arms [Heereswaffenamt] as referee for the physics of explosions and blasting… At the end of the war I was occupied with experiments for producing extreme high pressures and temperatures, extreme velocities (up to 15 km/sec) and heavy swingings of the air [shock waves]. The practical use of these researches comprises: 1st for the war: the defense against V-weapons super- and atomic bombs by destroying them before they reach their target and the initiation of atomic bombs.

Charles A. Crowley to W. F. Heimlich. 31 August 1945. Headquarters United States Air Forces in Europe (Main). AFHRA C5094 frames 0957-0958.

Gerald Klein (Dr.), Dipl.-Eng., Manager of LGW. Address: Berlin-Dahlem, Hohe Ähren 10b. Specialty: Electrical flying control, V-2 control. A very efficient electrical engineer. Developed V-2 control devices. Worked at Peenemünde and later became group director of atomic devices in RLM [Reichsluftfahrtministerium]. At present being used by the British. Evacuated by "T" Force.

14. Personnel: Others

Where Are the Reports/Interrogations?

Dozens of experts with knowledge of the German nuclear program (including H-bombs) were brought to the U.S./U.K. after WWII

Karl-Friedrich Bonhoeffer	Gottfried Guderley	Walter Nielsch (?)
Wernher von Braun	Paul Harteck	Edgar Petersen
Rudolf Brill	Otto Haxel	Heinz Schlicke
Adolf Busemann	Richard Herzog	Erich Schumann
Walter Dornberger	Johannes Hans Jensen	Otto Schwede
Rudolf Edse	Willibald Jentschke	Edmung Sorg
Krafft Ehricke	Ulrich Jetter	Kurt Starke
Wilhelm Eitel	Georg Joos	Wolfgang Steurer
Gerhard Falck	Hartmut Kallmann	Ernst Stuhlinger
Karl Fiebinger	Hans Kammler	Hans Suess
Wolfgang Finkelnburg	Gerald Klein	Herbert Wagner
Rudolf Fleischmann	Stanley Kronenberg	Wilhelm Westphal
Siegfried Flügge	Heinz Maier-Leibnitz	Friedwardt Winterberg
Walter Glaser	Werner Maurer	Karl Wirtz
Wilhelm Groth	Hugo Neuert	Gernot Zippe

For more information, see *Forgotten Creators* D.14

NARA RG 330, Entry A1-1B, Boxes 1-186.
JIOA Foreign Scientist Case Files.

Countless others were interrogated in Europe, or taken to France, the Soviet Union, or other countries

Walter Trinks. 1945. NARA RG 319, Entry A1-134B, Folder XE098301 Trinks, Walter.
TO THE AMERICAN COMMAND OF THE INTERNMENT CAMP? CIC-STAFF… I am a Physicist and have been employed with the OKH until the end of the war in the research dept. of the office for arms [Heereswaffenamt] as referee for the physics of explosions and blasting… At the end of the war I was occupied with experiments for producing extreme high pressures and temperatures, extreme velocities (up to 15 km/sec) and heavy swingings of the air [shock waves]. The practical use of these researches comprises: 1st for the war: the defense against V-weapons super- and atomic bombs by destroying them before they reach their target and the initiation of atomic bombs.

Charles A. Crowley to W. F. Heimlich. 31 August 1945. Headquarters United States Air Forces in Europe (Main). AFHRA C5094 frames 0957-0958.
Gerald Klein (Dr.), Dipl.-Eng., Manager of LGW. Address: Berlin-Dahlem, Hohe Ähren 10b. Specialty: Electrical flying control, V-2 control. A very efficient electrical engineer. Developed V-2 control devices. Worked at Peenemünde and later became group director of atomic devices in RLM [Reichsluftfahrtministerium]. At present being used by the British. Evacuated by “T” Force.

Robert E. Work. 18 September 1945. Preliminary Interrogation Report. Prof. Dr. Ulrich Hoffmann. AFHRA A5183 frame 0609.
PhD in chemistry from University of Berlin in 1926. Instructor at University of Berlin until 1936. Called to University of Rostock in 1936 where he became full professor in 1937. In April 1942 he was called to University of Vienna as Director of the Institute for Inorganic and Analytic Chemistry… Dr. Hoffmann’s research in the field of air interest was only in the development of the atomic bomb. Claims to have improved method of obtaining FLUOR, which is necessary to obtain UF6, one of the basic ingredients of the atomic bomb.

14. Personnel: Others

Where Are the Reports/Interrogations?

Dozens of experts with knowledge of the German nuclear program (including H-bombs) were brought to the U.S./U.K. after WWII

Karl-Friedrich Bonhoeffer	Gottfried Guderley	Walter Nielsch (?)
Wernher von Braun	Paul Harteck	Edgar Petersen
Rudolf Brill	Otto Haxel	Heinz Schlicke
Adolf Busemann	Richard Herzog	Erich Schumann
Walter Dornberger	Johannes Hans Jensen	Otto Schwede
Rudolf Edse	Willibald Jentschke	Edmung Sorg
Krafft Ehricke	Ulrich Jetter	Kurt Starke
Wilhelm Eitel	Georg Joos	Wolfgang Steurer
Gerhard Falck	Hartmut Kallmann	Ernst Stuhlinger
Karl Fiebinger	Hans Kammler	Hans Suess
Wolfgang Finkelnburg	Gerald Klein	Herbert Wagner
Rudolf Fleischmann	Stanley Kronenberg	Wilhelm Westphal
Siegfried Flügge	Heinz Maier-Leibnitz	Friedwardt Winterberg
Walter Glaser	Werner Maurer	Karl Wirtz
Wilhelm Groth	Hugo Neuert	Gernot Zippe

For more information, see *Forgotten Creators* D.14

NARA RG 330, Entry A1-1B, Boxes 1-186.
JIOA Foreign Scientist Case Files.

Countless others were interrogated in Europe, or taken to France, the Soviet Union, or other countries

Walter Trinks. 1945. NARA RG 319, Entry A1-134B, Folder XE098301 Trinks, Walter. TO THE AMERICAN COMMAND OF THE INTERNMENT CAMP? CIC-STAFF… I am a Physicist and have been employed with the OKH until the end of the war in the research dept. of the office for arms [Heereswaffenamt] as referee for the physics of explosions and blasting… At the end of the war I was occupied with experiments for producing extreme high pressures and temperatures, extreme velocities (up to 15 km/sec) and heavy swingings of the air [shock waves]. The practical use of these researches comprises: 1st for the war: the defense against V-weapons super- and atomic bombs by destroying them before they reach their target and the initiation of atomic bombs.

Charles A. Crowley to W. F. Heimlich. 31 August 1945. Headquarters United States Air Forces in Europe (Main). AFHRA C5094 frames 0957-0958.
Gerald Klein (Dr.), Dipl.-Eng., Manager of LGW. Address: Berlin-Dahlem, Hohe Ähren 10b. Specialty: Electrical flying control, V-2 control. A very efficient electrical engineer. Developed V-2 control devices. Worked at Peenemünde and later became group director of atomic devices in RLM [Reichsluftfahrtministerium]. At present being used by the British. Evacuated by "T" Force.

Robert E. Work. 18 September 1945. Preliminary Interrogation Report. Prof. Dr. Ulrich Hoffmann. AFHRA A5183 frame 0609.
PhD in chemistry from University of Berlin in 1926. Instructor at University of Berlin until 1936. Called to University of Rostock in 1936 where he became full professor in 1937. In April 1942 he was called to University of Vienna as Director of the Institute for Inorganic and Analytic Chemistry... Dr. Hoffmann's research in the field of air interest was only in the development of the atomic bomb. Claims to have improved method of obtaining FLUOR, which is necessary to obtain UF6, one of the basic ingredients of the atomic bomb.

Todos M. Odarenko. 1945. FIAT 63. Activities of the Second Institute of Physics of the University of Vienna.
Contrary to the statements, attributed by the U.S. newspapers to the various U.S. atomic experts, that it "would take the Germans some 100 years to solve the problem of atomic disintegration on an explosive basis" (for the manufacture of bombs), the opinion of the members of the Institute themselves was that, given a supply of radium and uranium, and permitting their return to Vienna, where certain of their materials and equipments are stored, they would be able to "complete their work" in some 3 to 6 months… That these claims of the Institute are not to be disregarded too readily would follow from the fact that Prof. Smyth spent considerable time with the Institute, revisited them several times, and thought it necessary to insist on the most stringent type of control over the scientific activities of the group, as well as on close individual observations.

14. Personnel: Others

Where Are the Reports/Interrogations?

Dozens of experts with knowledge of the German nuclear program (including H-bombs) were brought to the U.S./U.K. after WWII

- Karl-Friedrich Bonhoeffer
- Wernher von Braun
- Rudolf Brill
- Adolf Busemann
- Walter Dornberger
- Rudolf Edse
- Krafft Ehricke
- Wilhelm Eitel
- Gerhard Falck
- Karl Fiebinger
- Wolfgang Finkelnburg
- Rudolf Fleischmann
- Siegfried Flügge
- Walter Glaser
- Wilhelm Groth
- Gottfried Guderley
- Paul Harteck
- Otto Haxel
- Richard Herzog
- Johannes Hans Jensen
- Willibald Jentschke
- Ulrich Jetter
- Georg Joos
- Hartmut Kallmann
- Hans Kammler
- Gerald Klein
- Stanley Kronenberg
- Heinz Maier-Leibnitz
- Werner Maurer
- Hugo Neuert
- Walter Nielsch (?)
- Edgar Petersen
- Heinz Schlicke
- Erich Schumann
- Otto Schwede
- Edmung Sorg
- Kurt Starke
- Wolfgang Steurer
- Ernst Stuhlinger
- Hans Suess
- Herbert Wagner
- Wilhelm Westphal
- Friedwardt Winterberg
- Karl Wirtz
- Gernot Zippe

For more information, see *Forgotten Creators* D.14

NARA RG 330, Entry A1-1B, Boxes 1-186.
JIOA Foreign Scientist Case Files.

Countless others were interrogated in Europe, or taken to France, the Soviet Union, or other countries

Walter Trinks. 1945. NARA RG 319, Entry A1-134B, Folder XE098301 Trinks, Walter. TO THE AMERICAN COMMAND OF THE INTERNMENT CAMP? CIC-STAFF… I am a Physicist and have been employed with the OKH until the end of the war in the research dept. of the office for arms [Heereswaffenamt] as referee for the physics of explosions and blasting… At the end of the war I was occupied with experiments for producing extreme high pressures and temperatures, extreme velocities (up to 15 km/sec) and heavy swingings of the air [shock waves]. The practical use of these researches comprises: 1st for the war: the defense against V-weapons super- and atomic bombs by destroying them before they reach their target and the initiation of atomic bombs.

Charles A. Crowley to W. F. Heimlich. 31 August 1945. Headquarters United States Air Forces in Europe (Main). AFHRA C5094 frames 0957-0958.
Gerald Klein (Dr.), Dipl.-Eng., Manager of LGW. Address: Berlin-Dahlem, Hohe Ähren 10b. Specialty: Electrical flying control, V-2 control. A very efficient electrical engineer. Developed V-2 control devices. Worked at Peenemünde and later became group director of atomic devices in RLM [Reichsluftfahrtministerium]. At present being used by the British. Evacuated by "T" Force.

Robert E. Work. 18 September 1945. Preliminary Interrogation Report. Prof. Dr. Ulrich Hoffmann. AFHRA A5183 frame 0609.
PhD in chemistry from University of Berlin in 1926. Instructor at University of Berlin until 1936. Called to University of Rostock in 1936 where he became full professor in 1937. In April 1942 he was called to University of Vienna as Director of the Institute for Inorganic and Analytic Chemistry... Dr. Hoffmann's research in the field of air interest was only in the development of the atomic bomb. Claims to have improved method of obtaining FLUOR, which is necessary to obtain UF6, one of the basic ingredients of the atomic bomb.

Todos M. Odarenko. 1945. FIAT 63. Activities of the Second Institute of Physics of the University of Vienna.
Contrary to the statements, attributed by the U.S. newspapers to the various U.S. atomic experts, that it "would take the Germans some 100 years to solve the problem of atomic disintegration on an explosive basis" (for the manufacture of bombs), the opinion of the members of the Institute themselves was that, given a supply of radium and uranium, and permitting their return to Vienna, where certain of their materials and equipments are stored, they would be able to "complete their work" in some 3 to 6 months… That these claims of the Institute are not to be disregarded too readily would follow from the fact that Prof. Smyth spent considerable time with the Institute, revisited them several times, and thought it necessary to insist on the most stringent type of control over the scientific activities of the group, as well as on close individual observations.

Memo to P. M. Wilson. Atom-Bomb Specialist. 4 April 1946. TNA FO 1031/112.
Karl Heinz BOSECK, former Ustuf in the Waffen SS, alleges that he is an Atom-Bomb expert. He is now interned in No. 2 CIC, SANDBOSTEL and his P.O.W. No. is 204526. [Boseck studied under Erich Schumann, worked at Oranienburg SS facility near Auer.]

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?

RG 77
Entry 22
Box 166
(2)
1/2/s

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Memo w/att.
Date: 8-23-44
From: Furman
To: Smith

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 — Authority
4-2-91 AR — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 166
(8)
1/10/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: 32.22-1 Germany
Ltr. w/att.
Date: 12-1-44
From: Donovan
To: Groves

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 — Authority
4-2-91 AR — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 167
(15)
1/9/5

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: 32.12-2 Germany: Personnel (Jan 45-Dec 45)
Rpt. SIR 1280
Date: 12-6-44
From: CSDIC
To:

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 — Authority
4-3-91 cc — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 167
(13)
1/2/5

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: 32.12-2 Germany: Personnel (Jan 45-Dec 45)
Memo w/ encl
Date: 7-6-45
From: Perrin
To: —

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 — Authority
4-3-91 cc — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 166

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 167

RG 77
Entry 22
Box 166
(6A)
1/3/s

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: 32.22-1 Germany
Memo
Date: 3-12-45
From: Calvert
To: Speer

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 — Authority
4-2-91 AR — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 166
(6)
1/1/s

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: 32.22-1 Germany
Memo AA-220
Date: 9-19-45
From: Dix
To: Smith

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 — Authority
4-2-91 AR — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 167
(4)
1/2/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: 202.3-2 London Office: Combined Oper. Ger. Group
Ltr
Date: 9-24-45
From: Chadwick
To: Groves

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 — Authority
4-3-91 cc — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

Entry 22
Box 167
(10)
1/2/5

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: 32.12-2 Germany: Personnel (Jan 45-Dec 45)
Rpt. 172
Date: 11-5-45
From: Holt
To: —

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 — Authority
4-3-91 cc — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?

RG 77
Entry 22
Box 160

(19)
1/2/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Apr. 45 - Dec. 45
MSG. 65971
Date 10-11-45
From —
To War Dept.

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017
Authority

4-4-91 AR
Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (1-86)

RG 77
Entry 22
Box 160

(18)
1/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Apr. 45 - Dec. 45
MSG 66080
Date 11-8-45
From
To War Dept.

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017
Authority

4-4-91 AR
Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (1-86)

RG 77
Entry 22
Box 160

(6D)
1/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 205.2 Cables Incoming Top Secret
MSG. 70376
Date 3-18-46
From USMA, London
To War Dept.

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017
Authority

4-4-91 AR
Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (1-86)

RG 77
Entry 22
Box 160

(6C)
1/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 205.2 Cables Incoming Top Secret
MSG. 70456
Date 4-22-46
From London
To War Dept.

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017
Authority

4-4-91 AR
Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (1-86)

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 160

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 160

RG 77
Entry 22
Box 160

(9A)
1/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 205.2 Cables Incoming Top Secret
MSG. 70232
Date 1-31-46
From —
To —

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017
Authority

4-4-91 AR
Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (1-86)

RG 77
Entry 22
Box 160

(9)
1/2/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 205.2 Cables Incoming Top Secret
MSG 7561
Date 2-25-46
From USMA
To WAR Dept.

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017
Authority

4-4-91 AR
Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (1-86)

RG 77
Entry 22
Box 160

(6A)
1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 205.2 ~~Cbls~~ Cables Incoming TS
MSG. 70475
Date 4-28-46
From MA, London
To War Dept.

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017
Authority

4-4-91 AR
Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (1-86)

RG 77
Entry 22
Box 160

(4)
1/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 205.2 Cables Incoming Top Secret
MSG 1865
Date 9-5-46
From USMA, Praha
To War Dept.

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

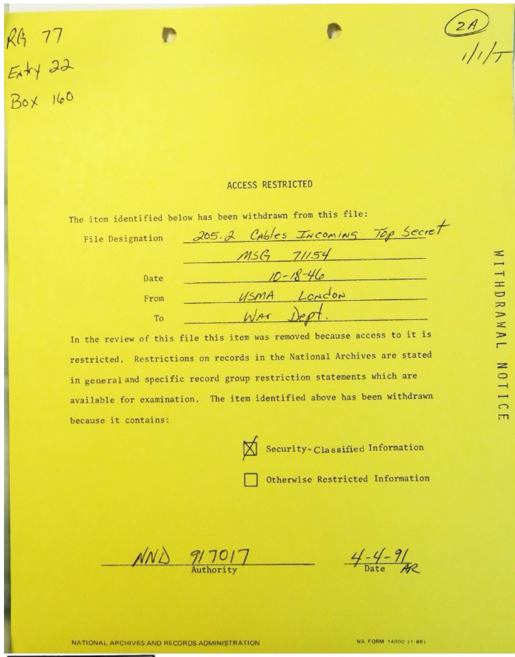
NND 917017
Authority

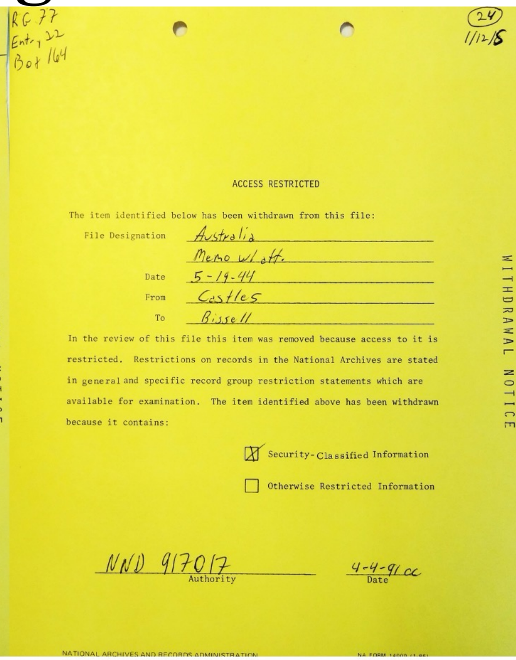
4-4-91 AR
Date

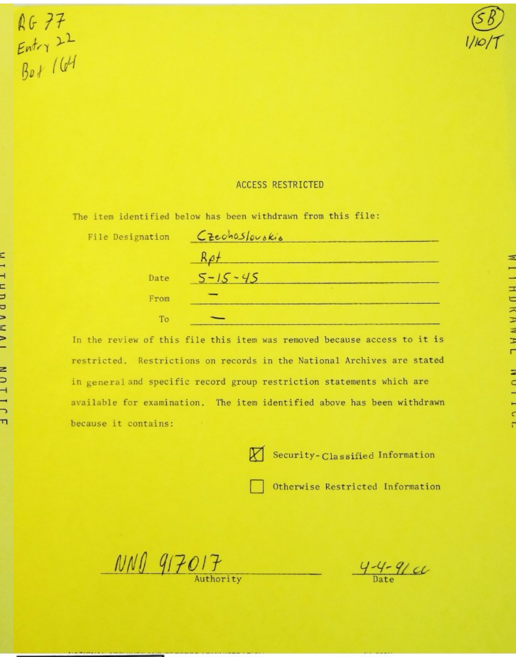
WITHDRAWAL NOTICE

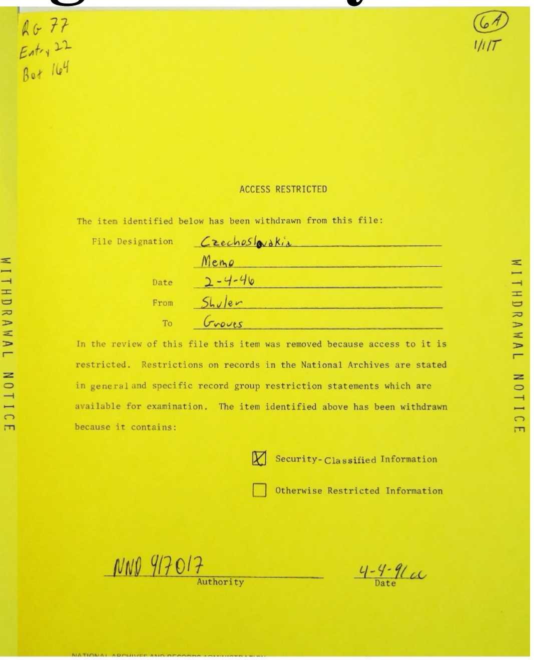
NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (1-86)

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?







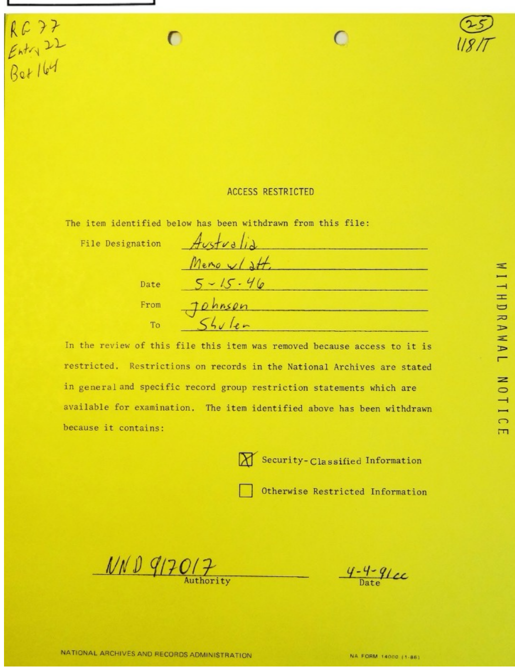


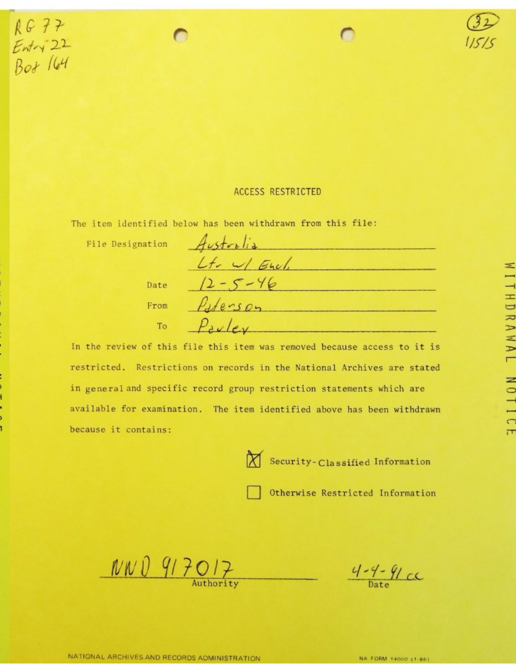
DECLASSIFIED Authority NND 917017

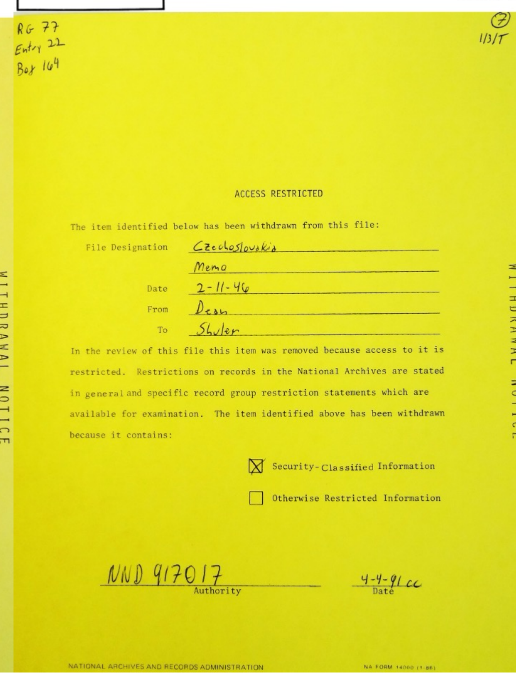
NARA RG 77, Entry UD-22A, Boxes 160 & 164

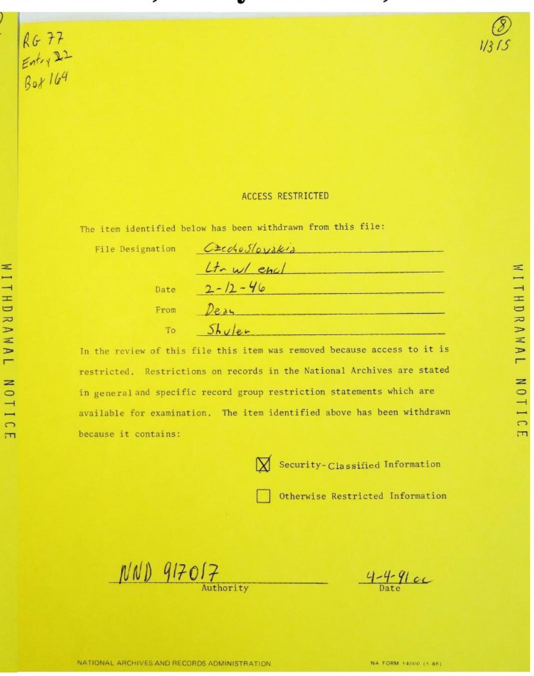
DECLASSIFIED Authority NND 917017

NARA RG 77, Entry UD-22A, Box 164

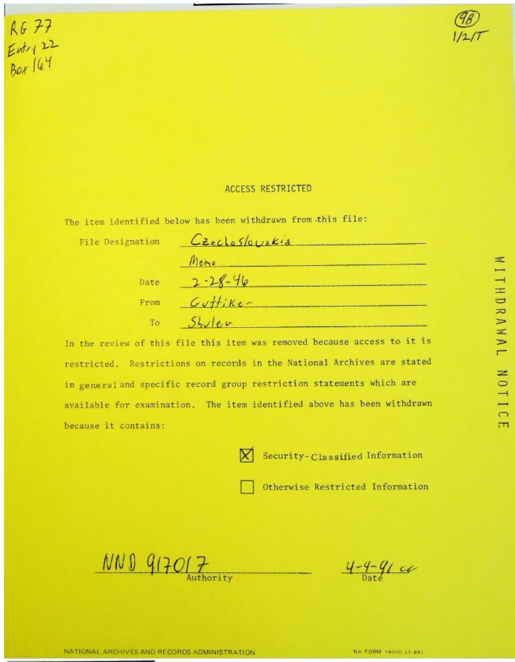








14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?


RG 77 Entry 22 Box 164 — (9B) 1/2/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Czechoslovakia, Memo
Date: 2-28-46
From: Guttiker
To: Shuler

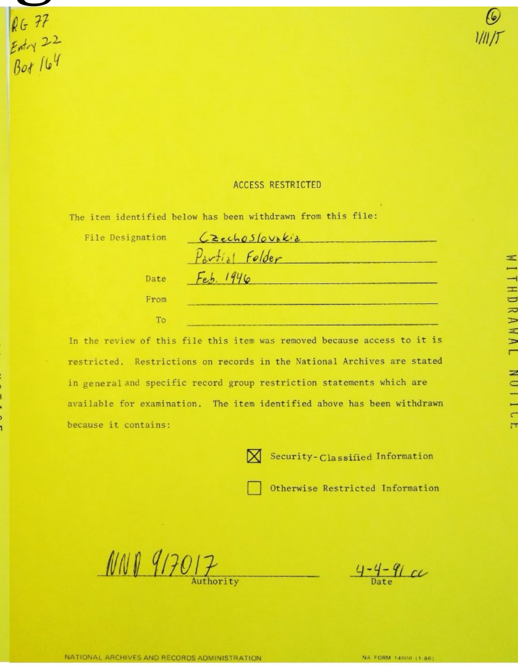
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 (Authority) — 4-4-91 cc (Date)

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 164 — (6) 1/11/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Czechoslovakia, Partial Folder
Date: Feb. 1946
From:
To:

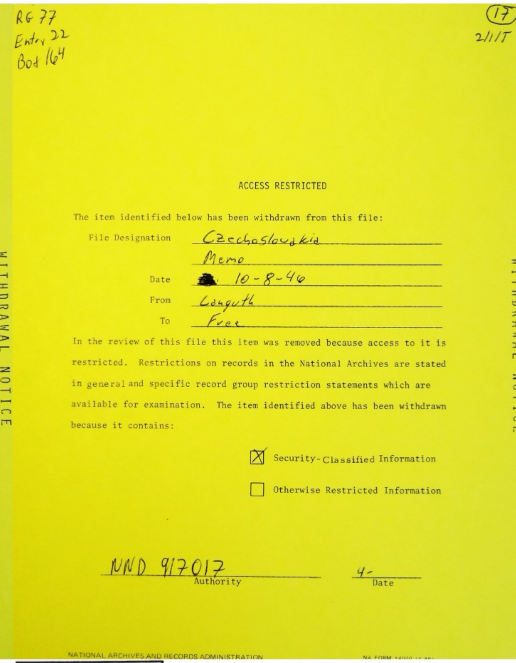
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 (Authority) — 4-4-91 cc (Date)

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 164 — (17) 2/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Czechoslovakia, Memo
Date: 10-8-46
From: Langguth
To: Free

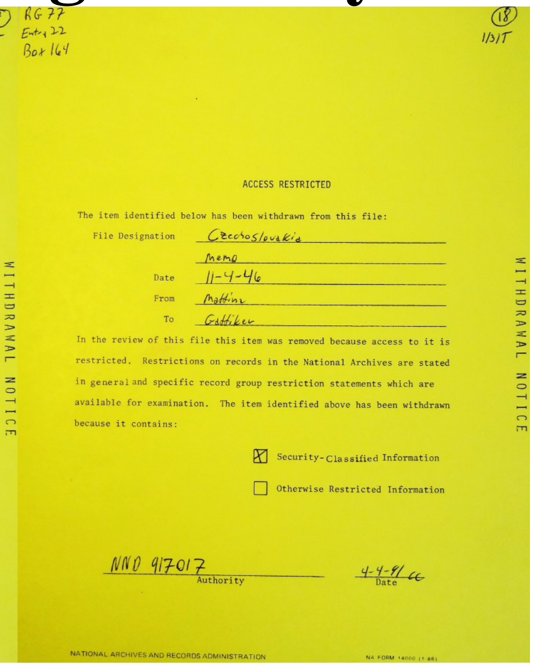
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 (Authority) — 4- (Date)

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 164 — (18) 1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Czechoslovakia, memo
Date: 11-4-46
From: Mattinz
To: Guttiker

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 (Authority) — 4-4-91 cc (Date)

WITHDRAWAL NOTICE

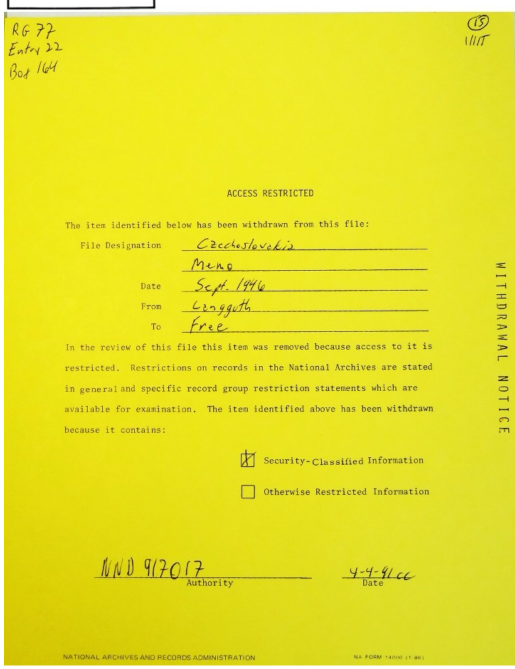
NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

DECLASSIFIED Authority NND 917017

NARA RG 77, Entry UD-22A, Box 164

DECLASSIFIED Authority NND 917017

NARA RG 77, Entry UD-22A, Box 164


RG 77 Entry 22 Box 164 — (15) 1/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Czechoslovakia, Memo
Date: Sept. 1946
From: Langguth
To: Free

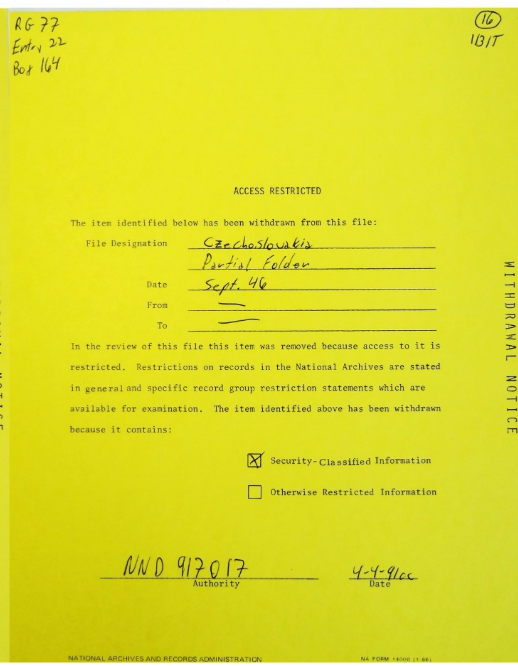
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 (Authority) — 4-4-91 cc (Date)

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 164 — (16) 1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Czechoslovakia, Partial Folder
Date: Sept. 46
From: —
To: —

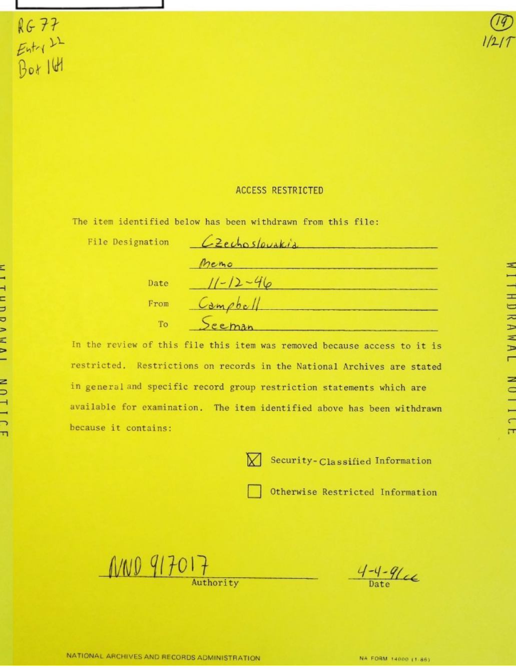
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 (Authority) — 4-4-91 cc (Date)

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 164 — (14) 1/2/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Czechoslovakia, memo
Date: 11-12-46
From: Campbell
To: Seeman

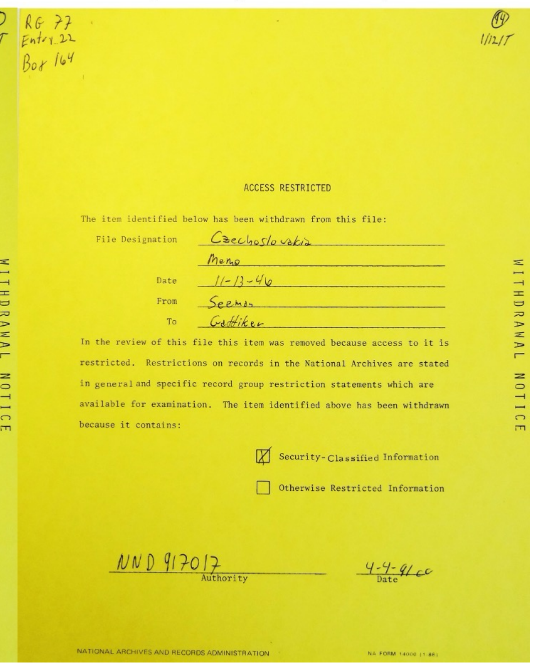
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 (Authority) — 4-4-91 cc (Date)

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 164 — (19) 1/12/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Czechoslovakia, Memo
Date: 11-13-46
From: Seeman
To: Guttiker

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

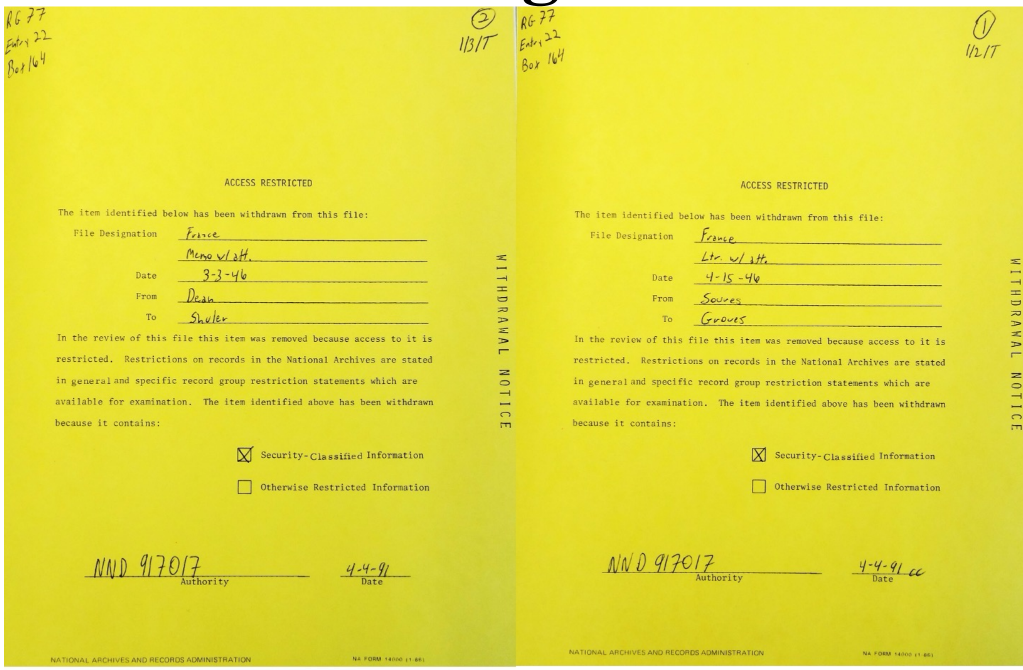
☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 (Authority) — 4-4-91 cc (Date)

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?



RG 77
Entry 22
Box 164

(2) 1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: France
Memo w/att.
Date: 3-3-46
From: Dean
To: Shuler

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 — Authority
4-4-91 — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 164

(1) 1/2/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: France
Ltr. w/att.
Date: 4-15-46
From: Souers
To: Groves

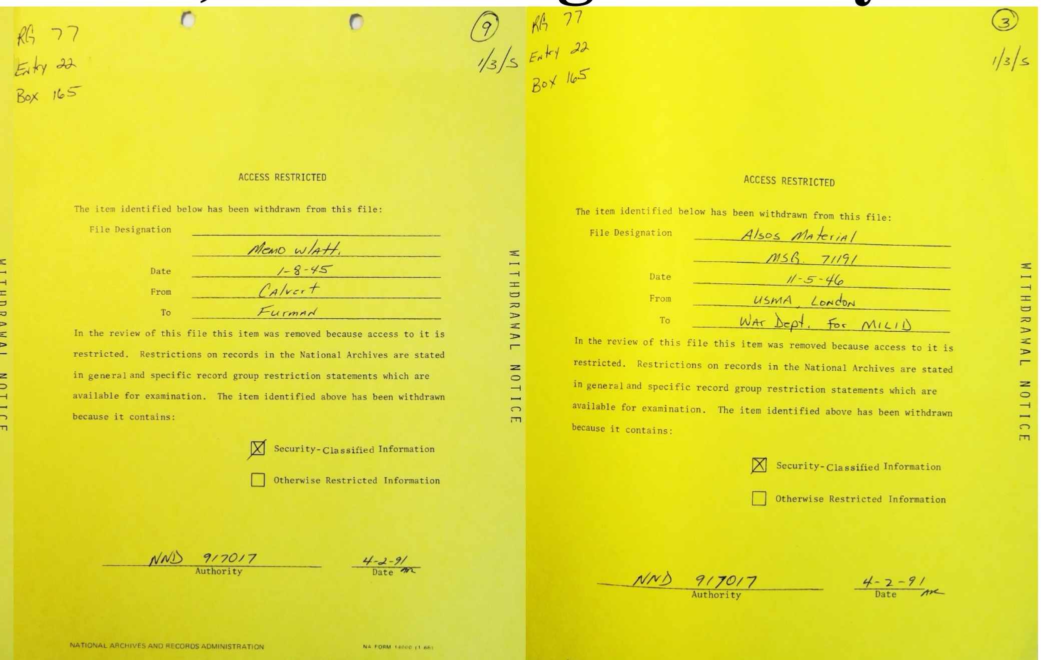
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 — Authority
4-4-91 cc — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)



RG 77
Entry 22
Box 165

(9) 1/3/S

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Memo w/att.
Date: 1-8-45
From: Calvert
To: Furman

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 — Authority
4-2-91 AK — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 165

(3) 1/3/S

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Alsos Material
MSB 71191
Date: 11-5-46
From: USMA, London
To: War Dept. for MILID

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 — Authority
4-2-91 AK — Date

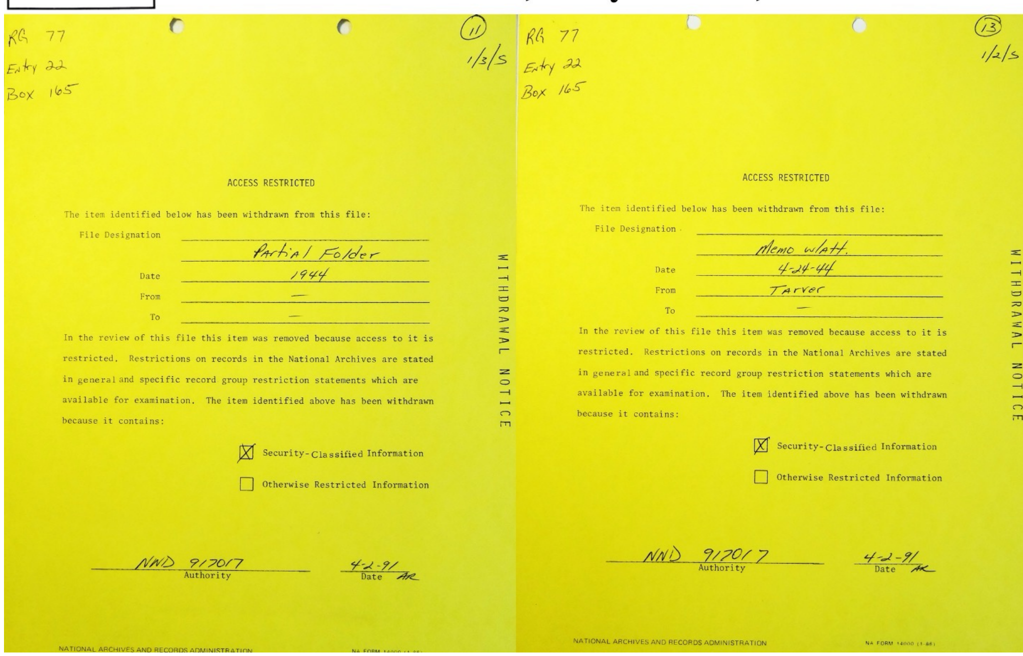
WITHDRAWAL NOTICE

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Boxes 164 & 165

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 165



RG 77
Entry 22
Box 165

(11) 1/3/S

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Partial Folder
Date: 1944
From: —
To:

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 — Authority
4-2-91 AK — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

RG 77
Entry 22
Box 165

(13) 1/2/S

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Memo w/att.
Date: 4-24-44
From: Tarver
To: —

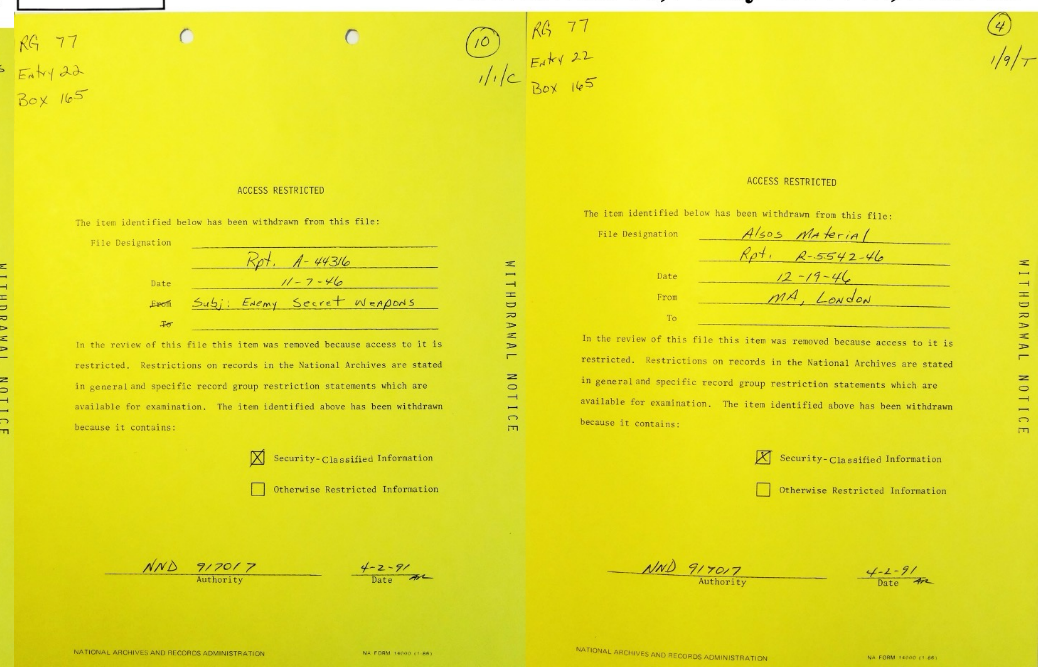
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 — Authority
4-2-91 AK — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)



RG 77
Entry 22
Box 165

(10) 1/1/C

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Rpt. A-44316
Date: 11-7-46
~~From~~ Subj: Enemy Secret Weapons
~~To~~

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 — Authority
4-2-91 AK — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 165

(4) 1/9/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Alsos Material
Rpt. R-5542-46
Date: 12-19-46
From: MA, London
To:

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

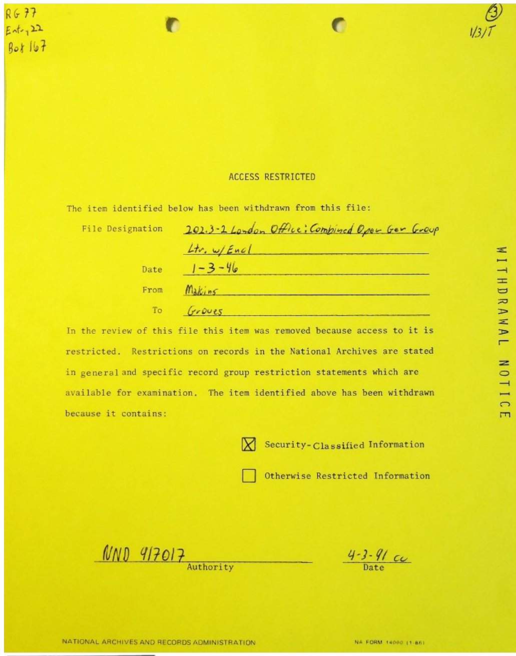
☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 — Authority
4-2-91 AK — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?



RG 77 Entry 22 Box 167 ③ 1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 202.3-2 London Office: Combined Oper Ger Group Ltr. w/Encl

Date 1-3-46

From Makins

To Groves

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

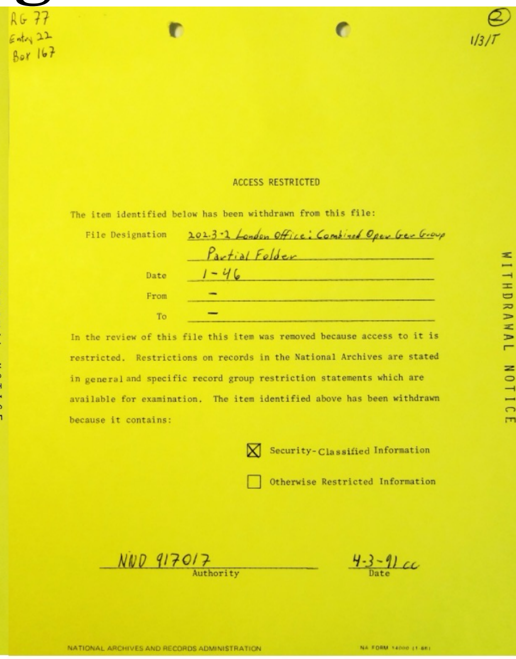
☒ Security-Classified Information

☐ Otherwise Restricted Information

NND 917017 Authority — 4-3-91 cc Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)



RG 77 Entry 22 Box 167 ② 1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 202.3-2 London Office: Combined Oper Ger Group Partial Folder

Date 1-46

From –

To –

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

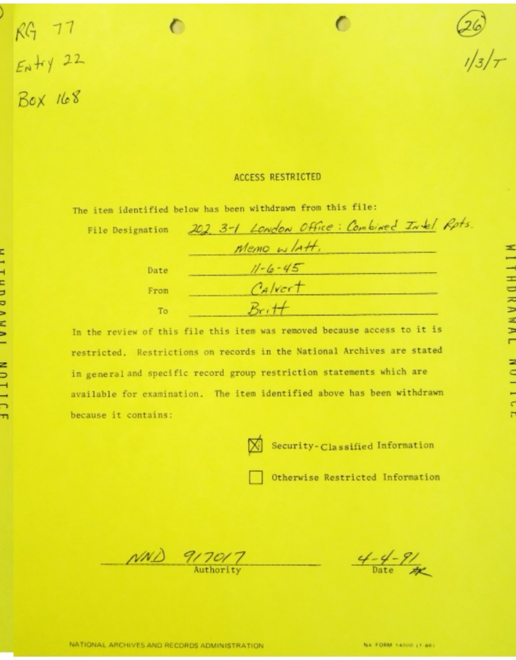
☒ Security-Classified Information

☐ Otherwise Restricted Information

NND 917017 Authority — 4-3-91 cc Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)



RG 77 Entry 22 Box 168 (26) 1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 202.3-1 London Office: Combined Intel Rpts. Memo w/att.

Date 11-6-45

From Calvert

To Britt

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

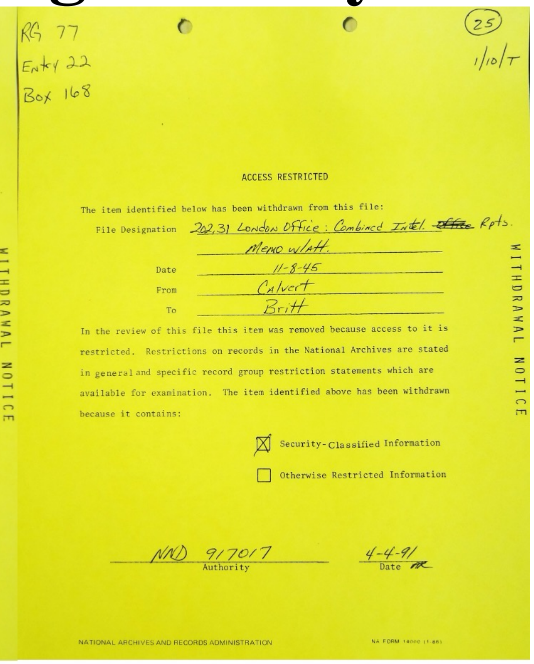
☒ Security-Classified Information

☐ Otherwise Restricted Information

NND 917017 Authority — 4-4-91 AR Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)



RG 77 Entry 22 Box 168 (25) 1/10/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 202.31 London Office: Combined Intel. ~~Office~~ Rpts. Memo w/att.

Date 11-8-45

From Calvert

To Britt

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information

☐ Otherwise Restricted Information

NND 917017 Authority — 4-4-91 AR Date

WITHDRAWAL NOTICE

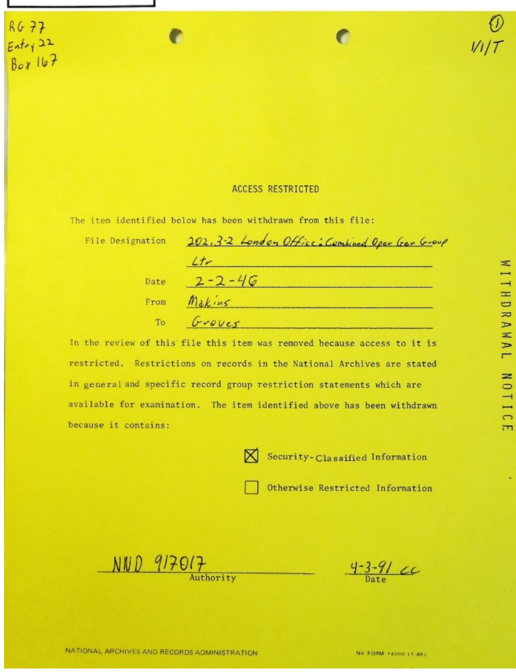
NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

DECLASSIFIED Authority NND 917017

NARA RG 77, Entry UD-22A, Box 167

DECLASSIFIED Authority NND 917017

NARA RG 77, Entry UD-22A, Box 168



RG 77 Entry 22 Box 167 ① 1/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 202.3-2 London Office: Combined Oper Ger Group Ltr

Date 2-2-46

From Makins

To Groves

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

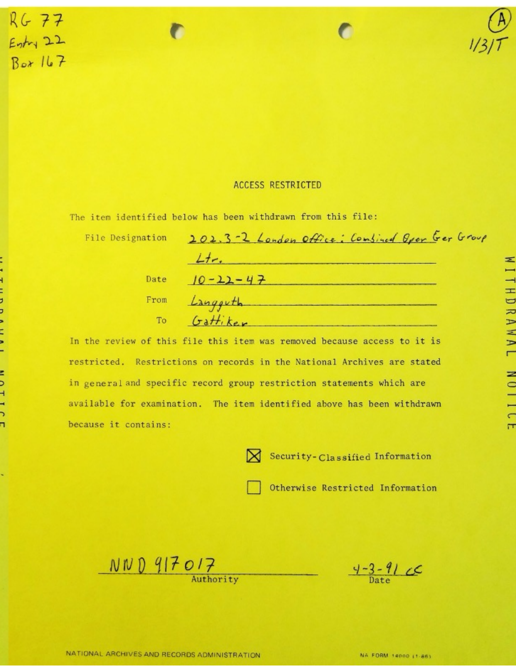
☒ Security-Classified Information

☐ Otherwise Restricted Information

NND 917017 Authority — 4-3-91 cc Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)



RG 77 Entry 22 Box 167 Ⓐ 1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 202.3-2 London Office: Combined Oper Ger Group Ltr.

Date 10-22-47

From Langguth

To Gattiker

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

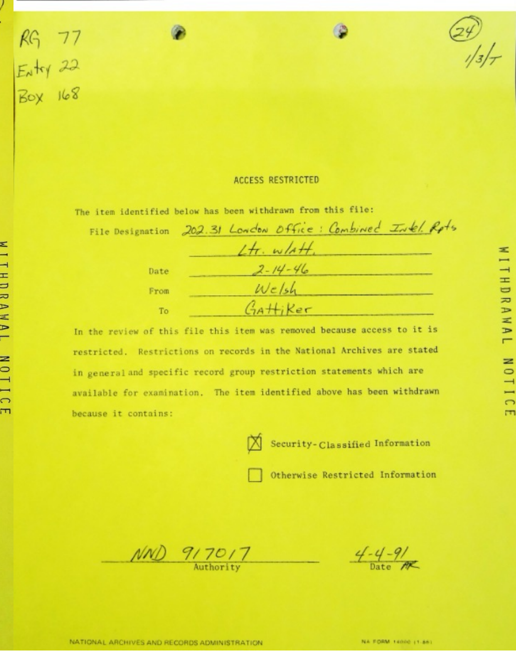
☒ Security-Classified Information

☐ Otherwise Restricted Information

NND 917017 Authority — 4-3-91 cc Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)



RG 77 Entry 22 Box 168 (24) 1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 202.31 London Office: Combined Intel Rpts. Ltr. w/att.

Date 2-14-46

From Welsh

To Gattiker

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

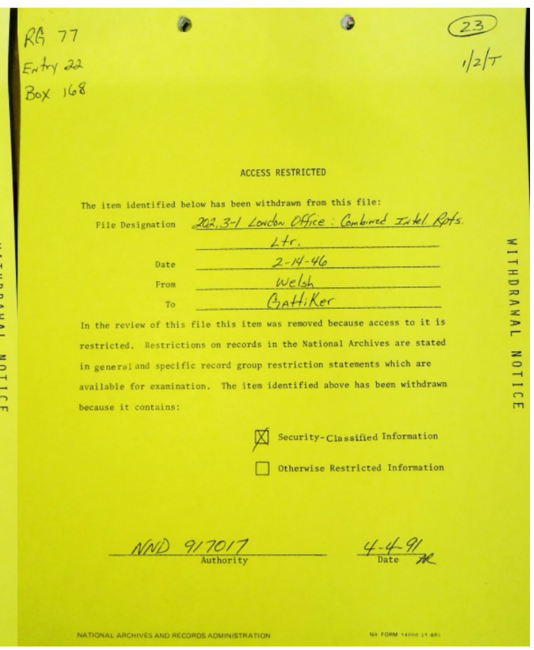
☒ Security-Classified Information

☐ Otherwise Restricted Information

NND 917017 Authority — 4-4-91 AR Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)



RG 77 Entry 22 Box 168 (23) 1/2/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 202.3-1 London Office: Combined Intel Rpts. Ltr.

Date 2-14-46

From Welsh

To Gattiker

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information

☐ Otherwise Restricted Information

NND 917017 Authority — 4-4-91 AR Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?

RG 77
Entry 22
Box 168
(22) 1/4/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 202.3-1 London Office: Combined Intel. Rpts.
Memo
Date 3-13-46
From Gattiker
To Shuler

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 Authority — 4-4-91 AR Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 168
(21) 1/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 202.3-1 London Office: Combined Intel Rpts.
Memo
Date 3-22-46
From London Office of Joint TA Intel Sec.
To Wash. Office

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 Authority — 4-4-91 AR Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 171
(20) 1/4/15

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 32.7003-1 Germ-US Wartime July 42-June 44
Partial Folder
Date June 1944
From —
To —

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 Authority — 4-8-91cc Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 171
(38) 1/15/15

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 32.60-2 Germany: Summary 1945-46
Summary
Date 7-31-44
From —
To —

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 Authority — 4-8-91a Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Boxes 168 & 169

DECLASSIFIED
Authority NND 917017

NARA RG 77, Entry UD-22A, Box 171

RG 77
Entry 22
Box 169
(6) 1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation
Report
Date 02/20/45
From —
To

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ ~~Security~~-Classified Information
☐ Otherwise Restricted Information

NND 917017 Authority — 4/5/91 CS Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 169
(7) 1/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation
Partial Folder
Date 1945
From
To —

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ ~~Security~~-Classified Information
☐ Otherwise Restricted Information

NND 917017 Authority — 4/5/91 CS Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 171
1/2/15

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 32.7003-2 Germ-US Wartime July-Oct. 44
Ltr. AA-118
Date 9-11-44
From Dix
To Furman

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 Authority — 4-8-91cc Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 77
Entry 22
Box 171
(16) 1/2/15

12/15/09

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 32.7003-2 Germ-US Wartime July-Oct. 44
Rpt. FF-83
Date 10-21-44
From Paris
To

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

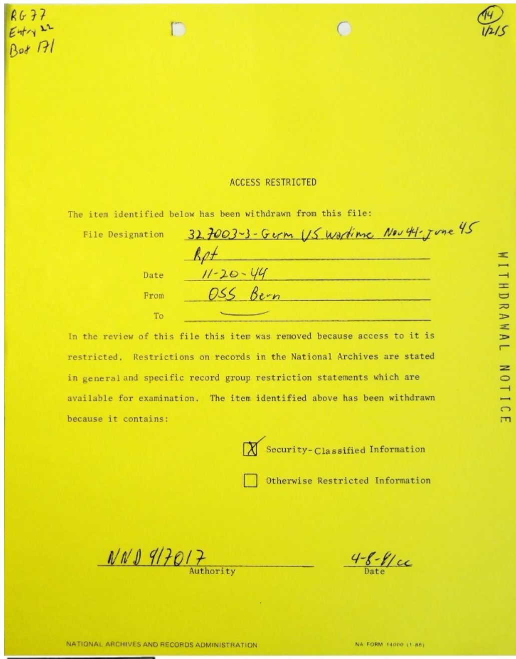
☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 917017 Authority — 4-8-91cc Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?


RG 77 Entry 22 Box 171 (14) 1/2/5

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 32.7003-3-Germ US wartime Nov 41-June 45 Rpt

Date 11-20-44

From OSS Bern

To

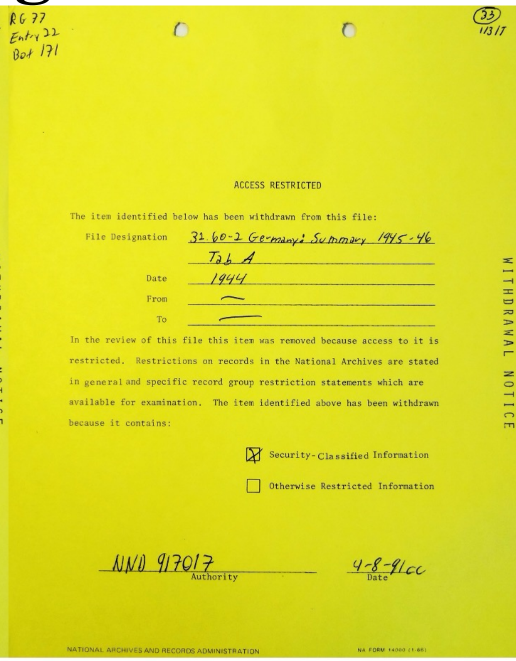
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 Authority — 4-8-91 cc Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 171 (33) 1/3/7

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 32.60-2 Germany: Summary 1945-46 Tab A

Date 1944

From —

To —

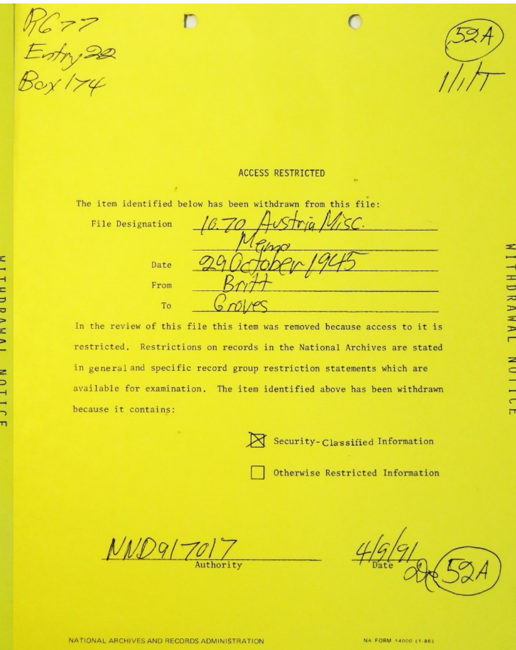
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 Authority — 4-8-91 cc Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 174 (52A) 1/1/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 10.70 Austria Misc. Memo

Date 29 October 1945

From Britt

To Groves

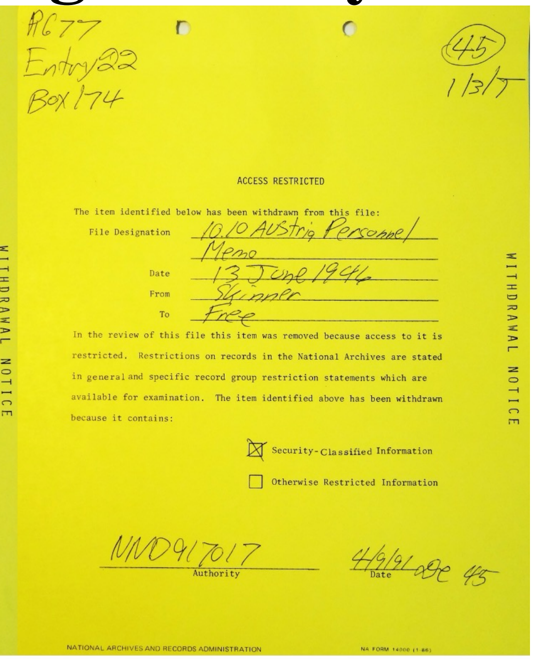
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 Authority — 4/9/91 dc Date (52A)

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 174 (45) 1/3/T

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 10.10 Austria Personnel Memo

Date 13 June 1946

From Skinner

To Free

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 Authority — 4/9/91 dc 45 Date

WITHDRAWAL NOTICE

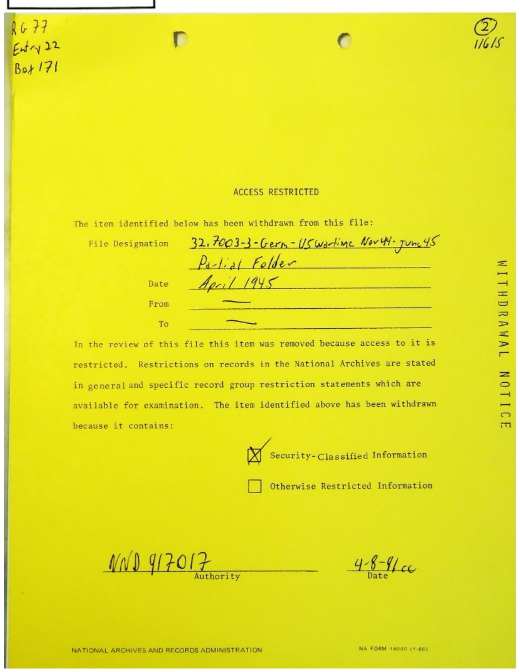
NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

DECLASSIFIED Authority NND 917017

NARA RG 77, Entry UD-22A, Box 171

DECLASSIFIED Authority NND 917017

NARA RG 77, Entry UD-22A, Boxes 174 & 175


RG 77 Entry 22 Box 171 (2) 11/6/5

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 32.7003-3-Germ-US wartime Nov 41-June 45 Partial Folder

Date April 1945

From —

To —

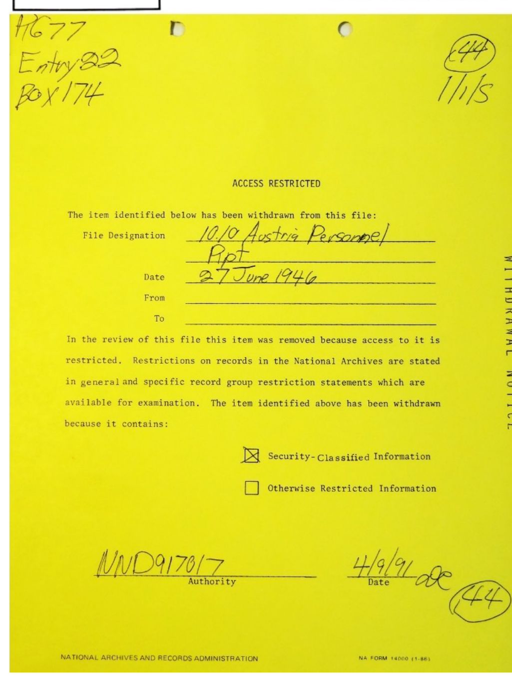
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 Authority — 4-8-91 cc Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 174 (44) 1/1/S

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation 10.10 Austria Personnel Rpt

Date 27 June 1946

From

To

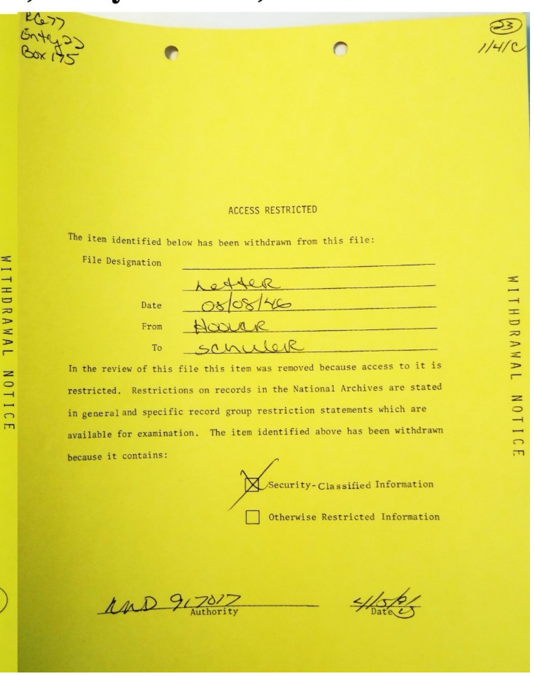
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 Authority — 4/9/91 dc Date (44)

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)


RG 77 Entry 22 Box 175 (23) 1/4/C

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation

Letter

Date 08/08/46

From Hoover

To Schuler

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

- [x] Security-Classified Information
- [ ] Otherwise Restricted Information

NND 917017 Authority — 4/5/85 Date

WITHDRAWAL NOTICE

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?

RG: 200 TAB #: (108)
ENTRY: Goudsmit Papers 1 / 2 / C
BOX: 3 COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation ALSOS (Historians Inventory Control Box 4 folder 6)
Memo
Date 24 June 1944
From Sam G.
To Waterman

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 Authority
06 October 1993 Date
Withdrawn by

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: 5
ENTRY: Goudsmit Papers 1 / 4 / S
BOX: 1 COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation FROM: PASH MISSION RELATED
MEMO
Date 24 JUNE 1944
From CERAME
To OIC

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 Authority
6 OCT 1993 Date
Withdrawn by REH

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: 4
ENTRY: Goudsmit Papers 1 / 24 / S
BOX: 1 COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation FROM: PASH MISSION RELATED
MEMO W/ATT
Date 17 OCT 1944
From ADAMS
To HAM

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 Authority
6 OCT 1993 Date
Withdrawn by REH

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: (104)
ENTRY: Goudsmit Papers 1 / 13 / S
BOX: 3 COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation (UNTITLED)
— ENTIRE FOLDER —
Date 00/00/44
From
To

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 Authority
06 October 1993 Date
Withdrawn by

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

NARA RG GOUDS, Entry UD-7420, Boxes 1–9

DECLASSIFIED
Authority NND933079

NARA RG GOUDS, Entry UD-7420, Boxes 1–9

DECLASSIFIED
Authority NND933079

RG: 200 TAB #: 6
ENTRY: Goudsmit Papers 1 / 10 / S
BOX: 1 COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation FROM: PASH MISSION RELATED
MEMO W/ENCL
Date 27 JUNE 1944
From HAM
To CHIEF, MIS

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 Authority
6 OCT 1993 Date
Withdrawn by REH

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: 6
ENTRY: Goudsmit 1 / 1 / S
BOX: 6 COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation PASH Mission Related
Ltr
Date 10/5/44
From Fisher
To Colby

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND933079 Authority
10/6/93 Date
Withdrawn by 4

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: (112)
ENTRY: Goudsmit Papers 1 / 27 / C
BOX: 3 COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Netherlands Intelligence (Hist. Off. Inventory Ctl. Box 4 Folder 4)
— ENTIRE FOLDER —
Date 00/00/1945
From
To

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 Authority
06 October 1993 Date
Withdrawn by

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: 7
ENTRY: Goudsmit 1 / 4 / S
BOX: 6 COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation PASH Mission Related
Memo w/att
Date 4/3/45
From Kemble
To Horton

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 Authority
10/6/93 Date
Withdrawn by 4

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?

RG: 200
ENTRY: GOUDSMIT PAPERS
BOX: 3

TAB #: (109)
1 / 4 / S
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation ALSOS (Historian Inventory Control Box 4 Folder 6)
LTR w/2 INCLS
Date 27 April 1945
From WOODY
To BURCHARD

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079
Authority

06 October 1993
Date

Withdrawn by fgt

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200
ENTRY: Goudsmit Papers
BOX: 3

TAB #: (106)
1 / 2 / S
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation ALSOS (Historian Inventory Control Box 4 Folder 6)
memo w/attach
Date 18 July 1945
From Goudsmit
To Eckman

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079
Authority

06 October 1993
Date

Withdrawn by fgt

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200
ENTRY: Goudsmit Papers
BOX: 3

TAB #: (99)
1 / 3 / S
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Historian's Office Inventory Control Box 4 Folder 4
LTR
Date 03 September 1945
From GOUDSMIT
To ECKMAN

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079
Authority

06 October 1993
Date

Withdrawn by fgt

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200
ENTRY: Goudsmit Paper
BOX: 3

TAB #: (100)
1 / 3 / S
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Historian's Office Inventory Control Box 4 Folder 4
Briefing Papers w/attach
Date 03 September 1945
From SMYTH
~~To~~ Subj: Removal to Russia of Uranium

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079
Authority

06 October 1993
Date

Withdrawn by fgt

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

NARA RG GOUDS, Entry UD-7420, Boxes 1–9

DECLASSIFIED
Authority NND933079

NARA RG GOUDS, Entry UD-7420, Boxes 1–9

DECLASSIFIED
Authority NND933079

RG: 200
ENTRY: GOUDSMIT PAPERS
BOX: 3

TAB #: (107)
1 / 3 / S
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation ALSOS (Historian's Inventory Control Bx. 4 Folder 6)
memo
Date 07 August 1945
From GOUDSMIT
~~To~~ Subj: Dissemination of Energy Scientific

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079
Authority

06 October 1993
Date

Withdrawn by fgt

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200
ENTRY: GOUDSMIT PAPERS
BOX: 3

TAB #: (105)
1 / 3 / S
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation ALSOS (Historian Inventory Control Box 4 Folder 6)
memo
Date 10 August 1945
From Goudsmit
To HAM

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079
Authority

06 October 1993
Date

Withdrawn by fgt

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200
ENTRY: GOUDSMIT PAPERS
BOX: 3

TAB #: (110)
1 / 1 / S
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation ALSOS (Historian's Inventory Control Box 4 Folder 6)
memo
Date 03 September 1945
From GOUDSMIT
To ECKMAN

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079
Authority

06 October 1993
Date

Withdrawn by fgt

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200
ENTRY: GOUDSMIT PAPERS
BOX: 3

TAB #: (111)
1 / 7 / S
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation ALSOS (Historians Inventory Control Box 4 Folder 6)
memo w/attach
Date 10 September 1945
From GOUDSMIT
To ECKMAN

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079
Authority

06 October 1993
Date

Withdrawn by fgt

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?

RG: 200 TAB #: 93
ENTRY: Goudsmit Papers 1 / 1 / C COPIES/ PPS. /CLASS.
BOX: 3

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Historian's Office Inventory Control Box 4 Folder 4
LTR
Date 08 January 1947
From Henderson
To Goudsmit

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

WITHDRAWAL NOTICE

NND 933079 Authority
06 October 1993 Date
Withdrawn by fjt

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: 94
ENTRY: Goudsmit Papers 1 / 1 / C COPIES/ PPS. /CLASS.
BOX: 3

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Historian's Office Inventory Control Box 4 Folder 4
LTR
Date 19 May 1947
From Goudsmit
To Henderson

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

WITHDRAWAL NOTICE

NND 933079 Authority
06 October 1993 Date
Withdrawn by fjt

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: 92
ENTRY: Goudsmit Papers 1 / 7 / S COPIES/ PPS. /CLASS.
BOX: 3

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Historian's Office Inventory Control Box 4 Folder 4
LTR w/Encl
Date 23 April 1946
From Goudsmit
To Snider

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

WITHDRAWAL NOTICE

NND 933079 Authority
06 October 1993 Date
Withdrawn by fjt

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: 5
ENTRY: Goudsmit 1 / 1 / u/c COPIES/ PPS. /CLASS.
BOX: 6

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Joint Research & Development Board
Ltr
Date 4/2/47
From Goudsmit
To Bush

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

WITHDRAWAL NOTICE

Authority NND 933079
Date 10/6/93
Withdrawn by lt

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

NARA RG GOUDS, Entry UD-7420, Boxes 1–9

DECLASSIFIED Authority NND933079

NARA RG GOUDS, Entry UD-7420, Boxes 1–9

DECLASSIFIED Authority NND933079

RG: 200 TAB #: 95
ENTRY: Goudsmit Papers 1 / 1 / C COPIES/ PPS. /CLASS.
BOX: 3

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Historian's Office Inventory Control Box 4 Folder 4
LTR
Date 22 May 1947
From Henderson
To Goudsmit

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

WITHDRAWAL NOTICE

NND 933079 Authority
06 October 1993 Date
Withdrawn by fjt

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: 96
ENTRY: Goudsmit Papers 1 / 1 / C COPIES/ PPS. /CLASS.
BOX: 3

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Historian's Office Inventory Control Box 4 Folder 4
LTR
Date 10 June 1947
From Henderson
To Goudsmit

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

WITHDRAWAL NOTICE

NND 933079 Authority
06 October 1993 Date
Withdrawn by fjt

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: 97
ENTRY: Goudsmit Paper 1 / 2 / C COPIES/ PPS. /CLASS.
BOX: 3

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Historian's Office Inventory Control Box 4 Folder 4
LTR
Date 10 November 1948
From Goudsmit
To Henderson

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

WITHDRAWAL NOTICE

NND 933079 Authority
06 October 1993 Date
Withdrawn by fjt

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

RG: 200 TAB #: 103
ENTRY: Goudsmit Papers 1 / 2 / C COPIES/ PPS. /CLASS.
BOX: 3

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation Historian's Office Inventory Control Box 4 Folder 4
LTR
Date 07 April 1967
From Goudsmit
To Liimatainen

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

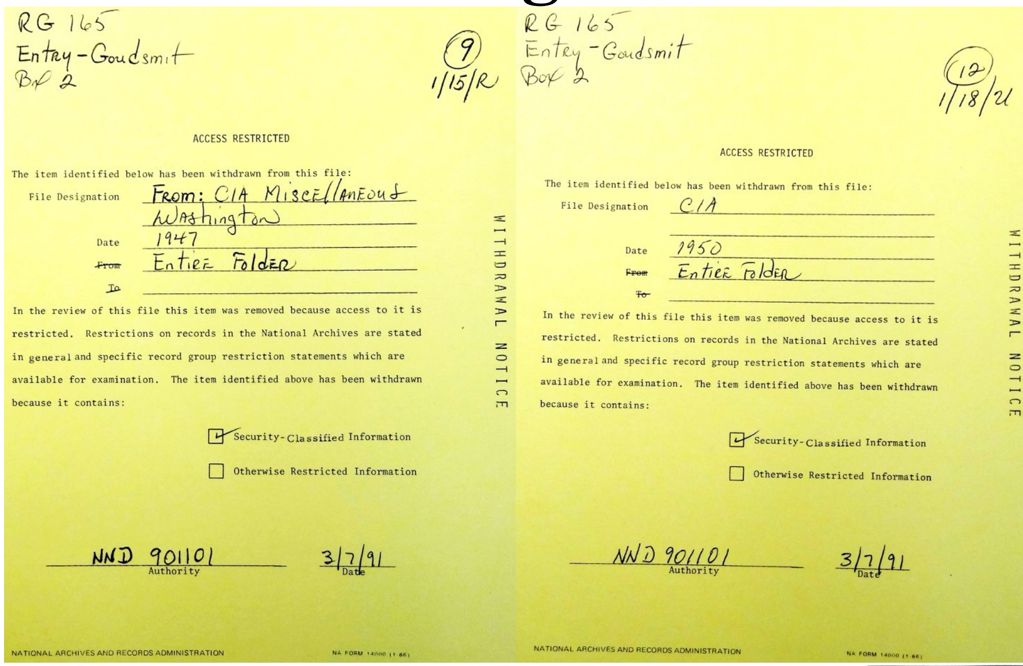
☒ Security-Classified Information
☐ Otherwise Restricted Information

WITHDRAWAL NOTICE

NND 933079 Authority
06 October 1993 Date
Withdrawn by fjt

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION NA FORM 14000 (5-92)

14. Why Are So Many Archival Files on the German Nuclear Program Still Classified, or Missing Entirely?



RG 165
Entry - Goudsmit
Box 2
(9)
1/15/R

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: From: CIA Miscellaneous Washington
Date: 1947
~~From~~ Entire Folder
To

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☑ Security-Classified Information
☐ Otherwise Restricted Information

NND 901101 — Authority
3/7/91 — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)

RG 165
Entry - Goudsmit
Box 2
(12)
1/18/21

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: CIA
Date: 1950
~~From~~ Entire Folder
~~To~~

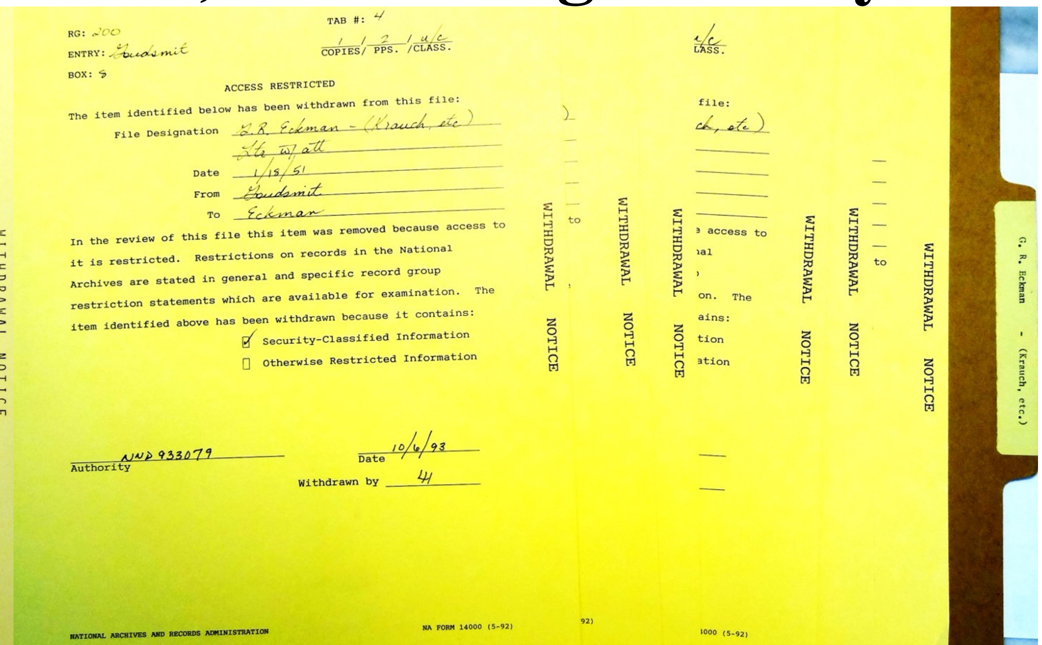
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☑ Security-Classified Information
☐ Otherwise Restricted Information

NND 901101 — Authority
3/7/91 — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (1-86)



RG: 200
ENTRY: Goudsmit
BOX: 5
TAB #: 4
1 / 2 / u/c
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: E. R. Eckman - (Krauch, etc.) Ltr w/ att
Date: 1/15/51
From: Goudsmit
To: Eckman

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☑ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 — Authority
10/6/93 — Date
Withdrawn by: 4l

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (5-92)

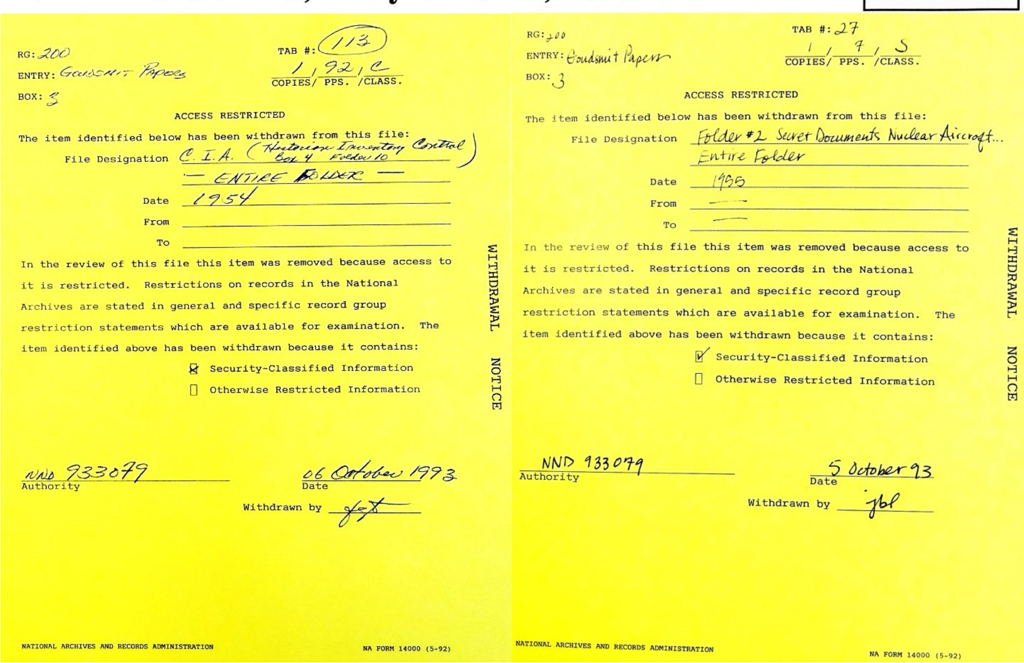
G. R. Eckman - (Krauch, etc.)

NARA RG GOUDS, Entry UD-7420, Boxes 1–9

DECLASSIFIED
Authority NND933079

NARA RG GOUDS, Entry UD-7420, Boxes 1–9

DECLASSIFIED
Authority NND933079



RG: 200
ENTRY: Goudsmit Papers
BOX: 5
TAB #: 113
1 / 92 / C
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: C.I.A. (Historian Inventory Control Box 4 Folder 10) — ENTIRE FOLDER —
Date: 1954
From
To

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 — Authority
06 October 1993 — Date
Withdrawn by

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (5-92)

RG: 200
ENTRY: Goudsmit Papers
BOX: 3
TAB #: 27
1 / 4 / S
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: Folder #2 Secret Documents Nuclear Aircraft... Entire Folder
Date: 1955
From
To

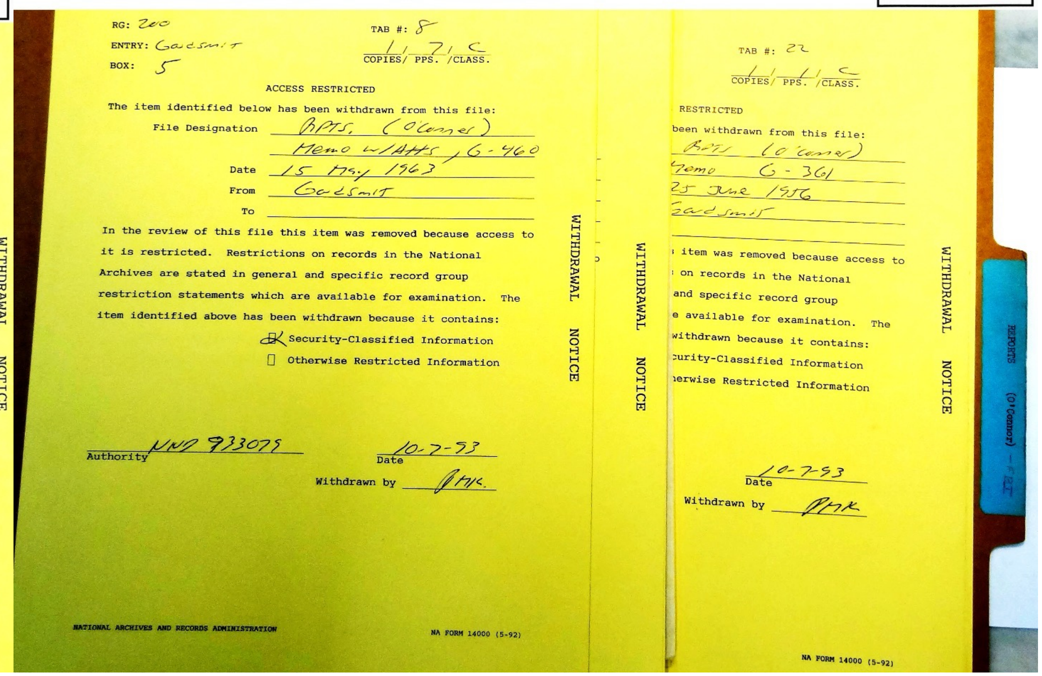
In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☑ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 — Authority
5 October 93 — Date
Withdrawn by: jbl

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (5-92)



RG: 200
ENTRY: Goudsmit
BOX: 5
TAB #: 8
1 / 7 / C
COPIES/ PPS. /CLASS.

ACCESS RESTRICTED

The item identified below has been withdrawn from this file:

File Designation: BPTS, (O'Conner) Memo w/Atts, 6-460
Date: 15 May 1963
From: Goudsmit
To

In the review of this file this item was removed because access to it is restricted. Restrictions on records in the National Archives are stated in general and specific record group restriction statements which are available for examination. The item identified above has been withdrawn because it contains:

☒ Security-Classified Information
☐ Otherwise Restricted Information

NND 933079 — Authority
10-7-93 — Date
Withdrawn by

WITHDRAWAL NOTICE

TAB #: 22

Memo 6-361
25 June 1956
Goudsmit

10-7-93 — Date

WITHDRAWAL NOTICE

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION — NA FORM 14000 (5-92)

REPORTS (O'Connor)

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

United States

President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

United States

President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

United States (cont'd)

William Casey
Allen Dulles
Frederick R. Loofbourow
Whitney Shepardson
Dr. Samuel K. Allison
Dr. Edward L. Bowles (MIT)
Dr. Karl P. Cohen
Dr. Enrico Fermi
Dr. Richard P. Fischer
Dr. Samuel A. Goudsmit
Caperton B. Horsley
Dr. Gerard P. Kuiper
Dr. Philip Morrison
Dr. Lothar W. Nordheim
Dr. Todos M. Odarenko
Dr. J. Robert Oppenheimer
Dr. Charles P. Smyth
Dr. Leo Szilard
Dr. Edward Teller
Dr. Alvin M. Weinberg
Dr. Eugene P. Wigner
Fritz Lang
Associated Press reporters
Life reporters
Los Angeles Times reporters
Newsweek reporters
New York Times reporters
Time reporters
Washington Post reporters

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

<u>United States</u>

President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

<u>United States (cont'd)</u>

William Casey
Allen Dulles
Frederick R. Loofbourow
Whitney Shepardson
Dr. Samuel K. Allison
Dr. Edward L. Bowles (MIT)
Dr. Karl P. Cohen
Dr. Enrico Fermi
Dr. Richard P. Fischer
Dr. Samuel A. Goudsmit
Caperton B. Horsley
Dr. Gerard P. Kuiper
Dr. Philip Morrison
Dr. Lothar W. Nordheim
Dr. Todos M. Odarenko
Dr. J. Robert Oppenheimer
Dr. Charles P. Smyth
Dr. Leo Szilard
Dr. Edward Teller
Dr. Alvin M. Weinberg
Dr. Eugene P. Wigner
Fritz Lang
Associated Press reporters
Life reporters
Los Angeles Times reporters
Newsweek reporters
New York Times reporters
Time reporters
Washington Post reporters

<u>Axis</u>

Adolf Hitler
Hermann Göring
Heinrich Himmler
Wilhelm Ohnesorge
Benito Mussolini
Grand Mufti of Jerusalem
Erwin Bartmann
Helmut J. Fischer
Werner Grothmann
Julius Schaub
Werner Wächter
Manfred von Ardenne
Dr. Wernher von Braun
Dr. Kurt Diebner
Dr. Robert Döpel
Dr. Rudolf Edse
Dr. Siegfried Flügge
Dr. Wilhelm Groth
Dr. Otto Hahn
Dr. Fritz Houtermans
Dr. Johannes Hans Jensen
Dr. Fritz Rehbein
Dr. Erich Schumann
Dr. Hermann Staudinger
Dr. Georg Stetter
Heinz Stölzel
Dr. Walter Trinks
Dr. Wilhelm Voss
General Walter Dornberger
General Gerhard Franz
General Hans Kammler
General Heinrich Kittel
Erwin Respondek
Hans Ulrich Rudel
Adolf Schneider
Alwin Urff

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

United States
President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

United States (cont'd)
William Casey
Allen Dulles
Frederick R. Loofbourow
Whitney Shepardson
Dr. Samuel K. Allison
Dr. Edward L. Bowles (MIT)
Dr. Karl P. Cohen
Dr. Enrico Fermi
Dr. Richard P. Fischer
Dr. Samuel A. Goudsmit
Caperton B. Horsley
Dr. Gerard P. Kuiper
Dr. Philip Morrison
Dr. Lothar W. Nordheim
Dr. Todos M. Odarenko
Dr. J. Robert Oppenheimer
Dr. Charles P. Smyth
Dr. Leo Szilard
Dr. Edward Teller
Dr. Alvin M. Weinberg
Dr. Eugene P. Wigner
Fritz Lang
Associated Press reporters
Life reporters
Los Angeles Times reporters
Newsweek reporters
New York Times reporters
Time reporters
Washington Post reporters

United Kingdom
Sir Winston Churchill
Sir Roy Fedden
Sir Reginald Patrick Linstead
Lord Robert Gilbert Vansittart
Lord John Moore-Brabazon
Esme Bligh, Earl of Darnley
Major Edmund Tilley
Charles Chamberlain
David Gattiker
George Gordon Young

Axis
Adolf Hitler
Hermann Göring
Heinrich Himmler
Wilhelm Ohnesorge
Benito Mussolini
Grand Mufti of Jerusalem
Erwin Bartmann
Helmut J. Fischer
Werner Grothmann
Julius Schaub
Werner Wächter
Manfred von Ardenne
Dr. Wernher von Braun
Dr. Kurt Diebner
Dr. Robert Döpel
Dr. Rudolf Edse
Dr. Siegfried Flügge
Dr. Wilhelm Groth
Dr. Otto Hahn
Dr. Fritz Houtermans
Dr. Johannes Hans Jensen
Dr. Fritz Rehbein
Dr. Erich Schumann
Dr. Hermann Staudinger
Dr. Georg Stetter
Heinz Stölzel
Dr. Walter Trinks
Dr. Wilhelm Voss
General Walter Dornberger
General Gerhard Franz
General Hans Kammler
General Heinrich Kittel
Erwin Respondek
Hans Ulrich Rudel
Adolf Schneider
Alwin Urff

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

United States

President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

United States (cont'd)

William Casey
Allen Dulles
Frederick R. Loofbourow
Whitney Shepardson
Dr. Samuel K. Allison
Dr. Edward L. Bowles (MIT)
Dr. Karl P. Cohen
Dr. Enrico Fermi
Dr. Richard P. Fischer
Dr. Samuel A. Goudsmit
Caperton B. Horsley
Dr. Gerard P. Kuiper
Dr. Philip Morrison
Dr. Lothar W. Nordheim
Dr. Todos M. Odarenko
Dr. J. Robert Oppenheimer
Dr. Charles P. Smyth
Dr. Leo Szilard
Dr. Edward Teller
Dr. Alvin M. Weinberg
Dr. Eugene P. Wigner
Fritz Lang
Associated Press reporters
Life reporters
Los Angeles Times reporters
Newsweek reporters
New York Times reporters
Time reporters
Washington Post reporters

United Kingdom

Sir Winston Churchill
Sir Roy Fedden
Sir Reginald Patrick Linstead
Lord Robert Gilbert Vansittart
Lord John Moore-Brabazon
Esme Bligh, Earl of Darnley
Major Edmund Tilley
Charles Chamberlain
David Gattiker
George Gordon Young

Soviet Union

General Ivan Ilyichev
Marshal Georgy Zhukov
Boris Chertok
Dr. Georgy Flerov
Dr. Igor Kurchatov
Pavel V. Oleynikov
L. D. Riabev

Axis

Adolf Hitler
Hermann Göring
Heinrich Himmler
Wilhelm Ohnesorge
Benito Mussolini
Grand Mufti of Jerusalem
Erwin Bartmann
Helmut J. Fischer
Werner Grothmann
Julius Schaub
Werner Wächter
Manfred von Ardenne
Dr. Wernher von Braun
Dr. Kurt Diebner
Dr. Robert Döpel
Dr. Rudolf Edse
Dr. Siegfried Flügge
Dr. Wilhelm Groth
Dr. Otto Hahn
Dr. Fritz Houtermans
Dr. Johannes Hans Jensen
Dr. Fritz Rehbein
Dr. Erich Schumann
Dr. Hermann Staudinger
Dr. Georg Stetter
Heinz Stölzel
Dr. Walter Trinks
Dr. Wilhelm Voss
General Walter Dornberger
General Gerhard Franz
General Hans Kammler
General Heinrich Kittel
Erwin Respondek
Hans Ulrich Rudel
Adolf Schneider
Alwin Urff

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

United States

President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

United States (cont'd)

William Casey
Allen Dulles
Frederick R. Loofbourow
Whitney Shepardson
Dr. Samuel K. Allison
Dr. Edward L. Bowles (MIT)
Dr. Karl P. Cohen
Dr. Enrico Fermi
Dr. Richard P. Fischer
Dr. Samuel A. Goudsmit
Caperton B. Horsley
Dr. Gerard P. Kuiper
Dr. Philip Morrison
Dr. Lothar W. Nordheim
Dr. Todos M. Odarenko
Dr. J. Robert Oppenheimer
Dr. Charles P. Smyth
Dr. Leo Szilard
Dr. Edward Teller
Dr. Alvin M. Weinberg
Dr. Eugene P. Wigner
Fritz Lang
Associated Press reporters
Life reporters
Los Angeles Times reporters
Newsweek reporters
New York Times reporters
Time reporters
Washington Post reporters

United Kingdom

Sir Winston Churchill
Sir Roy Fedden
Sir Reginald Patrick Linstead
Lord Robert Gilbert Vansittart
Lord John Moore-Brabazon
Esme Bligh, Earl of Darnley
Major Edmund Tilley
Charles Chamberlain
David Gattiker
George Gordon Young

Soviet Union

General Ivan Ilyichev
Marshal Georgy Zhukov
Boris Chertok
Dr. Georgy Flerov
Dr. Igor Kurchatov
Pavel V. Oleynikov
L. D. Riabev

Other:

Czech sources
(e.g., Karel Staller)

Axis

Adolf Hitler
Hermann Göring
Heinrich Himmler
Wilhelm Ohnesorge
Benito Mussolini
Grand Mufti of Jerusalem
Erwin Bartmann
Helmut J. Fischer
Werner Grothmann
Julius Schaub
Werner Wächter
Manfred von Ardenne
Dr. Wernher von Braun
Dr. Kurt Diebner
Dr. Robert Döpel
Dr. Rudolf Edse
Dr. Siegfried Flügge
Dr. Wilhelm Groth
Dr. Otto Hahn
Dr. Fritz Houtermans
Dr. Johannes Hans Jensen
Dr. Fritz Rehbein
Dr. Erich Schumann
Dr. Hermann Staudinger
Dr. Georg Stetter
Heinz Stölzel
Dr. Walter Trinks
Dr. Wilhelm Voss
General Walter Dornberger
General Gerhard Franz
General Hans Kammler
General Heinrich Kittel
Erwin Respondek
Hans Ulrich Rudel
Adolf Schneider
Alwin Urff

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

United States

President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

United States (cont'd)

William Casey
Allen Dulles
Frederick R. Loofbourow
Whitney Shepardson
Dr. Samuel K. Allison
Dr. Edward L. Bowles (MIT)
Dr. Karl P. Cohen
Dr. Enrico Fermi
Dr. Richard P. Fischer
Dr. Samuel A. Goudsmit
Caperton B. Horsley
Dr. Gerard P. Kuiper
Dr. Philip Morrison
Dr. Lothar W. Nordheim
Dr. Todos M. Odarenko
Dr. J. Robert Oppenheimer
Dr. Charles P. Smyth
Dr. Leo Szilard
Dr. Edward Teller
Dr. Alvin M. Weinberg
Dr. Eugene P. Wigner
Fritz Lang
Associated Press reporters
Life reporters
Los Angeles Times reporters
Newsweek reporters
New York Times reporters
Time reporters
Washington Post reporters

United Kingdom

Sir Winston Churchill
Sir Roy Fedden
Sir Reginald Patrick Linstead
Lord Robert Gilbert Vansittart
Lord John Moore-Brabazon
Esme Bligh, Earl of Darnley
Major Edmund Tilley
Charles Chamberlain
David Gattiker
George Gordon Young

Soviet Union

General Ivan Ilyichev
Marshal Georgy Zhukov
Boris Chertok
Dr. Georgy Flerov
Dr. Igor Kurchatov
Pavel V. Oleynikov
L. D. Riabev

Other:

Czech sources
(e.g., Karel Staller)
Dutch sources (e.g.,
Anthony van der Steenhoven)

Axis

Adolf Hitler
Hermann Göring
Heinrich Himmler
Wilhelm Ohnesorge
Benito Mussolini
Grand Mufti of Jerusalem
Erwin Bartmann
Helmut J. Fischer
Werner Grothmann
Julius Schaub
Werner Wächter
Manfred von Ardenne
Dr. Wernher von Braun
Dr. Kurt Diebner
Dr. Robert Döpel
Dr. Rudolf Edse
Dr. Siegfried Flügge
Dr. Wilhelm Groth
Dr. Otto Hahn
Dr. Fritz Houtermans
Dr. Johannes Hans Jensen
Dr. Fritz Rehbein
Dr. Erich Schumann
Dr. Hermann Staudinger
Dr. Georg Stetter
Heinz Stölzel
Dr. Walter Trinks
Dr. Wilhelm Voss
General Walter Dornberger
General Gerhard Franz
General Hans Kammler
General Heinrich Kittel
Erwin Respondek
Hans Ulrich Rudel
Adolf Schneider
Alwin Urff

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

United States

President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

United States (cont'd)

William Casey
Allen Dulles
Frederick R. Loofbourow
Whitney Shepardson
Dr. Samuel K. Allison
Dr. Edward L. Bowles (MIT)
Dr. Karl P. Cohen
Dr. Enrico Fermi
Dr. Richard P. Fischer
Dr. Samuel A. Goudsmit
Caperton B. Horsley
Dr. Gerard P. Kuiper
Dr. Philip Morrison
Dr. Lothar W. Nordheim
Dr. Todos M. Odarenko
Dr. J. Robert Oppenheimer
Dr. Charles P. Smyth
Dr. Leo Szilard
Dr. Edward Teller
Dr. Alvin M. Weinberg
Dr. Eugene P. Wigner
Fritz Lang
Associated Press reporters
Life reporters
Los Angeles Times reporters
Newsweek reporters
New York Times reporters
Time reporters
Washington Post reporters

United Kingdom

Sir Winston Churchill
Sir Roy Fedden
Sir Reginald Patrick Linstead
Lord Robert Gilbert Vansittart
Lord John Moore-Brabazon
Esme Bligh, Earl of Darnley
Major Edmund Tilley
Charles Chamberlain
David Gattiker
George Gordon Young

Soviet Union

General Ivan Ilyichev
Marshal Georgy Zhukov
Boris Chertok
Dr. Georgy Flerov
Dr. Igor Kurchatov
Pavel V. Oleynikov
L. D. Riabev

Other:

Czech sources
(e.g., Karel Staller)
Dutch sources (e.g.,
Anthony van der Steenhoven)
French sources
(e.g., Jacques Bergier)

Axis

Adolf Hitler
Hermann Göring
Heinrich Himmler
Wilhelm Ohnesorge
Benito Mussolini
Grand Mufti of Jerusalem
Erwin Bartmann
Helmut J. Fischer
Werner Grothmann
Julius Schaub
Werner Wächter
Manfred von Ardenne
Dr. Wernher von Braun
Dr. Kurt Diebner
Dr. Robert Döpel
Dr. Rudolf Edse
Dr. Siegfried Flügge
Dr. Wilhelm Groth
Dr. Otto Hahn
Dr. Fritz Houtermans
Dr. Johannes Hans Jensen
Dr. Fritz Rehbein
Dr. Erich Schumann
Dr. Hermann Staudinger
Dr. Georg Stetter
Heinz Stölzel
Dr. Walter Trinks
Dr. Wilhelm Voss
General Walter Dornberger
General Gerhard Franz
General Hans Kammler
General Heinrich Kittel
Erwin Respondek
Hans Ulrich Rudel
Adolf Schneider
Alwin Urff

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

__United States__
President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

__United States (cont'd)__
William Casey
Allen Dulles
Frederick R. Loofbourow
Whitney Shepardson
Dr. Samuel K. Allison
Dr. Edward L. Bowles (MIT)
Dr. Karl P. Cohen
Dr. Enrico Fermi
Dr. Richard P. Fischer
Dr. Samuel A. Goudsmit
Caperton B. Horsley
Dr. Gerard P. Kuiper
Dr. Philip Morrison
Dr. Lothar W. Nordheim
Dr. Todos M. Odarenko
Dr. J. Robert Oppenheimer
Dr. Charles P. Smyth
Dr. Leo Szilard
Dr. Edward Teller
Dr. Alvin M. Weinberg
Dr. Eugene P. Wigner
Fritz Lang
Associated Press reporters
Life reporters
Los Angeles Times reporters
Newsweek reporters
New York Times reporters
Time reporters
Washington Post reporters

__United Kingdom__
Sir Winston Churchill
Sir Roy Fedden
Sir Reginald Patrick Linstead
Lord Robert Gilbert Vansittart
Lord John Moore-Brabazon
Esme Bligh, Earl of Darnley
Major Edmund Tilley
Charles Chamberlain
David Gattiker
George Gordon Young

__Soviet Union__
General Ivan Ilyichev
Marshal Georgy Zhukov
Boris Chertok
Dr. Georgy Flerov
Dr. Igor Kurchatov
Pavel V. Oleynikov
L. D. Riabev

__Other:__
Czech sources (e.g., Karel Staller)
Dutch sources (e.g., Anthony van der Steenhoven)
French sources (e.g., Jacques Bergier)
Polish sources (e.g., Gezo Mansfeldt)

__Axis__
Adolf Hitler
Hermann Göring
Heinrich Himmler
Wilhelm Ohnesorge
Benito Mussolini
Grand Mufti of Jerusalem
Erwin Bartmann
Helmut J. Fischer
Werner Grothmann
Julius Schaub
Werner Wächter
Manfred von Ardenne
Dr. Wernher von Braun
Dr. Kurt Diebner
Dr. Robert Döpel
Dr. Rudolf Edse
Dr. Siegfried Flügge
Dr. Wilhelm Groth
Dr. Otto Hahn
Dr. Fritz Houtermans
Dr. Johannes Hans Jensen
Dr. Fritz Rehbein
Dr. Erich Schumann
Dr. Hermann Staudinger
Dr. Georg Stetter
Heinz Stölzel
Dr. Walter Trinks
Dr. Wilhelm Voss
General Walter Dornberger
General Gerhard Franz
General Hans Kammler
General Heinrich Kittel
Erwin Respondek
Hans Ulrich Rudel
Adolf Schneider
Alwin Urff

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

United States

President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

United States (cont'd)

William Casey
Allen Dulles
Frederick R. Loofbourow
Whitney Shepardson
Dr. Samuel K. Allison
Dr. Edward L. Bowles (MIT)
Dr. Karl P. Cohen
Dr. Enrico Fermi
Dr. Richard P. Fischer
Dr. Samuel A. Goudsmit
Caperton B. Horsley
Dr. Gerard P. Kuiper
Dr. Philip Morrison
Dr. Lothar W. Nordheim
Dr. Todos M. Odarenko
Dr. J. Robert Oppenheimer
Dr. Charles P. Smyth
Dr. Leo Szilard
Dr. Edward Teller
Dr. Alvin M. Weinberg
Dr. Eugene P. Wigner
Fritz Lang
Associated Press reporters
Life reporters
Los Angeles Times reporters
Newsweek reporters
New York Times reporters
Time reporters
Washington Post reporters

United Kingdom

Sir Winston Churchill
Sir Roy Fedden
Sir Reginald Patrick Linstead
Lord Robert Gilbert Vansittart
Lord John Moore-Brabazon
Esme Bligh, Earl of Darnley
Major Edmund Tilley
Charles Chamberlain
David Gattiker
George Gordon Young

Soviet Union

General Ivan Ilyichev
Marshal Georgy Zhukov
Boris Chertok
Dr. Georgy Flerov
Dr. Igor Kurchatov
Pavel V. Oleynikov
L. D. Riabev

Other:

Czech sources
(e.g., Karel Staller)
Dutch sources (e.g.,
Anthony van der Steenhoven)
French sources
(e.g., Jacques Bergier)
Polish sources
(e.g., Gezo Mansfeldt)
Swedish sources
(e.g., Nils Werner Larsson)

Axis

Adolf Hitler
Hermann Göring
Heinrich Himmler
Wilhelm Ohnesorge
Benito Mussolini
Grand Mufti of Jerusalem
Erwin Bartmann
Helmut J. Fischer
Werner Grothmann
Julius Schaub
Werner Wächter
Manfred von Ardenne
Dr. Wernher von Braun
Dr. Kurt Diebner
Dr. Robert Döpel
Dr. Rudolf Edse
Dr. Siegfried Flügge
Dr. Wilhelm Groth
Dr. Otto Hahn
Dr. Fritz Houtermans
Dr. Johannes Hans Jensen
Dr. Fritz Rehbein
Dr. Erich Schumann
Dr. Hermann Staudinger
Dr. Georg Stetter
Heinz Stölzel
Dr. Walter Trinks
Dr. Wilhelm Voss
General Walter Dornberger
General Gerhard Franz
General Hans Kammler
General Heinrich Kittel
Erwin Respondek
Hans Ulrich Rudel
Adolf Schneider
Alwin Urff

15. Some Well-Informed People Who Concluded That the German Nuclear Weapons Program Was Not Small and Primitive

<u>United States</u>
President Franklin D. Roosevelt
Vice President Henry A. Wallace
Senator Harry F. Byrd
Senator Elbert D. Thomas
Justice Robert H. Jackson
FBI Director J. Edgar Hoover
Secretary Henry H. Fowler
Ambassador John Gunther Dean
General Henry H. Arnold
General Thomas J. Betts
General Omar N. Bradley
General George Bryan Conrad
General Dwight D. Eisenhower
General Leslie R. Groves
General John L. Magruder
General George C. Marshall
General George S. Patton
General Donald L. Putt
General George C. McDonald
General William L. Richardson
General Carl A. Spaatz
Commander Herbert Agar
Colonel Howard W. Dix
Colonel George R. Eckman
Colonel John A. Keck
Colonel John A. O'Mara
Colonel Loyd K. Pepple
General Leslie E. Simon
Colonel Lowell P. Weicker
Colonel George Bryant Woods
Major Horace K. Calvert
Major Alexander de Seversky
Major Robert R. Furman
Captain George C. Davis
Jack H. Alberti
Moe Berg

<u>United States (cont'd)</u>
William Casey
Allen Dulles
Frederick R. Loofbourow
Whitney Shepardson
Dr. Samuel K. Allison
Dr. Edward L. Bowles (MIT)
Dr. Karl P. Cohen
Dr. Enrico Fermi
Dr. Richard P. Fischer
Dr. Samuel A. Goudsmit
Caperton B. Horsley
Dr. Gerard P. Kuiper
Dr. Philip Morrison
Dr. Lothar W. Nordheim
Dr. Todos M. Odarenko
Dr. J. Robert Oppenheimer
Dr. Charles P. Smyth
Dr. Leo Szilard
Dr. Edward Teller
Dr. Alvin M. Weinberg
Dr. Eugene P. Wigner
Fritz Lang
Associated Press reporters
Life reporters
Los Angeles Times reporters
Newsweek reporters
New York Times reporters
Time reporters
Washington Post reporters

<u>United Kingdom</u>
Sir Winston Churchill
Sir Roy Fedden
Sir Reginald Patrick Linstead
Lord Robert Gilbert Vansittart
Lord John Moore-Brabazon
Esme Bligh, Earl of Darnley
Major Edmund Tilley
Charles Chamberlain
David Gattiker
George Gordon Young

<u>Soviet Union</u>
General Ivan Ilyichev
Marshal Georgy Zhukov
Boris Chertok
Dr. Georgy Flerov
Dr. Igor Kurchatov
Pavel V. Oleynikov
L. D. Riabev

<u>Other:</u>
Czech sources (e.g., Karel Staller)
Dutch sources (e.g., Anthony van der Steenhoven)
French sources (e.g., Jacques Bergier)
Polish sources (e.g., Gezo Mansfeldt)
Swedish sources (e.g., Nils Werner Larsson)
Swiss sources (e.g., Constantin Chilowsky)

<u>Axis</u>
Adolf Hitler
Hermann Göring
Heinrich Himmler
Wilhelm Ohnesorge
Benito Mussolini
Grand Mufti of Jerusalem
Erwin Bartmann
Helmut J. Fischer
Werner Grothmann
Julius Schaub
Werner Wächter
Manfred von Ardenne
Dr. Wernher von Braun
Dr. Kurt Diebner
Dr. Robert Döpel
Dr. Rudolf Edse
Dr. Siegfried Flügge
Dr. Wilhelm Groth
Dr. Otto Hahn
Dr. Fritz Houtermans
Dr. Johannes Hans Jensen
Dr. Fritz Rehbein
Dr. Erich Schumann
Dr. Hermann Staudinger
Dr. Georg Stetter
Heinz Stölzel
Dr. Walter Trinks
Dr. Wilhelm Voss
General Walter Dornberger
General Gerhard Franz
General Hans Kammler
General Heinrich Kittel
Erwin Respondek
Hans Ulrich Rudel
Adolf Schneider
Alwin Urff

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- **Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.**

- **Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.**

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- **Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.**
- **Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.**
- **Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.**

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- **Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.**
- **Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.**
- **Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.**
- **Employing tens of thousands of workers in multiple plants to enrich uranium.**

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- **Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.**
- **Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.**
- **Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.**
- **Employing tens of thousands of workers in multiple plants to enrich uranium.**
- **Building numerous dedicated power plants to provide electricity to those facilities.**

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- **Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.**
- **Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.**
- **Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.**
- **Employing tens of thousands of workers in multiple plants to enrich uranium.**
- **Building numerous dedicated power plants to provide electricity to those facilities.**
- **Producing heavy water at at least ~27 sites all over German-controlled Europe.**

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.
- Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.
- Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.
- Employing tens of thousands of workers in multiple plants to enrich uranium.
- Building numerous dedicated power plants to provide electricity to those facilities.
- Producing heavy water at at least ~27 sites all over German-controlled Europe.
- Producing enormous quantities of many other materials (beryllium, fluorine, calcium, zirconium, cadmium, etc.) that are vital for a nuclear weapons program, in some cases all at the same site.

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- **Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.**
- **Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.**
- **Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.**
- **Employing tens of thousands of workers in multiple plants to enrich uranium.**
- **Building numerous dedicated power plants to provide electricity to those facilities.**
- **Producing heavy water at at least ~27 sites all over German-controlled Europe.**
- **Producing enormous quantities of many other materials (beryllium, fluorine, calcium, zirconium, cadmium, etc.) that are vital for a nuclear weapons program, in some cases all at the same site.**
- **Building large, partially underground octagonal pool fission reactors that are visible from wartime aerial surveillance photos and described in site reports.**

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- **Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.**
- **Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.**
- **Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.**
- **Employing tens of thousands of workers in multiple plants to enrich uranium.**
- **Building numerous dedicated power plants to provide electricity to those facilities.**
- **Producing heavy water at at least ~27 sites all over German-controlled Europe.**
- **Producing enormous quantities of many other materials (beryllium, fluorine, calcium, zirconium, cadmium, etc.) that are vital for a nuclear weapons program, in some cases all at the same site.**
- **Building large, partially underground octagonal pool fission reactors that are visible from wartime aerial surveillance photos and described in site reports.**
- **Developing and testing spherical implosion bombs and explosive lenses from 1940 onward.**

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.
- Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.
- Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.
- Employing tens of thousands of workers in multiple plants to enrich uranium.
- Building numerous dedicated power plants to provide electricity to those facilities.
- Producing heavy water at at least ~27 sites all over German-controlled Europe.
- Producing enormous quantities of many other materials (beryllium, fluorine, calcium, zirconium, cadmium, etc.) that are vital for a nuclear weapons program, in some cases all at the same site.
- Building large, partially underground octagonal pool fission reactors that are visible from wartime aerial surveillance photos and described in site reports.
- Developing and testing spherical implosion bombs and explosive lenses from 1940 onward.
- Building and shipping compact high-flux neutron generators suitable for use as neutron initiators in fission bombs.

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.
- Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.
- Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.
- Employing tens of thousands of workers in multiple plants to enrich uranium.
- Building numerous dedicated power plants to provide electricity to those facilities.
- Producing heavy water at at least ~27 sites all over German-controlled Europe.
- Producing enormous quantities of many other materials (beryllium, fluorine, calcium, zirconium, cadmium, etc.) that are vital for a nuclear weapons program, in some cases all at the same site.
- Building large, partially underground octagonal pool fission reactors that are visible from wartime aerial surveillance photos and described in site reports.
- Developing and testing spherical implosion bombs and explosive lenses from 1940 onward.
- Building and shipping compact high-flux neutron generators suitable for use as neutron initiators in fission bombs.
- Conducting large test explosions that are described by numerous sources and visible from wartime aerial photos.

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.
- Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.
- Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.
- Employing tens of thousands of workers in multiple plants to enrich uranium.
- Building numerous dedicated power plants to provide electricity to those facilities.
- Producing heavy water at at least ~27 sites all over German-controlled Europe.
- Producing enormous quantities of many other materials (beryllium, fluorine, calcium, zirconium, cadmium, etc.) that are vital for a nuclear weapons program, in some cases all at the same site.
- Building large, partially underground octagonal pool fission reactors that are visible from wartime aerial surveillance photos and described in site reports.
- Developing and testing spherical implosion bombs and explosive lenses from 1940 onward.
- Building and shipping compact high-flux neutron generators suitable for use as neutron initiators in fission bombs.
- Conducting large test explosions that are described by numerous sources and visible from wartime aerial photos.
- Telling its top officials and leaders of other countries that Germany possessed/would soon possess nuclear weapons.

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.
- Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.
- Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.
- Employing tens of thousands of workers in multiple plants to enrich uranium.
- Building numerous dedicated power plants to provide electricity to those facilities.
- Producing heavy water at at least ~27 sites all over German-controlled Europe.
- Producing enormous quantities of many other materials (beryllium, fluorine, calcium, zirconium, cadmium, etc.) that are vital for a nuclear weapons program, in some cases all at the same site.
- Building large, partially underground octagonal pool fission reactors that are visible from wartime aerial surveillance photos and described in site reports.
- Developing and testing spherical implosion bombs and explosive lenses from 1940 onward.
- Building and shipping compact high-flux neutron generators suitable for use as neutron initiators in fission bombs.
- Conducting large test explosions that are described by numerous sources and visible from wartime aerial photos.
- Telling its top officials and leaders of other countries that Germany possessed/would soon possess nuclear weapons.
- Developing delivery vehicles for those weapons.

15. Conclusions

According to recently rediscovered archival documents, wartime Germany was reported to be:

- **Obtaining thousands of tons of uranium and thorium ores from sites across Europe, beginning in 1938 and continuing as a high priority to the very end of the war.**
- **Processing uranium ore to uranium oxide, uranium metal, UF_6, and other products at at least ~20 sites.**
- **Manufacturing uranium gas centrifuges in factories in Switzerland, Kiel, Freiburg, Göttingen, Munich, Breslau, etc.**
- **Employing tens of thousands of workers in multiple plants to enrich uranium.**
- **Building numerous dedicated power plants to provide electricity to those facilities.**
- **Producing heavy water at at least ~27 sites all over German-controlled Europe.**
- **Producing enormous quantities of many other materials (beryllium, fluorine, calcium, zirconium, cadmium, etc.) that are vital for a nuclear weapons program, in some cases all at the same site.**
- **Building large, partially underground octagonal pool fission reactors that are visible from wartime aerial surveillance photos and described in site reports.**
- **Developing and testing spherical implosion bombs and explosive lenses from 1940 onward.**
- **Building and shipping compact high-flux neutron generators suitable for use as neutron initiators in fission bombs.**
- **Conducting large test explosions that are described by numerous sources and visible from wartime aerial photos.**
- **Telling its top officials and leaders of other countries that Germany possessed/would soon possess nuclear weapons.**
- **Developing delivery vehicles for those weapons.**

If you found thousands of pages of evidence from knowledgeable sources that some modern country suddenly started doing all of those things, would you conclude that that country clearly had no significant nuclear weapons program, or would you decide that all of that evidence raises real concerns and warrants a more detailed investigation?

15. Further Work

The true, detailed, complete history of the wartime German nuclear program has not yet been publicly written by anyone (including me).

15. Further Work

The true, detailed, complete history of the wartime German nuclear program has not yet been publicly written by anyone (including me).

To do that, we must first:

- Search for relevant documents in archives and personal collections around the world, and lobby to have all files declassified and released.

15. Further Work

The true, detailed, complete history of the wartime German nuclear program has not yet been publicly written by anyone (including me).

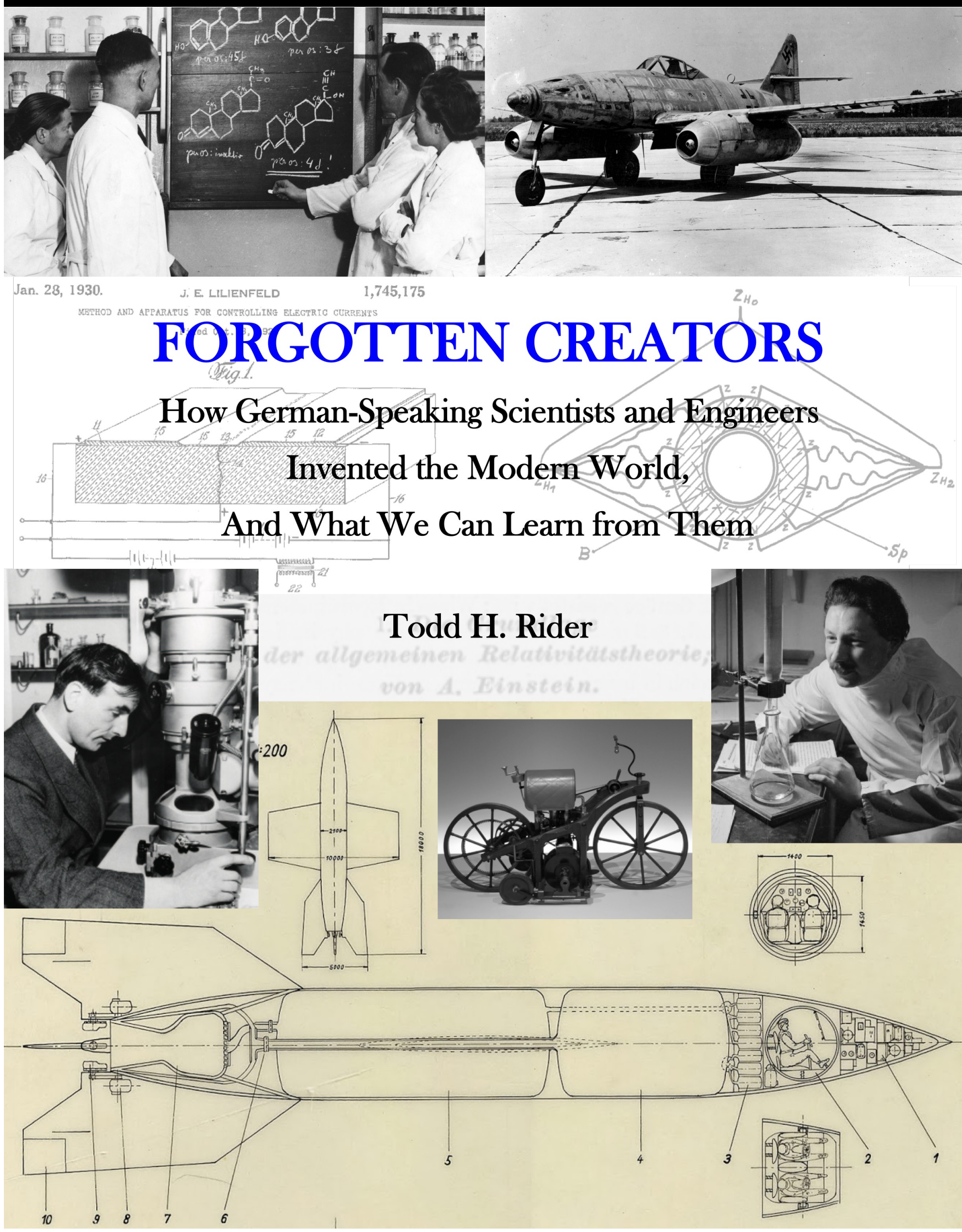
To do that, we must first:

- Search for relevant documents in archives and personal collections around the world, and lobby to have all files declassified and released.

- Conduct industrial archaeology digs (carefully!) and laboratory analyses at all sites suspected to have been involved in the wartime German nuclear program.

riderinstitute.org/revolutionary-innovation

Over 6000 pages including document photos, digitized text, and translations



Slide presentations:

Forgotten Creators of the German Atomic Bomb

Forgotten Creators of the German H-Bomb

Forgotten Creators of the German Nuclear Triad [delivery methods]

Forgotten Creators of German Microelectronics

Forgotten Creators of German Biotechnology

Lessons from the Forgotten Creators

thor@riderinstitute.org

ToddHRider@gmail.com

Some Reviewers' Comments on *Forgotten Creators*

"Todd H. Rider's *Forgotten Creators* is an encyclopedic consideration of Germany's central place in the advancement of science and technology between 1800 and 1945. Drawing upon a wide range of sources, Rider has summarized that effort in a survey that will impress the reader just as much for the breadth of German intellectual achievement as for the influence that achievement has had upon the modern world."

George W. Cully, retired Director, Office of History at Air University, Maxwell Air Force Base, Alabama

"Todd H. Rider's *Forgotten Creators* is a monumental treatise about and an exciting intellectual journey through the contributions of scientists and technologists in Germany and other Central European countries and German-speaking areas to universal progress. It is thoroughly researched, meticulously documented, and presented in an easy-to-perceive way. The pre-war and pre-Nazi German system of science support has lessons that would be difficult to emulate but worthy to ponder about even today. The long-range tragic consequences in science caused by National Socialism are well demonstrated as are the benefits in the West and in the East from the exodus of Jewish scientists before and the importation of others from Germany following World War II. The book is a virtually bottomless well for mining reliable information in the history of science and technology. The 'forgotten creators' are no longer forgotten. Todd is to be congratulated for his accomplishment and thanked for sharing it so generously with the international community."

István Hargittai, Professor Emeritus of Chemistry, Budapest University of Technology and Economics, author of *Buried Glory, Candid Science, Drive and Curiosity, Great Minds, Judging Edward Teller, Martians of Science,* and *The Road to Stockholm*

"The book *Forgotten Creators* is a really impressive book, as Todd H. Rider tries to mention all relevant German-speaking scientists and engineers and their scientific fields up to 1945 in this mammoth project. In this form, nobody has dared to do this before. The author deserves my full respect for this. I am pleased that we were able to support him in his research."

Thomas Köhler, Peenemünde Historical-Technical Museum historian and head of the archive

"*Forgotten Creators* is an examination of mid-twentieth-century German science and technology, studying the question of how this era came to be so productive. Using extensive reproduction of original materials and source accounts, the author is not only able to provide an overview of what is known about wartime activities, but is also able to indicate avenues for future historical research. The careful and comprehensive referencing permits the materials presented to be used in academic studies. A notable feature of this work is the fluid format provided by online publication, allowing revisions and new materials to be added. An especially important emphasis of the book is what can be learned from both the German-speaking scientists and the World War II era in general that could improve scientific productivity and creativity now."

Thomas Kunkle, Los Alamos National Laboratory, retired

"With his work, based on very comprehensive, thoroughly researched sources, Todd Rider has presented an astonishing study of the history of German science, especially in the first half of the twentieth century, which also reveals many connections that have been unjustly forgotten or little noticed. This also applies to numerous persons whose achievements are hardly known."

Günter Nagel, author of *Wissenschaft für den Krieg, Himmlers Waffenforscher, Atomversuche in Deutschland,* and *Das geheime deutsche Uranprojekt 1939-1945*

"A very valuable part of the book is devoted to the development of nuclear weapons in Germany during WWII, 1939-1945. While the histories of both the US/British Manhattan Project and the Soviet atomic project have been to a large extent declassified, little is actually known about the German work. Rider has done historians a favor by marshalling all of the evidence he could find in US, German, and Russian archives regarding the German atomic project. The inescapable conclusion is that the Germans were much farther advanced in nuclear weapons development than is generally thought."

Lee Pondrom, Professor Emeritus of Physics, University of Wisconsin-Madison, author of *The Soviet Atomic Project: How the Soviet Union Obtained the Atomic Bomb*

"*Forgotten Creators* by Todd Rider is an extraordinary work of detailed research and new insights into the technological advances contributed by German-speaking scientists. His lengthy and in-depth study of history often overlooked or not even seen in more cursory reviews is a refreshing read. His attempt to create the fullest account possible has resulted in a fine reference book that also serves to introduce new research for the reader. Rider's contention, right up front in the Executive Summary—that inventions and discoveries had their highest concentration of revolutionary innovations from scientists and engineers from the German-speaking central European research world in the nineteenth and early twentieth centuries—demands the reader's attention. He then fills an enormous amount of over 4,000 pages with supporting details. Amazing subject matter and new revolutionary insights dug up through meticulous research make *Forgotten Creators* a 'must read' for serious historians and curious researchers alike."

D. Ray Smith, Oak Ridge National Lab Historian, retired

"This truly voluminous study provides an in-depth overview of techno-scientific achievements and innovations which originated from the German-speaking world. It is a rich and fascinating history of the transnational circulation of knowledge over a period of no less than two centuries."

Helmuth Trischler, Head of Research, Deutsches Museum, Munich

"A most important and deserving book. Todd Rider's research on the German rocket and nuclear programs in World War II is especially impressive because of the number and depth of the sources cited and the meticulousness of their evaluation. Really pioneering work has been done here!"

Matthias Uhl, Deutsches Historisches Institut, Moscow, author of *Stalins V-2: Der Technologietransfer der deutschen Fernlenkwaffentechnik* and *Die Organisation des Terrors: Der Dienstkalender Heinrich Himmlers 1943-1945*

"Todd Rider has produced a meticulously researched and cogently argued *tour de force* on the men and the circumstances that drove the modern German Renaissance in science and technology. Brought out of the long shadow of the Third Reich, the story of this Golden Age of human enquiry is convincingly shown to have as much relevance to our present times as it did then. A remarkable achievement."

Stephen Walton, Senior Curator, U.K. Imperial War Museum

Dr. Todd H. Rider riderinstitute.org

Fundamental Limitations on Plasma Fusion Systems Not in Thermodynamic Equilibrium

by

Todd Harrison Rider

S.M., Nuclear Engineering, MIT, 1994
S.M., Electrical Engineering and Computer Science, MIT, 1991
S.B., Electrical Engineering, MIT, 1991

Submitted to the Department of Electrical Engineering and Computer Science in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June 1995

© Todd Harrison Rider 1995

The author hereby grants to MIT permission to reproduce and to distribute publicly paper and electronic copies of this thesis document in whole or in part.

Signature of Author
Department of Electrical Engineering and Computer Science
May 19, 1995

Certified by
Lawrence M. Lidsky
Professor of Nuclear Engineering
Thesis Supervisor

Accepted by
Frederic R. Morgenthaler
Chairman, Department Committee on Graduate Students

Fundamental Constraints on Large-Scale Antimatter Rocket Propulsion

Todd H. Rider

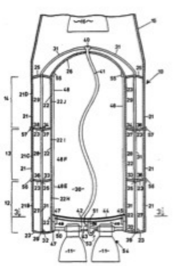
A B Cell–Based Sensor for Rapid Identification of Pathogens

Broad-Spectrum Antiviral Therapeutics

Fundamental limitations on plasma fusion systems not in thermodynamic equilibrium

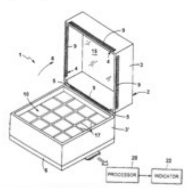
United States Patent Rider — Patent Number: 4,723,736 — Date of Patent: Feb. 9, 1988

ROCKET STAGING SYSTEM



United States Patent Rider — Patent Number: 6,087,114 — Date of Patent: Jul. 11, 2000

OPTOELECTRONIC SENSOR



United States Patent Rider — Patent No.: US 7,566,694 B2 — Date of Patent: *Jul. 28, 2009

ANTI-PATHOGEN TREATMENTS

Relativistic Quantum Field Theory

Todd H. Rider thor@riderinstitute.org 13 November 2019

Any suggestions for improvements would be greatly appreciated.

Three quarks for Muster Mark!

–James Joyce, *Finnegans Wake (1939)*

I think I can safely say that nobody understands quantum mechanics.

–Richard Feynman, *The Character of Physical Law* (1965)

Overview

Relativistic quantum field theory (or field theory, for short) combines special relativity, which describes very fast things, and quantum mechanics, which describes very small things. The resulting theory correctly predicts the behavior of fundamental particles, which are small and often move at high speeds (or are in bound states with relativistic energies). A "toy theory" of spinless particles will be used to first introduce some of the basic techniques and results of field theory, since the spin of real particles makes calculations more complicated. Field theory will then be applied in succession to each of the four fundamental forces. Quantum electrodynamics is a field theory describing the electromagnetic force; it is relevant to phenomena such as Compton scattering and electron-positron annihilation. The field theory of the weak nuclear force describes phenomena such as the decay of neutrons (beta decay) and muons. Quantum chromodynamics describes the strong nuclear force and thus is relevant to the behavior of the quarks that compose particles like protons, neutrons, and pions. Finally, it will be shown that general relativity is equivalent to applying field theory to gravitation, although there remain obstacles to developing a complete quantum theory of gravity.

Biochemistry

1

Todd H. Rider thor@riderinstitute.org 13 November 2019

Any suggestions for improvements would be greatly appreciated.

Near the further end a low arched passage branched away from it and led to the chemical laboratory. This was a lofty chamber, lined and littered with countless bottles. Broad, low tables were scattered about, which bristled with retorts, test-tubes, and little Bunsen lamps, with their blue flickering flames. There was only one student in the room, who was bending over a distant table absorbed in his work. At the sound of our steps he glanced round and sprang to his feet with a cry of pleasure. "I've found it! I've found it," he shouted to my companion, running towards us with a test-tube in his hand. "I have found a re-agent which is precipitated by hoemoglobin, and by nothing else." Had he discovered a gold mine, greater delight could not have shone upon his features.

"Dr. Watson, Mr. Sherlock Holmes," said Stamford, introducing us.

–Arthur Conan Doyle, *A Study in Scarlet* (1887)

"It was all done that evening and night. While I was still sitting under the sickly, drowsy influence of the drugs that decolourise blood, there came a repeated knocking at the door... It was my landlord, with a notice of ejectment or something... For a moment he gaped. Then he gave a sort of inarticulate cry, dropped candle and writ together, and went blundering down the dark passage to the stairs... I shall never forget that dawn, and the strange horror of seeing that my hands had become as clouded glass, and watching them grow clearer and thinner as the day went by, until at last I could see the sickly disorder of my room through them, though I closed my transparent eyelids. My limbs became glassy, the bones and arteries faded, vanished, and the little white nerves went last. I gritted my teeth and stayed there to the end. At last only the dead tips of the fingernails remained, pallid and white, and the brown stain of some acid upon my fingers... I went and stared at nothing in my shaving-glass, at nothing save where an attenuated pigment still remained behind the retina of my eyes, fainter than mist. I had to hang on to the table and press my forehead against the glass. It was only by a frantic effort of will that I dragged myself back to the apparatus and completed the process."

–Griffin, in H. G. Wells' *The Invisible Man* (1897)

Overview

Biochemistry covers the chemical molecules and reactions that are important in biology. Most biological molecules fall into five categories: (1) nucleic acids such as deoxyribonucleic acid (DNA), ribonucleic acid (RNA), and their component nucleotides; (2) proteins and their component amino acids; (3) lipids such as fatty acids, triglycerides, and cholesterol; (4) carbohydrates such as simple sugars and various polymers composed of them; and (5) iron- or magnesium-containing porphyrins in hemoglobin, chlorophyll, etc. Most biochemical reactions have many steps, each of which is catalyzed by different enzymes, proteins that act as specialized molecular machines to greatly speed up and control reactions. Some major types of biochemical reactions include the synthesis (production) or catabolism (degradation) of proteins, nucleic acids, lipids, carbohydrates, and porphyrins. Other important biochemical reactions include respiration, in which energy is produced by combining hydrogen from biomolecules with oxygen from the air to form water; fermentation, in which smaller amounts of energy are extracted from biomolecules without oxygen; and photosynthesis, basically respiration run in reverse so that light energy is absorbed and stored by splitting water into more oxygen for the air and more hydrogen in biomolecules.

Fluid Mechanics and Aerodynamics

Todd H. Rider thor@riderinstitute.org 13 November 2019

Any suggestions for improvements would be greatly appreciated.

On aircraft:

"There is as much pressure exerted by a substance against the air as by the air against the substance.

"Observe how the beating of its wings against the air suffices to bear up the weight of the eagle in the highly rarefied air which borders on the fiery element! Observe also how the air moving over the sea, beaten back by the bellying sails, causes the heavily laden ship to glide onwards!

"So that by adducing and expounding the reasons of these things you may be able to realize that man when he has great wings attached to him, by exerting his strength against the resistance of the air and conquering it, is enabled to subdue it and to raise himself upon it."

On parachutes:

"If a man have a tent made of linen of which the apertures have all been stopped up, and it be twelve braccia across and twelve in depth, he will be able to throw himself down from any great height without sustaining any injury."

On helicopters:

"I find that if this instrument made with a screw be well made–that is to say, made of linen of which the pores are stopped up with starch–and be turned swiftly, the said screw will make its spiral in the air and it will rise high."

Advice for test pilots:

"This machine should be tried over a lake, and you should carry a long wineskin as a girdle so that in case you fall you will not be drowned."

–Leonardo da Vinci, *The Notebooks* (ca. 1500)

Overview

Fluid mechanics and aerodynamics concerns the motion of liquids and gases or their interactions with objects such as pipes or aircraft. One fundamental factor affecting how to model the behavior of a fluid is whether the fluid is compressible, or in other words whether its density changes significantly when its pressure its increased. Another fundamental factor is viscosity, or whether the particles of the fluid seem to stick to each other and pull on each other. Therefore, it is most convenient to divide models of fluid behavior into four categories: (1) incompressible, inviscid fluids, (2) incompressible viscous fluids, (3) compressible inviscid fluids, and (4) compressible viscous fluids. Important applications of fluid mechanics include the design of ships and submarines, as well as helicopters, airplanes, parachutes, and spacecraft reentering the atmosphere. Other applications include fluids in pipes and lubricants in machinery, pressure and circulation in the ocean and atmosphere, and sound waves and shock waves.